Central European Journal of Sport Sciences and Medicine | Vol. 43, No. 3/2023: 15–23
ISSN (print): 2300-9705 | ISSN (online): 2353-2807 | DOI: 10.18276/cej.2023.3-02

STUDENT ATTITUDES 2015–2023 TOWARDS THE USE OF MODERN TECHNOLOGY TO MEASURE THEIR OWN PHYSICAL ACTIVITY

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Abstract Physical activity is one of the important pillars helping to maintain well-being and health. The aim of the article was to try to identify the directions of changes in students' attitudes towards physical activity between 2015 and 2023, including the aspect of monitoring movement and exercise using modern technologies. The article presents research conducted on a group of 180 students of physical education and tourism and recreation. The declared physical activity of the students was analysed, along with the need to monitor movement using electronic devices. A shortened version of the International Physical Activity Questionnaire (IPAQ) was used as the research tool. The questionnaire was modified by adding questions on monitoring physical activity. Analysis of the results shows that the declared physical activity has changed over the analysed time period. In 2015, an average of 74.5% of the students in the studied faculties declared their activity as high, while in 2023, 38.5% of the students did so. In 2015, an average of 25.5% of the students surveyed declared their physical activity, while in 2023, an average activity was declared by 20% of the students surveyed. Low activity was declared by 1% in 2015 and by an average of 41.5% of students in 2023. There was no determinant effect of the gender of the surveyed students on the level of physical activity. An increase in the number of students using modern technology to monitor their own physical activity was found over the analysed time period.

Key words: physical activity, IPAQ, modern technology, sports students, tourism and leisure students

Introduction

Physical activity is an activity that should accompany a person throughout life. Movement and activity also have their place in situations of illness, e.g. as one element of rehabilitation. It helps to maintain and even improve health. An important aspect of physical activity is also its relation to the education of children, adolescents and, more broadly, society as a whole by accompanying it throughout its life with a hedonistic effect on humans (Nowak et al., 2019).

In recent years, there have been significant changes in the way people live. We are witnessing changing social and economic patterns around the world (Boon et al., 2010). In terms of physical activity, sedentary lifestyles have become dominant and this is a worldwide phenomenon (Knuth, et al., 2010). These changes are due, among other things, to the development of technology. The pandemic has significantly affected many aspects of life, including lifestyle and physical activity habits. In view of the negative trends also observed in the health status of students, it seems necessary to pay attention to their lifestyle, including physical activity levels. Research on physical activity undertaken by students was conducted, among others, at Lviv University in Ukraine. There, it was found that better

results in terms of physical activity undertaking were observed in male students than in female students (Bergier et al., 2017). Other authors found that male and female students with higher levels of physical activity declared higher levels of quality of life (Pavlova et al., 2017). On the other hand, a Turkish researcher found that students studying physical education at T.C. Hitit University declared a higher quality of life, taking into account, among other things, the physical sphere, than students of other majors studying at this university (Çiçek, 2018). Further research in this regard therefore seems justified (Gruzieva et al., 2018).

Research on physical activity takes on particular importance after the long period associated with the pandemic, which introduced various restrictions including mobility and social isolation. Young people, who have always been one of the most active groups in society, have been negatively affected by the social isolation associated with the pandemic. Children and young people are spending more and more time in front of computer screens, mobile phones without leaving home in their free time (Ridley, 2018). This behaviour leads to a reduction in physical activity and thus has a negative impact on health. This trend has affected all active people including students.

There are now many ways to monitor physical activity. For this reason, children and young people are increasingly turning to modern technology to help them measure their own physical activity. One of the most popular is the use of mobile apps to track workout results, calories burned during exercise and other physical activity-related parameters. Apps installed on phones allow people to monitor their progress and communicate with other app users, which can help keep them motivated to be active. Their popularity is due to the fact that smartphones are very common among young people. Another way to monitor physical activity is by using dedicated devices such as smartwatches or fitness bands (Nadobnik, 2018). These devices can function independently and can also be used to monitor sleep quality. In recent years, interest in healthy lifestyles and physical activity has increased (Villas-Boas, 2019). This phenomenon has been particularly evident among young people, who have become increasingly aware of the benefits of regular exercise and taking care of their bodies and, therefore, their well-being (Núñez-Rocha, et al., 2020). In this context, the post-pandemic studies, which have certainly left a strong mark on social behaviour, may seem interesting.

Purpose of the research

The aim of the research conducted was to attempt to determine the attitudes of University of Szczecin students of physical education and tourism and recreation towards physical activity over the period 2015–2023. An interesting aspect of the research was to determine the influence of the type of major and gender on the level of activity and the respondents' willingness to use electronic devices to monitor their own physical activity.

A hypothesis was formulated, pandemic time adversely affected students' physical activity levels. It was considered that physical education students would be more likely to undertake physical activity than tourism and recreation students. The time of the pandemic forced students, among other things, to study remotely, so modern technologies became essential for functioning in the spheres of learning, culture, socialising, etc. For this reason, students regardless of their field of study will also be interested in technological opportunities after the pandemic, including those for monitoring physical activity.

Material and Methods

Several instruments are available to measure physical activity, including different versions of self-report questionnaires, direct observation, telemetry heart rate measurement, motion sensors and others (Montoye, et al.,

1996). Unfortunately, each of these methods has its limitations (Welk, 2002). There is currently no ideal or best solution (Terwee, et al., 2010). Recently, motion sensors for measuring physical activity have been strongly gaining popularity (Freedson & Miller, 2000), mainly due to their measurement accuracy, relatively low price and small size.

The International Physical Activity Questionnaire (IPAQ) was developed in 1998 to standardise and develop a global standard for measuring human physical activity (Craig, et al., 2003). Since then, the IPAQ has become the most widely used physical activity questionnaire (van Poppel MNM, at.al., 2010), with two versions: The 31-item form (IPAQ-LF) and the 9-item short form (IPAQ-SF). The short form records activity of four levels of intensity: 1) high-intensity activity such as aerobics, 2) moderate-intensity activity such as cycling, 3) walking and 4) sitting.

The study used the Polish version of the IPAQ (Biernat et al., 2007, 2008). The questionnaire was supplemented by adding questions on the issue of monitoring physical activity using modern technology. This article presents the results of a study conducted in 2015 and in 2023 on a group of students of physical education and tourism and recreation at the University of Szczecin. In 2015, the study group consisted of 80 students, while in 2023 the study group consisted of 100 students. The limited size of the respondents was due to the relatively small number of students studying these subjects. It was assumed that the need for physical activity of students undertaking the above-mentioned majors may be more related to the choice of profession and interests of the future job, in which physical activity will play a dominant role. The information obtained was statistically analysed using Excel 2010 spreadsheet and STATISTICA 12.

Results

Self-assessment of physical activity refers to how an individual assesses their own level of physical activity. It is a subjective assessment made by the individual based on their own experiences and observations. The IPAQ scale divides physical activity into three categories, depending on duration and intensity (Biernat, 2007): low-intensity activities, such as walking, which last at least 10 minutes per day; moderate-intensity activities, such as brisk walking, cycling, dancing, fitness, which last at least 10 minutes per day; and high-intensity activities, such as running, jumping, aerobics, which last at least 10 minutes per day.

A total of 180 people participated in the surveys. The first survey took place in 2015, while the second survey took place in 2023. Basic information on the students surveyed is presented in Table 1.

Table 1. Basic information on surveyed students - descriptive statistics

Year of research	N	M	Me	σ	SKE	K	Min	Max
2015	80	23.92	22	5.68	2.92	11.49	18	55
2023	100	21.97	21	3.42	2.83	10.39	18	40

Legend: N – number of subjects, M – mean , Me – median, σ – standard deviation, SKE – skewness, K – kurtosis, Min – minimum, Max – maximum

Source: own study.

The average age of the students surveyed in 2015 was 23.92 years, while in 2023 the average age was 21.97 years. The median age of the students surveyed in 2015 was 22 years, while in 2023 the median age was 21 years. The standard deviation of the students' ages in 2015 was 5.68 and in 2023 the standard deviation was 3.42, indicating greater age variability for the 2015 group than for the latter group (2023). The calculated SKE and K

indicate a larger number of younger students in 2023 compared to the students surveyed in 2015. Basic information related to the gender breakdown of the study subjects is presented in Table 2.

Table 2. Table of N numbers by gender of the surveyed students of physical education (PE) and tourism and recreation (TR)

	Year of research			Year of research	
Gender and field of study	2015	2023	Gender and field of study	2015	2023
F P.E.	15	25	F T.R.	24	23
M P.E.	27	38	M T.R.	14	14

Legend: F P.E. – female P.E. students, M P.E. – male P.E. students, F T.R. – female TR students, M T.R. – male TR students, K – female, M – male

Source: own elaboration.

The 2015 study group consisted of 39 females and 41 males, while in 2023, 48 females and 52 males participated in the study. The distribution of numbers (N) of the different age groups of students surveyed is shown in Table 3.

Table 3. Numbers of students surveyed in 2015 and in 2023

Year of survey	2015		2023	
Age of respondents (years)	N	Percentage of respondents [%]	N	Percentage of respondents [%]
x ≤ 20	15	18.75	34	34.00
20 < x ≤ 25	49	61.25	58	58.00
25 < x ≤ 30	8	10.00	5	5.00
30 < x ≤ 35	4	5.00	1	1.00
x > 35	4	5.00	2	2.00
	K-S d = 0.257, p < 0.01; Lilliefors p < 0.01; Shapiro-Wilk W = 0.702, p = 0.000		K-S d = 0.241, p < 0.01; Lilliefors p < 0.01; Shapiro-Wilk W = 0.720, p = 0.000	

Source: own elaboration.

The research found that the largest group was students aged 20–25. In 2015, this age group comprised 61.25% (N = 49) while in 2023, 58% (N = 58) of respondents were in this age group. The second group in terms of numbers were students under the age of 20. In 2015, they accounted for 18.75% of the respondents (N = 15), while in 2023, the group of students under 20 years of age accounted for 34% (N = 34). The age distributions of the students surveyed do not follow a near normal distribution (2015 Shapiro-Wilk W = 0.702, p = 0.000; 2023 Shapiro-Wilk W = 0.720, p = 0.000).

Basic information on the declared physical activity of physical education and tourism and recreation students is presented in Figure 1.

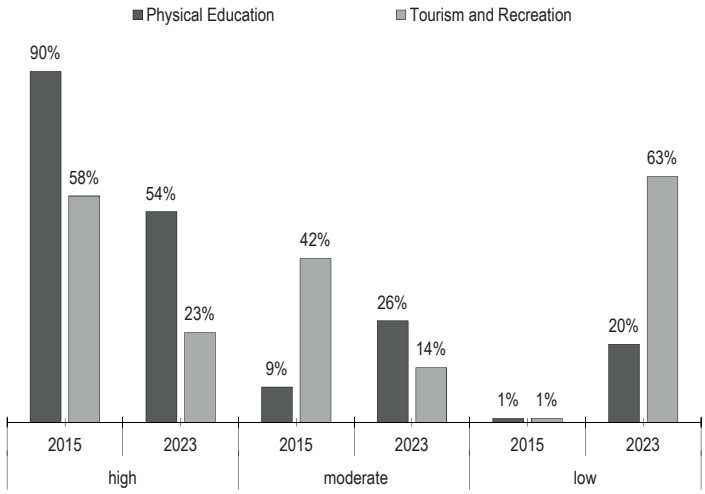

Figure 1. Students [%] declaring physical activity levels in 2015 and in 2023.
Source: own elaboration.

In the 2015, an average of 73.5% of the students in the studied subjects declared their physical activity at a high intensity level, while in 2023, 38.5% of students indicated such activity. In the 2015, medium physical activity was declared on average by 25.5% of the students surveyed, while in 2023, medium activity was declared by 20% of the students. Low activity in 2015 was declared by 1% and in 2023 by an average of 41.5% of respondents. The detailed data obtained shows a high rate of change. In 2015, 90% of the surveyed physical education students declared high activity, while the value of this activity decreased to 54% in 2023. A decrease in the number of students declaring high physical activity was also recorded for tourism and recreation students – here a change was observed from 58% to 23% of respondents. A change was also noted in the case of students describing their activity as low. In 2015, 1% of both physical education and tourism and recreation students described their physical activity as low. However, in 2023, analysis of the survey information indicated that 20% of physical education students and 63% of tourism and recreation students described their physical activity as low.

For those declaring moderate physical activity, the number of physical education students increased from 9% in 2015 to 26% in 2023. For tourism and recreation students declaring a moderate level of physical activity, it decreased from 42% in 2015 to 14% in 2023.

Analysis of the study variables was performed using the Independence χ^2 Test for p-value with an assumed $p < 0.05$. The results of these analyses are presented in Table 4.

Table 4. Independence χ^2 test for variables: field of study, gender, year of study, level of declared physical activity, use of physical activity monitoring devices.

Year of research	P.E. course of study	Variables tested	The result of independence χ^2 test
2015	Women Men	Gender and level of physical activity	The result is not significant at $p < 0.05$
2023	Women Men	Gender and level of physical activity	The result is not significant at $p < 0.05$
Year of research	T.R. course of study	Variables tested	The result of independence χ^2 test
2015	Women Men	Gender and level of physical activity	The result is not significant at $p < 0.05$
2023	Women Men	Gender and level of physical activity	The result is not significant at $p < 0.05$
Year of research	P.E. course of study	Variables tested	The result of independence χ^2 test
2015	Women Men	Gender and the use of physical activity monitoring devices	The result is not significant at $p < 0.05$
2023	Women Men	Gender and the use of physical activity monitoring devices	The result is not significant at $p < 0.05$
Year of research	T.R. course of study	Variables tested	The result of independence χ^2 test
2015	Women Men	Gender and the use of physical activity monitoring devices	The result is not significant at $p < 0.05$
2023	Women Men	Gender and the use of physical activity monitoring devices	The result is not significant at $p < 0.05$
Year of research	Course of study	Variables tested	The result of independence χ^2 test
2015	P.E. T.R.	Course of study and physical activity levels	**The result is significant at $p < 0.05$**
2023	P.E. T.R.	Course of study and physical activity levels	**The result is significant at $p < 0.05$**

Source: own elaboration.

The Independence χ^2 test showed that the gender of the physical education students did not determine the respondents' declaration of physical activity levels in both 2015 (p-value = 0.500) and 2023 (p-value = 0.381). A similar lack of gender determination when declaring physical activity levels was observed for tourism and recreation students in both 2015 (p-value = 0.984) and 2023 (p-value = 0.249). For physical education students, gender did not determine the use of self-monitoring devices for physical activity in both 2015 (p-value = 0.340) and 2023 (p-value = 0.758). A lack of gender determination for activity monitoring was also observed for tourism and recreation students in 2015 (p-value = 0.723) and in 2023 (p-value = 0.443). The Independence χ^2 test showed the determination of the field of study on the declared level of physical activity in both 2015 (p-value < 0.000) and 2023 (p-value < 0.000).

Discussion

The study has shown that over the last few years, there have been significant changes in students' attitudes towards physical activity, recreation, and active leisure time. Students of Physical Education and Tourism and Recreation, due to the specificity of their chosen educational profile, should be characterised by high physical activity, while due to their young age – also openness to new technologies, especially electronic and IT technologies (Nadobnik & Eider, 2015). The study conducted showed that most participants had positive attitudes towards

physical activity. However, many of them stated that they did not have enough time for regular physical activity due to their workload, studies and other responsibilities. The literature suggests that the use of modern technology is associated with more positive attitudes towards physical activity (Mynarski et al., 2013). Nowadays, young people spend more and more time in front of screens, which often leads to a lack of movement and low physical activity. Fear of failure or criticism - some young people fear failure or criticism from others - can lead to a reluctance to try new forms of activity.

The research conducted indicates that among the students surveyed who declared their activity level to be low, interest in monitoring their activity was as high as that of more active students. The analyses of the results showed that the use of modern technology to monitor their own physical activity by students in the study fields analysed increased on average from 16 per cent in comparison with 2015 to 100 per cent in 2023. In 2015, 22 per cent of the surveyed Physical Education students used modern technologies to monitor their own physical activity, while at the same time 10 per cent of the surveyed tourism and recreation students used electronic devices. In 2023, 100% of the students in the surveyed majors declared using technology during their physical activity.

The pandemic resulted in the closure of schools, sports clubs and fitness centres, which affected young people's access to places where they could play sport. Due to the closure of schools, young people have been forced to study remotely, which has involved long periods of time spent in front of a computer or smartphone screen. This, among other things, has resulted in a decrease in physical activity for young people and an increase in time spent sitting. The analysis of the data obtained also showed a change in the declared level of physical activity among the students of the studied faculties. This change consisted largely of a significant decrease in the number declaring a high level of physical activity. An increase in the number of modern technology users using physical activity monitoring devices was found. This increase was also observed among those declaring their own physical activity at a low level.

The pandemic and the associated restrictions have reminded people of the importance of looking after their health and fitness. Many people are beginning to realise that physical activity doesn't have to be about working out in a gym or doing a strenuous workout. There are many other ways to keep fit, such as jogging, yoga, swimming or dancing (Ridley, 2018). It is worth remembering that regular physical activity is important for maintaining physical and mental health, so it is worth making it a regular part of your lifestyle (Richard et al., 2021).

Changes in students' attitudes towards physical activity before and after the pandemic are still under investigation, but trends in young people's appreciation of the importance of physical activity for physical and mental health and general well-being, among other things, have already been described (Kotarska et al., 2021). The time between the studies coincided with a period associated with pandemic restrictions, which is likely to have had a direct and strong impact on young people's physical activity.

The advantages of physical activity monitoring are numerous. They allow you to determine your progress in your sport and achieve your goals. In this way, you can effectively adapt your training and diet to your needs, which can lead to better results. Monitoring physical activity can help reduce the risk of injury, as you can avoid overloading your body and plan for adequate recovery, and can help maintain motivation and prevent energy dips during training.

Monitoring physical activity is just one of many ways to look after health and fitness. Adequate nutrition, regular check-ups and rest and recovery are equally important. All these elements together form a holistic approach to health and ensure a long and healthy life (Salahuddin, 2012). Excessive use of modern technology, especially

video games and social media, can lead to a sedentary lifestyle and reduced time spent on physical activity. This can lead to health problems such as obesity, heart disease and diabetes. It is important that young people learn to use modern technology in a healthy and moderate way, while encouraging physical activity. This can be done through the use of fitness apps that motivate regular workouts while also setting a limit on the amount of time they can use electronic devices. It is also worth encouraging young people to engage in outdoor physical activity, such as cycling, running or playing football, in order to avoid a sedentary lifestyle and enrich their lives with movement and physical activity. The results of the study suggest that pandemic time may have an impact on the reduction of physical activity in the study group of students, with an increased interest in monitoring physical activity.

Monitoring your own physical activity can have many benefits for your health and fitness. It can have a positive impact on maintaining motivation, adapting training and diet to one's needs and reducing the risk of injury. With a variety of ways to monitor physical activity, everyone can find the best way to control their training (Nadobnik, 2019). The results of the study indicate significant changes over the last few years in students' attitudes towards spending time actively and changes towards the use of modern technology to measure their own physical activity. Those declaring themselves to be inactive were also keen to monitor their progress regarding activity and movement.

Conclusions

1. The number of students declaring low levels of physical activity increased.
2. Statistically significant differences were found between the field of study and declared physical activity.
3. There was no significant effect of gender on the declared level of physical activity.
4. The number of students using technological devices to monitor their own physical activity increased.
5. There was no significant effect of gender and field of study on willingness to use devices to monitor physical activity levels.

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Cite this article as: Nadobnik, J. (2023). Student Attitudes 2015–2023 Towards the Use of Modern Technology to Measure their Own Physical Activity. *Central European Journal of Sport Sciences and Medicine*, *3*(43), 15–23, https://doi.org/10.18276/cej.2023.3-02