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Authors' Contribution:

A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

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Abstract

Background: The purpose of the research was to check opinions of students of various stages of education in the Pomeranian province about the attractiveness of Nordic Walking in comparison with other activities.

Material/Methods: About 500 intentionally selected students participated in the survey. These were students of 11-18 years of age. Half of them participated in Nordic walking PE lessons. The researched students' schools were localized in the Pomeranian province in Poland. Methods of a diagnostic survey using two questionnaires were applied. The first one was used to assess the level of students' physical activity and was also used to research health behaviours of children and adolescents in Europe (HBSC). The second one – our own – was created to assess the attractiveness of Nordic walking. In the first part, the subjects ranked Nordic walking in comparison with other forms of physical activity. In the second part, they declared eagerness to attend such lessons.

Results: The collected data imply a vast diversity of students' opinions about the attractiveness of Nordic walking in comparison with other forms of physical activity and indicate the need to do research in the area of students' preferences in planning PE lessons at school.

Conclusions: It seems that in subsequent years of education, NW will gain followers among this group because it is a natural form of movement, whose health effects are starting to be seen not only by teachers but also by students.

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Introduction

More and more scientific reports confirm the claim that physical inactivity is one of the most important public health problems of the 21st century [1]. The level of physical activity meeting biological and health needs is the most commonly cited key component of a healthy lifestyle [2]. A number of studies [3] show that the elevated risk of mortality affects physically inactive people, regardless of their degree of obesity. The level of physical activity among children and adolescents is of particular importance. It stimulates the motor, somatic, psychological and social development. It is also assumed that regular physical activity during the school period is an important predictor of similar behaviors in adulthood [4, 5].

Looking for the optimal level of physical activity, experts from many countries usually take into account the total duration and the intensity of physical effort undertaken in everyday life. Combined effort of at least moderate intensity, lasting not less than 60 minutes a day has been adopted as the optimal level for children and adolescents. According to studies, the recommended level of physical activity is not reached by 43% to 88% of teenagers in various European countries [6].

Evaluation of Polish teenagers' health behaviors, including physical activity, also does not allow drawing optimistic conclusions. An international study, Health Behavior in School-aged Children (HBSC) indicates a low level of physical activity in school children [7]. Also the percentage of children with a reduced level of physical fitness increases [8].

The team working on the report from the HBSC study [9] point out that sedentary behavior in free time is an extremely dangerous competitor for physical activity. Its excess in the time budget of children and youth is one of the causes of many health problems. Immobility results in increasing incidence of overweight and obesity. In Poland, overweight affects almost 17% of children and adolescents aged 6-19 years [10].

In member countries of the European Union a number of initiatives have been undertaken in order to reduce the number of obese and inactive children. These relate, among others, to organization of work of the school as well as the quality of physical education.

Justifying the importance of good physical education, Masurier and Corbin [11] show that it is commercially viable, that it is an ally in fighting obesity, that it assists the development of life-long physical fitness, that it supports the system of universal education of children, that it gives children unique opportunities to "stay active", that it promotes a desire to learn, that it teaches self-organization and develops motor skills. The authors conclude that physical education, playing the above-mentioned roles, is widely appreciated, and, quoting Park [12], they add that the 21st century marks the transition of the profession of a physical education teacher from the position of "a second-rate specialist" to "a first-rate professional."

With this in view, does, and if so what new and original, PE bring to life of modern school? According to Zuchora [13], the school should keep pace with the students' development, and the teachers' important task is to listen carefully to children and young people's needs. We know, however, that school reality still departs from these assumptions.

In recent years, the media as well as the results of the Supreme Audit Office inspection point to multifaceted weaknesses of school physical education, which is expressed in numerous notes from doctors, absenteeism and insufficient physical activity.

Research conducted in many European countries [14] has shown that the forms of physical activity offered to students in physical education classes are less attractive than those available outside school. In addition, it is still mainly the teacher that decides on the content of the class.

A study of Polish students in school years 2007-2009 [15] confirmed that absenteeism in PE classes increased at particular stages of education: in elementary schools (4th-6th grade) – about 13%, in junior high schools – about 24% and in senior high schools – about 36%. Surveys among pupils showed that nearly one third of senior high school pupils and a fifth of elementary and junior high school pupils found PE classes uninteresting. The students pointed out the lack of a diversified offer in PE classes.

Pupils in Polish schools have very limited choices of content of physical activity in physical education classes. This hinders implementation of one of the most important tasks of the PE – choosing "sports for lifetime" and preparing to practice them after graduation. Recent changes in

the Polish educational system facilitated searching for an optimal organizational model of PE. The regulation on the permissible forms of mandatory physical education classes is conducive to better adaptation of the school offer to students' varied capabilities and needs. This is a chance which teachers should not waste [16].

Observing contemporary trends in the area of physical recreation, one can notice an increased interest in Nordic walking (NW). The popularity of this discipline primarily stems from its simplicity, as it combines a natural gait with an active use of poles. Its main advantages also include its outdoor nature [17]. The main objective of applying this motor system is to involve muscles unused during a standard gait, while maintaining a high intensity of exercise and a perceived subjectively low level of fatigue. NW may be cultivated at three levels of proficiency. The health level is recommended to those who wish to remain physically fit and improve their well-being. It is ideal for beginners and for persons with mobility problems caused by disorders of the spine, hip, knee and ankle joints, as well as diabetes, obesity and cardiovascular diseases. It is also permitted to pregnant women. The fitness level is for intermediate persons who wish to improve their overall efficiency and are looking for new solutions. The sports level involves mountain training, running and jumping on different substrate with high intensity, and it is individually planned [18].

The form of physical activity initially aimed mostly for the elderly today is found in the school physical education curricula, supporting its implementation. It is especially recommended to students with breathing, metabolic and movement apparatus problems who are unable to participate fully in accomplishing the PE curriculum [19]. Analysis of the literature shows a lack of comprehensive information on the popularity of Nordic walking among children and youth. Is it a form of activity which has a chance to raise the attractiveness and effectiveness of PE classes and to adapt them to the students' individual needs? These are the questions that the authors are attempting to answer in the present research.

Aim and the research problem

The aim of the study was to find out students' opinions on the attractiveness of Nordic walking compared to other physical activities available at school. In addition, the purpose of the study was to clarify the specific determinants of these opinions. In this regard, the following research questions have been formulated:

1. Is NW is an attractive form of physical activity during the obligatory and optional in-school classes as well as out of school?
2. Is the attractiveness of Nordic walking dependent on gender, age, attitude to physical education and the level of physical activity?

Material and methods

The method of a diagnostic survey using two questionnaires was applied in the study. The first, original one, was related to the attractiveness of Nordic walking. Subjects created a ranking of available forms of physical activity with regard to their attractiveness. The list of forms of physical activity was created with a use of the method of competent judges, who have indicated the most common sports at school. Competent judges were a group of physical education teachers with at least 10 years' experience and a high degree of career development. Based on their opinion, a list of eleven sports popular at school was compiled and then supplemented with Nordic walking. In the questionnaire the forms of physical activity were listed alphabetically, and NW was placed in the fifth position. The second questionnaire regarded an evaluation of the level of students' physical activity and attitudes to physical education. It was prepared on the basis of the questions included in the HBSC questionnaire, which is used in studies of students' health behaviors.

Students from 5 deliberately selected Tricity schools participated in the study. Three schools in which students participate in Nordic walking classes and two in which they do not have such a possibility were chosen for the purpose of the research. Due to the location of the school, there is a possibility to practice Nordic walking in all the surveyed schools. Opinions of 446 pupils were

collected, among whom there were: 52% of girls and 48% of boys, 24% of students from senior grades of elementary school, 35% from junior high school and 41% from senior high school.

In the light of the subjects' declarations, 77% of them willingly participate in PE classes, 30% belong to sports clubs, 37% are physically active at the level recommended by the WHO. Every fourth surveyed student participated in Nordic walking classes.

Results

The ranking of the attractiveness of disciplines comprised 12 different forms of activity with which the subjects may come into contact during physical education classes. Students ranked them from 1 (the most attractive form of physical activity) to 12 (the least attractive one). The higher the mean value of the ranking, the lower this discipline was put on the list, that is, in the students' opinion it was less attractive. The mean ranking value of NW was 8.43 (SD = 3.25). NW took 12th place among the disciplines and appeared to be the least attractive.

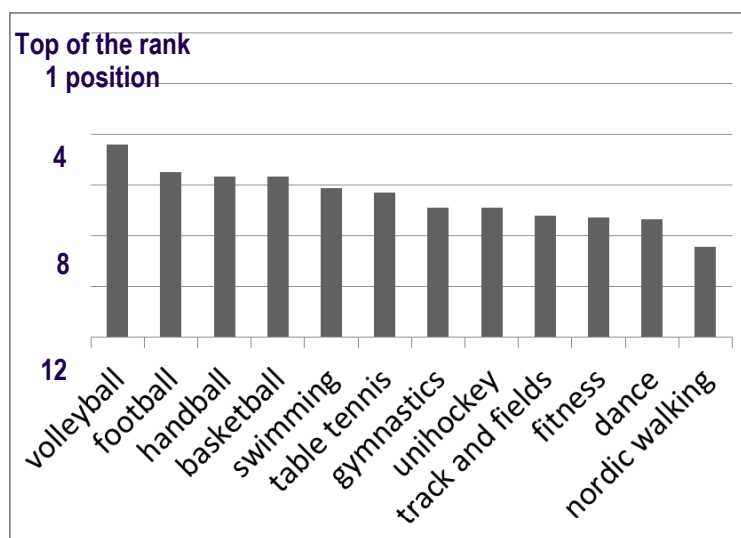


Fig. 1. The mean ranking of attractiveness

Table 1. NW ranking and selected psychosocial and demographic factors

| | Mean ranking | SD | t | p |
|--|--------------|------|------|-------|
| Girls | 7.87 | 3.06 | | |
| Boys | 9.01 | 2.73 | 4.13 | 0.000 |
| The students willingly participating in physical education classes | 8.64 | 2.89 | | |
| Students reluctantly participating in physical education classes | 7.61 | 3.10 | 2.98 | 0.003 |
| Physically inactive students | 7.91 | 3.21 | | |
| Physically active students | 8.77 | 2.60 | 2.37 | 0.003 |
| Students being members of a sports club | 8.98 | 2.47 | | |
| Students not being members of a sports club | 8.19 | 3.10 | 2.61 | 0.009 |
| Students who have not had contact with NW | 8.79 | 2.66 | | |
| Students participating in NW classes | 7.31 | 3.49 | 4.68 | 0.000 |

The value of standard deviation indicates a large diversity of students' opinions. Various groups of students ranked NW slightly differently.

As follows from the analysis of the collected empirical material, schoolgirls assessed the attractiveness of this form of sport higher than schoolboys (significance at $p = 0.000$). Pupils willingly participating in physical education classes ranked NW lower compared to a group of

school pupils declaring participation in lessons because, as they claimed, "they had to" (significance at $p = 0.003$). Students who had been physically active in the last seven days prior to the survey rated the attractiveness of NW lower than pupils not taking up physical activity during this period (significance at $p = 0.003$). In a group of students – sportsmen, NW received a lower ranking than among students who were not members of sports clubs (significance at $p = 0.009$). People walking with poles gave NW a higher rank than persons not having contact with this form of activity (significance at $p = 0.000$). The pupils' age did not differentiate their opinions on the attractiveness of NW. The mean score at various stages of education varied from 8.16 to 8.77.

Table 2. A comparison of the significance of differences in the attractiveness of NW at elementary school, junior high school and senior high school.

| Facility type | | Kruskal-Wallis Test |
|--------------------|--------------------|---------------------|
| Elementary school | Junior high school | 0.035516 |
| Elementary school | Senior high school | 1.330831 |
| Junior high school | Senior high school | 1.527163 |

To compare the significance of differences of NW attractiveness in each type of school, a non-parametric test was used, which revealed that there were no statistically significant differences between the three groups. To assess the relevance, the Kruskal-Wallis Test was applied (Table 2) due to the scale used to evaluate the attractiveness of different forms of activity.

Table 3. Comparison of students having NW in PE lessons with those not having such classes

| | | U Mann-Whitney Test |
|---|--|---------------------|
| Students who did not practice NW in classes (N=110) | Students who practiced NW in classes (N=336) | 0.000190 |

Due to the scale used to evaluate attractiveness, which is not a continuous scale, the U Mann-Whitney Test was used to compare two non-parametric samples. An analysis of the data presented in Table 3 revealed statistical significance differentiating both these groups.

In answer to the question, "Which sports would you like to play in different types of activities?", respondents chose four disciplines from the list of twelve activities. In total, 13% of students indicated NW as an attractive activity in physical education lessons. Interest in NW grew to 16% for extracurricular classes conducted at school, and every fifth subject chose NW as an interesting activity but conducted outside the school, in his spare time.

In all three types of the aforesaid activities, schoolgirls chose NW more often than boys. This form of activity during a lesson of physical education was chosen by 19% of girls and 6% of boys. During optional classes conducted at school, 21% of girls declared a wish to practice this form of physical activity, and 11% of boys. Nearly every fourth girl and every fifth boy considered NW walking as an interesting form of movement during an activity conducted outside school. Research indicates that students are more likely to choose NW as a preferred form of activity during their leisure time than school classes, especially PE classes.

Students who do not like physical education more often chose NW as one of the four disciplines which they would like to practice during physical education lessons, extracurricular activities and outside school. Every tenth person keen on physical education and every fifth person in the group of those students who do not like physical education chose Nordic walking as a preferred form in the classroom. 25% of students who declared distaste for physical education lessons would like to practice Nordic walking during optional classes, and nearly 23% during leisure-time activities. In the group of students who like school physical education, 20% chose NW as an interesting form of recreation, and 14% would like to see such activities take place at school as extracurricular classes.

NW was more often selected by students not practicing sports; this referred to both physical education lessons, optional classes, and those organized by themselves in their free time. Every

12th pupil practicing sport and every seventh student not practicing sports chose physical education classes based on the NW form. In optional classes 14% of sports men and 17% of inactive students declared a wish to participate in NW classes. In out-of-school classes 14% of athletes and 24% of students who were not members of sports clubs chose this form of activity. The study has shown that student athletes prefer more intense forms of physical activity both in physical education classes and in extracurricular and after-school classes.

Persons participating in NW activities in all kinds of classes are more likely to choose this form of physical activity than students who have not previously met with this form of sport. During lessons of physical education from among students having previous contact with NW, almost 25% of the subjects would want to continue a similar program. Over 26% in this group would like to deal with this form of activity in classes outside the school, while only 12% of pupils not walking with poles would choose this kind of activity. Among people with no experience of NW close to 20% of the subjects declared that they would like to try walking with poles.

Discussion

Few researchers have studied the issue of interest in Nordic walking in school physical education. This results from the fact that NW is a relatively new sports discipline and is usually associated with a form intended for the elderly. It is an activity that can be enjoyed both individually and as a team.

The obvious civilization progress and the dynamics of life have resulted in an increased interest in lifestyle whose contents represents values, behavior, and attitude focused on improving and protecting health. This behavior, called health behavior, belongs to the most important, controllable and modifiable health-related factors of the individual and the society [20].

Today's youth experience associated with taking up physical activity should be continuously extended with new offers of physical activity forms. This activity is a key component of complex behaviors necessary for the proper development of a young body. In the light of the above, physical education programs at school are enriched ever to a greater extent with health education content and activities arising from them. Thematic diversity in schools curricula, next to team games, gymnastics, swimming, table tennis, athletics, dance, and floorball, includes NW as an alternative form of physical activity during mandatory and non-mandatory PE classes. Contemporary scientific reports attest to the positive impact of NW in the sphere of exercisers' psychomotricity [21, 22], thus confirming the validity of wider popularization of such activities in schools. NW is a proposal of an optimum form of physical activity outdoors improving fitness in children and youth, and a proposal for leisure activities. It has been proven that Nordic walking, as a form of health and recreational improvement, increases the capabilities of the cardiopulmonary and respiratory system even by 22% comparing to non-exercising persons [23].

One of the measures of energy consumption during various physical activities is MET. This unit is equivalent to the consumption of 1 kilocalorie per kilogram of body weight within an hour [24]. Assuming that a march with poles will be at a pace of 8 km/h, the energy consumption will be of 7 MET. In the light of the above, the latest studies confirm that NW stimulates processes connected with an accelerated reduction in body fat. Mommert-Jauch's study [25] has shown that, while maintaining a rational diet and regular NW activity of appropriate intensity and volume adjusted to age, participants of the experiment lost about 2.5 kg of body weight. A tendency to sedentary lifestyle at school, limited only to a short march during one inter-class break, makes the cells, tissues and organs use up glycogen stored in muscles. There is no reduction of the fat tissue as a result of lack of activity of enzymes responsible for fats oxidation [26]. It is worth promoting NW as an alternative form of physical activity that involves over 90% of the muscles of the whole body [27]. The results of own research have shown little interest in NW among school children and adolescents.

In students' opinion, physical education enjoys great popularity. From Cillik et al.'s research [28] it appears that among senior high school pupils 70% of girls and 39.2% boys like PE lessons, while 22.1% girls and as many as 53.3% boys declare that they like them very much. Among the most-enjoyed forms of physical activity during PE lessons 71.7% boys list team games. These raise

a slightly less interest among girls, since only 21.7% of them believe them to be the most interesting form of activity. Alfut et al. [29] achieved similar results of students' survey on PE.

Literature survey that the authors of the present article conducted for the sake of this research did not provide data allowing the comparison of the achieved results with other authors' results, due to the pioneering nature of the study regarding the attractiveness of NW among students from the second to the fourth stage of education.

It seems that in subsequent years of education, NW will gain followers among this group because it is a natural form of movement, whose health effects are starting to be seen not only by teachers but also by students.

Conclusions

- 1) NW is a form of movement of little attractiveness in school physical education.
- 2) NW is more attractive for students who are less physically active and do not belong to any sports clubs.
- 3) NW is a more attractive form during extracurricular or after-school classes than at PE lessons.
- 4) NW at physical education lessons is appealing to every fifth female student and every twentieth male student.
- 5) NW is an attractive form for every fifth student who does not like PE and every fifth student who is little active physically.
- 6) NW is an attractive form of extracurricular activity for every fifth female student and every tenth male student.
- 7) NW is an interesting sport for every fourth pupil who does not like PE and for every sixth student with an inadequate dose of weekly physical activity.

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