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Politechnika Opolska
Wydział Wychowania Fizycznego i Fizjoterapii
ul. Prószkowska 76
45-758 Opole
budynek nr 9 p. 23
www.jpe-health.pwsz.raciborz.edu.pl
jpe_health@onet.eu

Administrative editor: Katarzyna Kasowska, Piotr Mucha
Technical editor: Janusz Krajewski
Correction: Rachael Sumner

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ICT USE IMPLICATIONS FOR EXERCISE PARTICIPATION AND HEALTH IN THE NIGERIAN UNIVERSITY COMMUNITY

DOMINIC, Olufunmilola L.[1], SEIDINA, Iliasu Y.[1], Williams, D. F.[2], Oyerinde, O. O.[3], Olaitan 'L.[4], Onifade, O. A.[4]

[1]Department of Human Kinetics Education, University of Ilorin, Ilorin, Nigeria

[2]Department of Clinical Pharmacy and Pharmacy Practice, University of Ilorin, Ilorin, Nigeria

[3]Department of Physical and Health Education, Bayero University, Kano, Nigeria

[4]Department of Health Promotion and Environmental Health Education, University of Ilorin, Ilorin, Nigeria

Abstract

Background: *ICT use encourages deviation from a physically active lifestyle and might surreptitiously become a contemporary contributor to chronic diseases. The study was conducted to examine the extent of ICT use and its implications for exercise participation and health in the Nigerian University Community.*

Methods: *A descriptive survey research design involving permanent members of the University of Ilorin, Nigeria was used. A multistage sampling technique was used to select 767 staff and students with an age range of 15–60 years. The University of Ilorin ethical review committee granted clearance (UERC/ASN/2016/588). The respondents were informed and all signed the informed consent form. A validated questionnaire, "Information and Communication Technology Use and Sedentariness Questionnaire (ICTUSQ)" with reliability (r=.89), was used for data collection. Statistical analyses conducted were frequency, percentage and One-way ANOVA; p≤0.05.*

Result: *The most common types of ICT activities among the Nigerian University Community were: mobile phones calls/texting 91.0% (n=698), online-chats 90.9% (n=697), computer use 69.9% (n=536) and viewing TV/DVD 64.5% (n=495). Due to ICT use, respondents were continuously sedentary for several hours daily. Only 34.8% (n=267) of them participated in the recommended amount of exercise, the majority 81.0% (n=621) reported that they were too busy to exercise. ICT-induced health problems included shoulder pain 60.9% (n=467), thumb pain 68.6% (n=526), fatigue 33.0% (n=253), phone addiction 84.3% (n=646) and anxiety/depression 76.1% (n=544). Irrespective of age, factors that largely determined the extent of ICT use were gender, n=767, F(9, 757)=407.73, p≤0.005; occupation, n=767, F(9, 757)=163.79, p≤0.002; and type of job, n=767, F (9, 757)=639.45, p≤0.003.*

Conclusion: *Excessive ICT use leads to sedentariness and a reduction in the desire to exercise. The accumulated effect might accelerate the risk of cardiometabolic, cardiovascular, physiological and mental disorders. Regular physical activity breaks of at least 5 minutes each hour of continuous ICT use, and the introduction of physical education and sport programmes to inculcate sustainable physical activity culture in the university community is recommended.*

Keywords: *Ergonomic, Exercise, Health, ICT use, Physical activity, Sedentariness*

Introduction

The development of information and communication technology (ICT) has had a considerable effect on human lives. Examples of such ICT devices include digital cameras, game consoles, television, digital video discs (DVD), mobile phones, the computer, internet and mobile devices. The great ease of working, processing information, communicating or relaxing that ICT use has created has changed former lifestyle patterns (Prince et al, 2015). Exposure to ICT and multimedia devices constantly encourage Nigerians to sit down with a greater inclination for comfort that impedes all physical effort and neglects our culture of

physical activity. Most official and commercial buildings now have elevators, more people take flights, and travel in cars even over walkable distances of a few hundred metres (Dominic, Onifade & Lajide, 2010; Hamilton, Hanilton & Zderic, 2007).

In the same vein, Maiyaki and Garbati (2014) have lamented the decline of physical activity among tertiary institution students in Nigeria, but the integration of ICT with advances in life practices tends to divert more people towards sedentariness at a rate that might increase the health challenges of Nigeria through incidences of several forms of chronic diseases among children and adults. The gradual spread of ICT devices spanning from the invention of home computers to laptops, smart phones and other smaller mobile devices have increased access to a vast amount of information coupled with new access to life changing opportunities including innovations in collaborative technology and home grown solutions for Africa in areas like agriculture, climate change, financial services and healthcare delivery services (The World Bank, 2012). Recent information channels include the internet, satellite televisions as well as the Social Networks (SNs) like Facebook, Instagram, Twitter, WhatsApp and LinkedIn (Anderson & DeWolfe, 2003; Rosenbush, 2006). The daily presence of SNs and the related activity of Nigerians, especially young people, is very high. Aside from spending several hours viewing television/DVDs daily, many people who engage in office-based work spend 8 to 10 hours a day sitting behind the desk either working or attending meetings (Adams, 2004; Proper, 2012). This increases the risk of mental overload and stress, which are consequences of high exposure to sedentariness.

Trembley et al (2017) have defined sedentariness as any waking activity characterized by an energy expenditure of ≤1.5 metabolic equivalents of the task (MET) and a sitting or reclining posture. MET is used to quantify energy in multiples that are relative to an individual's resting metabolic rates. An MET is equivalent to the rate of oxygen consumption (VO2) that is approximately 3.5ml of oxygen consumed per kilogram of body weight per minute for an average adult who is sitting down quietly. This implies that an individual performing a physical activity of 3METs has a VO2 that is three times higher than someone who is sitting down quietly. Alternatively, MET can be expressed using slow walking (which has a MET of 2.0), meaning that energy expenditure increases by 2.0 times more than when sitting down quietly (Ainsworth, 2000). The working of MET suggests that energy expended in physical activity is a function of the type and amount of physical exertion involved in a particular activity. Hence, energy expenditure is regarded as a continuum where physical activity (PA) level is classified as sedentary, if PA≤1.5METs; light, if PA>1.5METs but ≤3METs; moderate, if PA>3METs but ≤6METs; and vigorous, if PA>6METs (Trembley et al, 2017).

Meis, Kremers and Bouman, (2012) have reported that sedentary behaviour has been found to be a predictor of weight gain (Wijndaele et al, 2009), type 2 diabetes (Krishnan, Rosenberg, Palmer, 2009), cardiometabolic risk (Healy, 2008; Wijndaele et al, 2009; Dunstan et al, 2010), specific cancers (Howard et al, 2008), cardiovascular diseases (Hamilton, Hamilton & Zderic, 2007), and all-cause mortality and cardiovascular mortality (Inoue et al, 2008; Katzmarzyk, Church, Craig & Bouchard, 2009; Dunstan et al, 2010). Insufficient physical activity and lack of exercise allows easy development of atherosclerosis, damage of cardiac muscles and heart due to increase of pressure on the arteries and restriction of blood flow to the organs. If this condition is heightened, it may result in cardiovascular disease and/or cardiac arrest (Schofield, Quigley & Brown, 2009). In addition, prolonged sitting is associated with the risks of breast cancer and colon cancer, which seem to be more influenced by sitting too much (Colen, 2011), and it has been confirmed that less sitting might prevent 37,000 cases of lung cancer, 30,600 cases of prostate cancer, 12,000 cases of endometrial cancer, and 1,800 cases of ovarian cancer. Despite the reported risks, sedentary lifestyles are increasing not only in developed countries but also in developing countries; the situation is not considered to be significant for public health particularly in Nigeria (Maiyaki & Garbati, 2014) where many people

still consider physical activeness as unnecessary stress.

The use of ICT has some ergonomic implications that have resulted in different types of musculoskeletal disorders among users (Thomee, Dellve, Haresntam & Hagberg, 2010). Most of these disorders, ranging from short term discomfort to chronic conditions, were due to having bad sitting posture, postural hygiene, excess weight, lack of muscular strength and physical activity (Airaksinen et al, 2006). Examples of short term musculoskeletal disorders associated with ICT use include non-specific pains from the neck, shoulders, lower back and upper extremities, fingers and wrist (Airaksinen et al, 2006; Yang, Chen, Huang & Chang, 2016). Repetitive movement of a particular muscle group that is typical to the use of ICT devices could result in chronic conditions known as Carpal Tunnel Syndrome (CTS) (Adeyemi, 2010; Shiri & Falah-Hassani, 2015). Many people in the Nigerian University Community have a higher preference for laptop computers because these have greater power, are portable and innovative. Unfortunately, this has higher implications for the risk of CTS because the screen is married to the keyboard and it is difficult to place both the screen and keyboard at an ideal height. This creates postural problems that mostly affect the upper body.

The International Labour Organization (ILO) (as cited in Adeyemi, 2010) has noted that the ergonomic problems of most workers in developing countries like Nigeria are not given a high priority among occupational health and safety considerations. This could be attributed to poor employee welfare and general lack of awareness among employers and ICT users. ICT use has an implication for the communities of higher learning where a number of academic and administrative tasks are carried out using ICT. In addition, ICT causes electromagnetic hypersensitivity with the visual display unit affecting the skin and eyes which become strained after staring at the screen for a long time. The use of a small keyboard on a mobile phone has been reported by Themee, et al. (2010) to cause musculoskeletal symptoms and pain in the thumbs, hands, back and neck, a condition he describes as Texting Tendonitis (TT). Other physiological symptoms include headaches, earaches, sensations of warmth and fatigue (Thomee et al, 2010). Most people assume awkward postures that cause them to hunch/flex their head, neck and upper back down towards their devices (Muscolino, 2012). The worst of these postures are associated with the use of mobile devices.

Most Nigerians tend to be inactive and sit during their leisure time due to use of various ICT devices, most of which now have amazingly advanced features that make them more attractive to users. In fact, Martin (2011) has noted that electronic screen use (such as watching television/DVDs, computer use, video games and portable devices) are the most common leisure activities in developing as well as many industrialized countries. Of course, the use of ICT affords individuals a very easy way to enjoy their leisure time. Most people have been reported to spend excessive time on ICT use; and several children exceed the recommended maximum of two hours a day of screen use for leisure (Thomee et al, 2010) which might lead to avoidable negative health consequences. Addo, et al. (2015) and Aladeniyi et al. (2017) have pointed out that leisure sitting time was associated with overweight and obesity. Similarly, Brown, Williams, Ford, Ball and Doboson (2005) have also observed that there is weight gain among females with increased sitting time. They explained that “women who sat for more than 4½ hours daily were more likely to have increase in weight by over 5kg within 5 years”. Sedentary time increases the incidence of higher cholesterol, fasting insulin, weight problems, obesity and increases the risk of premature death. Dominic, et al. (2010) and Silva, et al. (2018) have observed that one of the four common causes of chronic diseases such as heart disease, stroke, cancer, diabetes, obesity and arthritis is a lack of physical activity.

The continual increasing sophistication of ICT devices makes it possible for users to work from anywhere, such as at home, in vehicles and other places with many of them finding it difficult to separate work from their private lives. This is a situation that causes role stress, role conflict and overload, technological stress, sleep disturbance

and problems, low mood, a sense of loneliness, depression and frustration for most individuals whose work is largely ICT based (Thomee et al, 2010). Heightened stress resulting from higher levels of computer dependency as obtained in the Nigerian University Community can lead to increased blood pressure, heart attacks and other chronic diseases.

ICT use and Internet dependence in childhood, youth or adulthood has been associated with increasing depressive symptoms (Martin, 2011; Thomee et al, 2010). There is irrefutable evidence that being physically active later in life depends on an individual's ability to feel confident in an activity setting. This type of confidence most often comes from having learned fundamental movement and sport skills, or physical literacy, as a child. This is necessary for school physical education, academic and recreational sports programmes and integrating physical activity and an ergonomic conscious lifestyle for sustainable educational development.

Research has also shown that without the development of physical exercise literacy, many children and young people withdraw from physical activity and sport and turn to more inactive and/or unhealthy choices during their leisure time (Silva et al, 2018). This has an implication for sustainable physical education and sport programmes in tertiary institutions' communities since they are the sole producers of skilled manpower in Nigeria. While integration of ICT into most schedules of the University system in Nigeria has been rapid, there is scant information regarding its influence on the physical activity and heath of members. It is well established that while health remains an inevitable determinant of productivity among members of any community, physical activity and exercise are a major facilitator for health and wellbeing. Therefore, the objective of this study was to examine the extent of ICT use in our university community and its implication for sustainable physical activity and sport programmes to inculcate a healthy lifestyle and wellbeing among students, staff and all community members.

Research Methodology

The research design was a descriptive survey involving all the permanent members of the University of Ilorin, Nigeria. Out of 823 that were sampled, only 93.2% (n=767) respondents participated in the study. The rest did not complete the instrument properly and were excluded. Multistage sampling techniques that comprised of stratified, proportionate (10%) and random sampling were used. Participants were stratified and randomly selected based on occupations which consisted of 84.2% (n=646) students, 12.4% (n=95) university staff and 3.3% (n=26) staff of private organizations. Regarding gender, 60.2% (n=462) were male and 39.8% (n=305) were female. Their age ranged from 15 to 60 years with a frequency distribution of 15-19 years (35.2%, n=270), 20-24 years (30.8%, n=236), 25–29 years (16.4%, n=162), 30–34 years (6.0%, n=46), 35–39 years (2.5%, n=19), 40–45 years (3.4%, n=26) and 45–60 years (5.7%, n=44). The respondents engaged in different types of job that involved ICT use. Their job description showed that there were 82.9% (n=636) students, 4.6% (n=35) typists, 4.6% (n=23) lecturers, 2.9% (n=22) computer analysts, 2.9% (n=22) bankers, 2.3% (n=18) self-employed and 1.4% (n=11) accountants. The University of Ilorin ethical review committee granted clearance for the study (UERC/ASN/2016/588). The respondents were adequately informed and all signed the informed consent form.

A validated questionnaire, "Information and Communication Technology Use and Sedentariness Questionnaire (ICTUSQ)" with reliability coefficient (r=.89), was used for data collection. The questionnaire was divided into sections A and B. Section A focused on respondents' demographic data such as gender, age, occupation and type of job, while section B focused on self-reported ICT behaviours that were rated using a four-point likert type rating (strongly agree, agree, disagree and strongly disagree) scale. The instrument was validated for both face and content validity while the reliability was ascertained using the test retest method. The data generated via instrumentation was regrouped into positive responses (strongly

agree + agree) and negative responses (disagree + strongly disagree) and was analysed using frequency count and percentage for the demographic data and answering of the research questions. The inferential statistic of One-way analysis of variance (ANOVA) was used to analyse the hypotheses at a 0.05 alpha level. For variables where differences occurred, the effect size was calculated to ascertain the magnitude of difference. The SPPS 20.0-version application software was used for the statistical analyses.

Results

Table 1. Descriptive Analysis of the Participants' ICT Use, Preferences to Exercise and Induced Health Problems

S/N	Indicators	Positive Response n (%)	Negative Response n (%)
	Common Type of ICT Activities of the Participants		
1	Viewing TV/DVD	495 (64.5)	272 (35.4)
2	Telephone calls/texting	698 (91.0)	69 (9.0)
3	chatting online	697 (90.9)	70 (9.2)
4	Using computer	536 (69.9)	231 (30.1)
5	**ICT Use and Prolonged Sitting Hours**		
6	Continuous sitting at the computer for at least 4hours daily	546 (71.2)	221 (28.8)
7	Leisure time TV/DVD sitting or at least 3hours	459 (59.9)	308 (40.2)
8	ICT induced sitting on Saturday for at least 3hours	350 (45.6)	417 (54.4)
9	ICT induced sitting on Sundays for at least 3hours	345 (45.0)	422 (55.0)
	ICT Use and Desire to Participate in Physical Exercise		
10	ICT use is more comfortable than physical exercise	325 (42.3)	442 (57.6)
11	Too busy to exercise but able to find time for ICT use	621 (81.0)	146 (19.0)
12	No work place regulation regarding physical exercise and ICT use	404 (52.6)	363 (47.4)
13	Participate in 3-5 times weekly exercise of 30 - 40 mins/day	267 (34.8)	500 (65.2)
	Common ICT Use Induced Physiological/Musculoskeletal Disorders		
14	Neck Pain	311 (40.5)	456 (59.5)
15	Upper back Pain	295 (34.4)	472 (51.5)
16	Shoulder Pain	467 (60.9)	300 (39.1)
17	Pain in the thumb	526(68.6)	241 (31.4)
18	Fatigues	253 (33.0)	514 (67.0)
19	Ear warmth	591 (77.0)	176 (22.9)
20	Eye strain	503 (65.5)	264 (34.4)
21	High preference for consumption high energy foods during ICT use	452 (58.9)	415 (41.1)
22	Difficulty in positioning of laptop & mobile phone at suitable height for the user	620 (80.8)	147 (19.2)
	Common ICT Use Induced Mental Disorders		
23	Mobile phone addiction	646 (84.3)	121 (15.8)
24	Neglect of body Signals for Personal needs	654 (85.3)	113 (14.7)
25	Anxiety and depression	544 (76.1)	183 (23.9)
26	Information overload	618 (80.5)	149 (19.4)

The results in table 1 were sub-divided into five sections showing descriptive analysis of the respondents' ICT behaviour, preference for using ICT over exercise and ICT induced health problems. Responses in the first section showed that there were four common type of ICT activities the respondents mainly engaged in. The highest of these was using mobile phones to make calls/send text messages 91.0% (n = 698) of respondents. This was closely followed by chatting online 90.9% (n = 697) of respondents; mobile phones were mainly used for this although some of them used computers or both, especially when it involved sending e-mails or Facebook messages. The next most common activity was using computers 69.9% (n=536) respondents, which was more common among lecturers, bankers, typists and computer operators than among students. The least common was viewing TV/DVD 64.5% (n=495) respondents.

In the second section we investigated whether ICT use induced prolonged sitting among the respondents. It was found that 71.2% (n=546) of the respondents spent not less than 4 hours using ICT, especially on weeks days and 59.9% (n = 459) of them sat for at least 3 hours using TV/DVD during leisure time. They also spent at least 3 hours using ICT during the weekend, more of them on Saturday 45.6% (n=350) than on Sunday 45.0% (n=345).

The third section dealt with a preference for ICT use over exercise especially during leisure time; 65.2% (n=500) of the respondents did not participate in recommended exercise of 30–40 minutes for 3-5 days per week. The majority of them 57.6% (n=442) claimed they prefer exercise to ICT use; however, 81.0% (n=621) reported that they were too busy to exercise, even though they could still find time to use ICT. This is probably because ICT is easy to use and is required a lot for both academic and occupational purposes. In addition, the majority of the respondents 52.6% (n=404) reported that there were no workplace regulation regarding physical exercise and duration of ICT use. Perhaps the respondents were ignorant of the risk associated with sedentariness resulting from prolonged ICT use; or that ICT use reduces the desire to engage in physical exercise.

Table 2. One-Way-ANOVA of ICT Use and Prolonged Sitting Hours

Variable	Model	Sum of Squares	df	Mean Square	F	η
Gender	Regression	152.30	9	16.92	407.73*	0.83
	Residual	31.42	757	42.00		
	Total	183.72	766			
Age	Regression	1988.82	2	220.98	1.22	-
	Residual	137.06	757	181.00		
	Total	2125.87	766			
Occupation	Regression	291.58	9	32.40	163.79*	0.94
	Residual	149.73	757	198.00		
	Total	441.32	766			
Type of Job	Regression	1845.42	9	205.05	639.45*	0.88
	Residual	242.74	757	321.01		
	Total	2088.16	766			

*significant at 0.05 alpha level

The fourth section elicited information on common ICT use inducing physiological/ musculoskeletal disorders. The response showed 80.8% (n=620) had difficulty in positioning there ICT devices - specifically, laptop and mobile phones - without assuming awkward postures. This resulted in disorders like neck pain 40.5% (n=311), upper back pain 34.4% n=295), shoulder pain 60.9% (n=467), pain in the thumb 68.6% (n=526), fatigue 33.0% (n=253), ear warmth 77.0% (n=591), eye strain 65.5% (n=503) and high preference for consumption of high energy foods 58.9%

(n=452), such as carbonated soft drinks, fries and pastries during ICT use.

Findings concerning ICT use inducing mental disorder were reported in the fifth section of the table. Most of them reported mobile phone addiction 84.3% (n=646), neglecting body signals for personal needs 85.3% (n=654) like eating, thirst, physical activity and even using the restroom. They also reported anxiety and depression disorders 76.1% (n=544), which could have resulted from long term ICT addiction.

The result in table 2 shows a one-way ANOVA conducted to examine the difference in ICT use among members of the university community with respect to age, gender, occupation and type of job. No significant difference existed among the respondents' ICT use in terms of age n=767, F (2, 766)=1.22, p≥0.15. This implied that age was not a determinant factor of the extent to which people in the Nigerian University Community used ICT. There was however a significant difference among the respondents when the other factors were considered: gender, n=767, F (9, 757)=407.73, p≤0.005; occupation, n=767, F (9.757)=163.79, p≤0.002; type of job, n=767, F (9, 757)=639.45, p≤0.003. The extent to which this factors exerted differences in the level of ICT use among the respondents was large, η2 values were; gender=.83, occupation=.94 and type of job=.88.

Discussion of Findings

ICT use is highly relevant for effective execution of occupational tasks and other life endeavours. This was largely demonstrated in this study by the extent to which members of the Nigerian University Community used it for several hours during week days and weekends. Confirming the submissions of (Schofield et al, 2009; Martin, 2011), the mostly preferred ICT devices were mobile phones, the computer and TV/DVD to satisfy needs like chatting, making calls and relaxing during leisure. The use of ICT influenced their lifestyle towards sedentariness (Adams, 2004; Proper, 2012) as many of them, though agreeing that ICT should not be preferred to exercising actually spent excessive time using ICT without considering exercise during their leisure time, despite the enormous health and fitness benefits that are accruable from regular exercise. Only 34.8% (n=267) of them participated in the recommended amount of exercise. Compared to reports in previous studies (Dominic et al, 2010; Maiyaki & Garbati, 2014), the proportion of those not exercising as recommended was higher among members of this Nigerian University community. This is unexpected considering the fact that the university community is an academic environment where the most educated people in the country are to be found. This suggests a low awareness of the dangers of excessive ICT use or mere negligence of physical activity (Dominic et al, 2010; Hamilton et al, 2007), which predisposes them to a high risk of excessive weight gain, chronic diseases and mortality (Wijndaele et al, 2009, Krishnan et al, 2009; Healy et al, 2008; Healya & Owena, 2010). Therefore, it is blatant that an intervention programme is required to inculcate the culture of physical activeness in the Nigerian university community. If the programme is well executed, it will positively impact on a lifetime of sustainable physical activity, especially among the students on whom the future of Nigeria depends.

ICT use was found to cause physiological and musculoskeletal disorders. The most prevalent of these were pain in the shoulder; pain in the thumb (tendonitis) and ear warmth which are associated with threshold shifts during the duration of long phone calls. According to Thomee et al (2010), these could cause deafness. Similarly, the university community members suffer eyestrain while using the computer or handset, indicated high consumption of energy food while using ICT. Frequent consumption of high energy food among sedentary workers has been well documented to lead to obesity, reduced cardiovascular fitness and increased risk of dying from heart disease (Adam, 2004; Martin, 2011; Schofield et al, 2009). In line with the opinion of Muscolino (2012) that unhealthy posture is largely associated with ICT use, we found that respondents who used laptop and portable devices like mobile phones were mostly affected because it is often difficult to place these devices at the ideal position for their height, hand and

eyes. Most people tend to hunch their backs and slouch their necks downward while using mobile phones or laptops. This is prevalent in the Nigerian University Community as most of the furniture has not been produced with ergonomic considerations (Adeyemi, 2010). This finding indicates a high risk of ICT induced musculoskeletal defects among members of Nigerian University Community.

The sophistication and multitasking features of modern ICT devices has increased its importance to such an extent that many people are becoming ICT addicted. This study revealed that the majority of people in the Nigerian University Community were affected by mental disorders which included ICT addiction, anxiety and depression, and an inability to process information properly for optimal benefits. These mental disorders are linked with sedentariness (Proper, Brown & Owen, 2007; Thomee et al, 2010; Martin, 2011; Olsen, 2012) as well as low productivity and an inability to fulfil one's full potentials, which could have a serious negative economic effect on the whole of Nigeria if many people become affected.

Independent of age, the factors that largely determine the extent of ICT use among members of the Nigerian University Community were gender, occupation and type of job. This implies that ICT-related sedentariness is generally influenced by the purpose for which an individual uses ICT (Adams, 2004; Proper, 2012). Females are generally known to engage in longer duration of sedentariness than males do, hence they exhibit greater risk of potential for chronic cardiometabolic and cardiovascular diseases like weight problems, obesity and high waist circumference (Healy et al, 2008). In fact, these risks increase proportionately with the duration of sedentariness (Colen, 2011). Our study revealed that occupation was the greatest determinant of ICT induced sedentariness followed by job description (type of job) and then, gender.

Although ICT-induced sedentariness may not be immediately harmful, the accumulated effects can accelerate the risk of the identified health problems. This suggests that if those who use ICT a lot are aware and conscious of the time they spend sitting with their ICT devices, they could effectively minimize the risk of these diseases.

Conclusion

The use of ICT is vital to members of the university community in Nigeria. The extent of ICT use was not determined by age but occupation, gender and type of job. Excessive use of ICT in the university community leads to sedentariness and reduction in the desire to engage in physical exercise which might increase the risk of cardiometabolic and cardiovascular diseases. Prolonged ICT use with poor posture resulted in physiological/ musculoskeletal and mental disorders among members of the Nigerian University Community. With awareness and consciousness of ICT use, these problems can be averted. In view of these, we recommend that:

1. Those who depend heavily on ICT use, either at work or for study purposes, should take regular breaks of at least 5 minutes each hour to walk around, climb the stairs and stretch.
2. Ergonomic consideration and physical exercise should be given a high priority at work and school. At home, leisure time should not be spent using ICT alone but combined with exercise.
3. There is a need to introduce special physical education and sports programmes into academia in order to inculcate a sustainable culture of physical activity. This can be achieved through awareness seminars, the repositioning of staff games, university sports and physical education, teacher preparation, and admission and training processes. This would motivate the general public to adopt a life style policy of "moving more, sitting less".

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Correspondence

DOMINIC, Olufunmilola L.
E-mail: lolafunmidom@gmail.com

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AWARENESS OF THE BENEFITS OF GINGER USAGE AMONG STUDENTS OF THE NIGERIAN ARMY SCHOOL OF EDUCATION, SOBI-ILORIN, KWARA STATE

Dominic, Olufunmilola L.[1], Muhammad Abdullahi, M.[2], Seidina, Iliasu Y.[2]

[1]Department of Health, Physical Education and Recreation, University of Cape Coast, Ghana.
[2]Department of Human Kinetics Education, University of Ilorin, Ilorin Nigeria.

Abstract

The objective of this study was to determine the level of awareness concerning the knowledge of the benefits and use of ginger among students of the Nigerian Army School of Education (NASE), Sobi-Ilorin Kwara State. A descriptive survey design was used to elucidate the awareness, knowledge of benefits and practice of ginger usage. The population included all 350 students from NASE, Ilorin. They were purposively selected, with 337 participating in the study. The instrument for data collection was a validated researcher-structured questionnaire. Test retest reliability was conducted and PPMC coefficient (r=0.72) was obtained. Frequency and percentage were used for demographic data while t-test was used for testing the hypotheses at 0.05 alpha level. The result revealed that NASE, Ilorin students were highly aware of the benefits of ginger, 312 (92.6%). There was significant difference between soldiers and officers in; awareness n=337, t (335)=4.94, p<0.001, η2 .007; health benefits n=337, t (335)=2.92, p < 0.004, η2 .002 and performance purposes n=337, t (335)=2.48, p<0.001, η2 .002. It was concluded that the majority of NASE students are aware of ginger, which they mainly consumed in drinks. A further study is necessary to ascertain the size of benefits and the best way ginger usage would enhance the health and job performance of military personnel.

Keywords: *Awareness, Ginger, Health, Performance, Supplements*

Introduction

Ginger, a natural spice, is commonly used among the populace of Nigeria for several purposes. These include its use as a spice, a herbal remedy, for its flavour and for the treatment of different illnesses. Over the last few years, there has been a substantial rise in the use of natural or alternative medicine among adults. These complementary and alternative medicines in the form of dietary supplements and herbal remedies are subscribed to on the premise that they have beneficial effects without advice from a physician (Cohen, Ek & Pan, 2002). Ginger (*Zingiber officinale Roscoe, Zingiberaceae*) has existed for thousands of years and it is one of the most commonly consumed dietary condiments in the world (Surh, Park, Chun, Lee, Lee& Lee, 1999). Ginger contains many bioactive components which are believed to exert a variety of remarkable pharmacological and physiological benefits like treatment of numerous ailments such as colds, nausea, arthritis, muscle pain, migraine, and hypertension (Nicoll & Henein, 2009; Ali, Blunden, Tanira & Nemmar, 2007).

The major producers of Ginger today are China and tropical/subtropical areas in Asia, Brazil, Jamaica and Nigeria (Osabor, Bassey & Umoh, 2015). The ginger plant is approximately 30 - 60 cm tall and is extremely rare to find in the wild. The name ginger is derived from the Middle English *gingivere*, but the term for this spice dates back over 3000 years to the Sanskrit word *srngaveram*, meaning “horn root,” based on its appearance. In Greek, it was called *ziggiberis*, and in Latin, *zinziberi*. The Indians and Chinese are believed to have produced ginger as a tonic root for over 5000 years to treat many ailments, and this plant is now cultivated throughout the humid tropics, with India being the largest producer. Ginger was used as a flavouring agent

long before history was formally recorded (Utuk, 2017).

Ginger was an exceedingly important article of trade and was exported from India to the Roman Empire over 2000 years ago, where it was especially valued for its medicinal properties. It continued to be a highly sought after commodity in Europe even after the fall of the Roman Empire, with Arab merchants controlling the trade in ginger and other spices for centuries. In the thirteenth and fourteenth centuries, the value of a pound of ginger was equivalent to the cost of a sheep. During medieval times, it was imported in preserved form to be used in sweets. Queen Elizabeth I of England is credited with the invention of the gingerbread man, which become popular as a Christmas treat (Ferguson, 2014). Ginger is found virtually in every market in Nigeria, either in dried or fresh form. The plant has a high medicinal and nutritional value. It is cultivated in large quantities by many farmers in the northern part of Nigeria (Kaduna, Benue, Nassarawa, Niger and Gombe). The ginger root is used in Nigeria as herbal medicine and in homes as spice for pap, as soup flavouring and in other delicacies, drinks and treatment for various illness (Utuk, 2017).

At least 115 constituents have been identified by a variety of analytical processes in fresh and dried ginger varieties. Gingerols are the major constituents of fresh ginger; gingerols are found to be lightly reduced in dry ginger, whereas the concentrations of shogaols, which are the major products in gingerol dehydration, are more abundant in dry ginger than in fresh ginger (Jolad, Lantz, Chen, Bates & Timmermann, 2005). Ginger contains at least 14 bioactive compounds, including 4-gingerol, 6-gingerol, 8-gingerol, 10-gingerol, 6-paradol, 14-shogaol, 6-shogaol, 1-dehydro-10-gingerdione, 10-gingerdione, hexahydrocurcumin, tetrahydro–curcumin, gingerenone A, 1,7-bis-(4′ hydroxyl-3′ methoxyphenyl)-5-methoxyhepthan-3-one and methoxy- 10-gingerol (Koh, Kim & Kim, 2009). Scientists have reported that the proportion of each individual component in a sample of ginger depends on the country of origin, commercial processor and whether the ginger is fresh, dried, or processed (Bailey-Shaw et al, 2008; Schwertner, Rios & Pascoe, 2006)

The most common and well-established use of ginger throughout history is utilization in alleviating symptoms like nausea and vomiting. Quimby (2007) and Thompson and Potter (2006) reported via several controlled studies that ginger is generally effective as an antiemetic (drug that controls vomiting and nausea). The effectiveness of ginger as an antiemetic has been attributed to its carminative (an herb or preparation that prevent gas formation) effect, which helps to break up and expel intestinal gas. This idea was supported by the results of a randomized, double-blind trial in which healthy volunteers reported that ginger effectively accelerated gastric emptying and stimulated antral contractions (Wu, Rayner & Chuah, 2008). Ginger root contains a very high level (3.85 mmol/100g) of total antioxidants, surpassed only by pomegranate and some types of berries (Halvorsen, 2002). Topic et al (2002) reported that ginger reduced age-related oxidative stress and ethanol induced hepatotoxicity (chemically-driven liver damage). The work of El-Sharaky, Newairy, Kamel and Eweda (2009); Ahmed et al (2008) also noted that ginger protects the levels of reduced glutathione (antioxidant) and suppresses lipid peroxidation (a process by which free radicals steal electrons from cell membranes, thereby causing damage to the cell).

One of the many health claims attributed to ginger is its ability to decrease inflammation, swelling and pain. Young et al (2005) and Minghett, Sosa and Cilurzo (2007) have reported that 6-gingerol, a dried ginger extract and a dried gingerol-enriched extract exhibits some level of analgesic and potent anti-inflammatory effects. Aside from the anti-inflammatory effect of ginger, it is also effective against osteoarthritis and rheumatism (Reginster, Gillot, Bruyere & Henrotin, 2000). There are also *in vitro* and animal data supporting its benefits in alleviating cardiovascular disease, as well as the anti-inflammatory, antioxidant, antiplatelet, hypotensive and hypolipidemic effects of this condiment (Nicoll & Henein, 2009). An aqueous ginger extract was reported to induce a dose-dependent decrease in arterial blood pressure in

a variety of animal models (Ghayur & Gilani, 2005). Furthermore, a ginger extract inhibited airway contraction and associated calcium signalling, possibly by blocking plasma membrane in calcium channels. The dried form of ginger was also beneficial in treating dementia, including Alzheimer's disease (Ghayur et al., 2008). El-Abhar, Hammad and Gawad (2008) reported that in rats, ginger extract alleviated the symptoms of acetic acid-induced ulcerative colitis.

Orally, ginger is usually well tolerated when used in typical doses. However, higher doses of 5 g per day increase the risk of side effects and decrease tolerability. Common side effects of ginger include abdominal discomfort, heartburn, diarrhoea and a pepper like irritant effect in the mouth and throat. Topically, ginger can cause dermatitis in sensitive individuals (Akram et al, 2011). This implies that ginger must not be consumed in excess so that its health benefits will not be compromised.

Nutrients in the form of dietary supplements can improve performance during physical activity. Athletes across Nigeria commonly take different types of supplements to boost their performance during physical activity or competitive sports including local supplements such as Zobo, Kunu and herbs (Amina et al, 2014). These local supplements are virtually found in every market in Nigeria most especially ginger, which is a commonly consumed dietary spice. However, the use of ginger as supplement in boosting performance as well as recovery is supported by limited studies. This was evident in the work of Mashhadi, et al (2013); which revealed that ginger has effects as an anti-oxidative and anti-inflammatory in promoting health and physical activity. Furthermore, this was buttressed by Nafiseh et al (2013), showing that ginger can increase performance in exercise. Melissa, Matsumura, Gerald, Zavorsky, James (2015) also reported that ginger can delay the onset of muscle soreness and enhance the recovery of muscle damage.

Several researches have confirmed ginger to have a beneficial role in the biological system, ranging from the alleviation of respiratory illnesses to enhancing the immune system and physical alertness as well as performance exercise (Nafiseh et al, 2013). We observed that the use of ginger is not new in NASE Sobi-Ilorin Kwara State Nigeria, which implies some level of awareness among students. Based on this, we assumed that ginger intake might improve their day-to-day activities, since their profession requires physical alertness and optimal performance if they are to survive. However, there is no empirical evidence to support this assumption. Therefore, it became imperative to find out the participants' level of ginger awareness, and the benefits and differences in ginger usage between officers and soldiers.

Methods

A descriptive research survey was adopted. The population included all of the 350 male and female students registered at NASE Sobi-Ilorin, Kwara State, Nigeria. All the students were purposively selected for the study because they possess similar characteristics and met the inclusion criteria of being military personnel, studying and resident at NASE Sobi-Ilorin. The valid sample was comprised of 337 respondents consisting of 232 soldiers and 105 officers with an age range of 18-50 years. A researcher-structured questionnaire which contained 30 items that were divided into sections A and B was used for data collection. Section A dealt with the participants' demographic data while section B dealt with their level of awareness and the benefits of ginger usage. The questionnaire was validated and subjected to test retest reliability which was conducted at the base of 222 Battalion, Nigerian Army Sobi-Ilorin with a two week interval between the first and second administration. The Pearson Product Moment Correlation (PPMC) was used to determine the reliability level and $r = 0.72$ was obtained. The participants were duly enlightened and informed consent was obtained from them before data collection. Frequency and percentage were used for analysis of demographic characteristics and answering of research questions while a t-test was used to test the hypotheses at 0.05 level of significance. All the statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS Version 20.0).

Results

Table 1: Level of Ginger Awareness among NASE Students in Sobi-Ilorin, Kwara State

Variable	All Students N (%)	Officers N (%)	Soldiers N (%)
Have you ever seen ginger?			
Yes	312 (92.6%)	99 (94.3%)	213 (91.8%)
No	25 (7.4%)	6 (5.7%)	19 (8.2%)
Total	**337 (100%)**	**105(100%)**	**232 (100%)**
Do you take ginger drink?			
Yes	274 (81.3%)	91 (86.7%)	183 (78.9%)
No	47 (13.9%)	14 (13.3%)	49 (21.1%)
Total	**337 (100%)**	**105 (100%)**	**232 (100%)**
How often do you use ginger?			
Daily	79 (23.4%)	20 (19.0%)	59 (25.4%)
Weekly	80 (23.7%)	29 (27.6%)	51 (22.0%)
Monthly	52 (15.4%)	19 (18.1%)	33 (14.2%)
Can't remember	99 (29.6%)	37 (35.2%)	85 (36.6%)
Total	**337 (100%)**	**105 (100%)**	**232 (100%)**

Table 2: Benefits of Ginger Use among Students of NASE, Sobi-Ilorin, Kwara State

Benefits	All Students N (%)	Officers N (%)	Soldiers N (%)
Health Benefits			
As a pain reliever			
Yes	173 (51.3%)	38 (36.2%)	135 (58.2%)
No	164 (48.7%)	67 (63.8%)	97 (41.8%)
Total	**337 (100%)**	**105(100%)**	**232 (100%)**
To stimulate appetite			
Yes	198 (58.8%)	47(44.8%)	151 (65.1%)
No	139(41.3%)	57(55.2%)	81(34.9%)
Total	**337 (100%)**	**105 (100%)**	**232 (100%)**
Nutritional Benefit			
As spice			
Yes	280 (83.1%)	91 (86.7%)	139 (81.5%)
No	57 (16.9%)	14 (13.4%)	43 (18.5%)
Total	**337 (100%)**	**105 (100%)**	**232 (100%)**
Performance Benefits			
For boosting stamina			
Yes	198 (58.8%)	49(46.7%)	149(54.2%)
No	139(41.3%)	56 53.4 (%)	83 (35.7%)
Total	**337 (100%)**	**105 (100%)**	**232 (100%)**
To be active and alert			
Yes	195 (57.9%)	51 (48.6%)	144 (62.1%)
No	142 (42.1%)	54 (51.5%)	88 (37.9%)
Total	**337 (100%)**	**105 (100%)**	**232 (100%)**

Results in table 1 revealed that the majority of NASE, Sobi-Ilorin students 92.6% (312) have seen ginger before, 7.4% (25) have not; 81.3% (274) of them take ginger drink while 13.9% (47) of them do not. In addition, 23.4% (79) of them use ginger daily, 23.7% (80) use it weekly, 15.4% (52) use it monthly, while 29.6% (99) cannot remember how often they use it. However, soldiers use ginger products daily while officers use them more weekly and monthly. Further consideration in terms of job status shows that the majority of the officers 94.3% (99) have seen ginger while just 5.7% (6) have not. Among the soldiers, 91.8% (213) of them have seen ginger while 8.2% (19) have not. The majority of officers 86.7% (91) drink ginger while 13.3% (14) did not. For the soldiers, the majority 78.9% (183) of them drink ginger while 21.1% (49) of them did not. This result implies that students of NASE, Sobi-Ilorin have a good awareness level of ginger and its products, and ginger is a part of the nutrients in the diets they consume.

Table 2 reveals that the respondents used ginger for different purposes such as health (pain relief and stimulating appetite), nutritional (spice) and performance (boosting stamina, activeness and alertness). The majority of the students 173 (51.3%) used ginger as pain reliever, among which 36.2% (38) of them were officers and 58.2% (135) of them were soldiers. The result also shows that the majority of students 58.8% (198) used ginger for boosting stamina. These comprised of 46.7% (49) officers and 149 54.2% (149) soldiers. The majority of the students used ginger for stimulating the appetite; these comprised of 44.8% (47) officers and 65.1% (151) soldiers. Furthermore, the majority of students used ginger to improve alertness and activeness for optimal performance in their job. Among these were 48.6% (51) officers and 62.1% (144) soldiers.

Table 3: t-test Analysis for Difference in Ginger Usage between Officers and Soldiers

Variables and Groups	N	M ± SD	MD	t	df	SED	η^2	Sig
Ginger Awareness:								
Soldiers	232	9.32 ± 1.32	1.67	4.94	335	1.02	.007	0.001
Officers	105	7.65 ± 0.22						
Total	**337**	**16.97 ± 1.54**						
Health Benefits from Ginger Intake:								
Soldiers	232	10.60 ± 2.56	0.94	2.92	335	0.32	.002	0.004
Officers	105	11.53 ± 2.68						
Total	**337**	**22.13 ± 5.24**						
Performance Benefits from Ginger Intake:								
Soldiers	232	5.13 ± 1.40	0.45	2.48	335	0.18	.002	0.001
Officers	105	5.58 ± 1.54						
Total	**337**	**10.71 ± 2.94**						

$p \leq 0.05$

Table 3 shows results of t-test analyses conducted to examine the differences in ginger usage between officers and soldiers. There was significant difference between soldiers and officers in all the tested variables: level of ginger awareness (*n=337, M ± SD 9.32 ± 1.32, t(335)=4.94, MD 1.67, SED 1.02, p<.001*); health benefits from ginger intake (*n=337, M ± SD 22.13 ± 5.24, t(335)=2.92, MD 0.94, p<0.004*) and performance benefits from ginger intake (*n=337, t(335)=2.48, MD 0.45, p<0.001*). Despite reaching statistical significance, the magnitude of the differences was very small *η2 .007, .002* and *.002* for awareness, health and performance benefits respectively.

Discussion

The study investigated awareness and practice of ginger usage among 337 students of Nigerian Army School of Education (NASE) Sobi-Ilorin, Kwara State. Their awareness level of ginger and ginger products was generally high. The majority of the respondents had seen and consumed ginger in different forms and for different health and performance benefits. Considering the observation of Surh et al. (1999), that ginger is a common dietary condiment that has been consumed for over a thousand years, it was found in this study that few of the students actually used ginger as often as daily, and fewer of them used it weekly or monthly.

It was revealed that the officers had seen and taken ginger drink more than soldiers did. However, more soldiers (25.4%) used ginger daily than officers (19.0%), but on a weekly and monthly basis; the officers (27.6% and 18.1%) used it more than the soldiers (22.0% and 14.2%) respectively. Since ginger is used for diverse purposes, this disparity between soldiers and officers might be due to levels of interaction, their cultural backgrounds and/or nutritional practices in the different units to which they had been posted to serve within the army. This corroborates the assertion of Gosh, (2011) that ginger is used in different ways including boosting appetite, alleviating cold and nausea.

The findings also revealed that more soldiers used ginger for relieving pain (58.2%) and stimulating the appetite (65.1%) than officers (36.2% and 44.8%) respectively. The nature of soldiers' jobs requires them to be always in the fields while officers perform their job mainly from the office, excluding those few on special duties. Since ginger has different bioactive compounds that yield several health benefits, the soldiers could have observed this and used ginger more because of their higher exposure to health hazards while in the fields. The high level of ginger usage as well as the small disparity in use, confirms the postulations of Nafiseh et al. (2013), Nicoll and Henein (2009) and Ali et al. (2008) that ginger has remarkable benefits for health and treatment of ailments. This was also the case among the students based on their cultural, social, occupational setting and health needs.

The majority of the soldiers preferred to use ginger for boosting stamina, activeness and alertness more than the officers did. It is well established that the physical demands of a military job requires high levels of fitness and alertness for optimal performance at all times. While this is crucial in military training, the soldiers of NASE, Sobi-Ilorin proved to be using ginger more than the officers to minimise fatigue, to boost stamina and alertness which is crucial for their job as revealed in table 3. This finding is similar to the view of Nafiseh et al (2013) and Bentley et al (2012) that ginger intake increases exercise performance among humans. This might be one of the reasons why soldiers whose occupation requires optimal performance, activeness and alertness used ginger and its products daily unlike the officers whose duties are conducted more from the office rather than the field.

Conclusion

The majority of the students had an awareness of ginger and mainly consumed it as a drink. Their frequency of use was generally low: just a few used it daily while even fewer used it weekly or monthly with specific objectives that included relieving pain, stimulating appetite, activeness and alertness. There was a difference in the awareness, knowledge of benefit and use of ginger among officers and soldiers. The officers mostly consumed ginger to derive nutritional benefits, but the soldiers used it for both nutritional and performance enhancement. We recommend that further studies should be carried out to elucidate the specific benefits of ginger on the health and performance of NASE students, general military performance and the appropriate times of the usage and dosage regimen in order to avert possible adverse effects of ginger overuse.

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Correspondence

Dominic, Olufunmilola L.
E-mail: lolafunmidom@gmail.com

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A COMPARISON OF PHYSICAL FITNESS LEVELS AND BODY MASS INDEX IN STUDENTS FROM 5TH TO 9TH GRADE IN PHYSICAL EDUCATION CLASSES DEPENDING ON URBAN OR RURAL PLACE OF RESIDENCE

Aldo Costa[1]; Ana Resende[1]; Samuel Honório[2]; Kelly O'Hara[1]; António Vicente[1]; Júlio Martins[1]

[1] University of Beira Interior, CIDESD, Covilhã, Portugal

[2] Sport, Health and Exercise Research Unit (SHERU), Instituto Politécnico de Castelo Branco, Portugal

Abstract

Introduction: *The main purpose of this study was to compare the physical fitness levels and body mass index of students from urban and rural residences at an elementary school in Portugal.* ***Methods:*** *The sample covered 270 students, 142 male and 128 female, aged between 9 and 16, from the 5th to the 9th grade. The Fitnessgram test battery (NES, 2002) measured the physical fitness, the body mass index was based on reference values from the World Health Organization (1995) and the students' profiles were assessed through biographical archives provided by the school. Results: The test results only demonstrated significant differences ($p<0.05$) amongst these students: Females in the 5th and 6th grade in the following tests, trunk extension with better results in students from rural residences and middle strength, with better results in students from urban residences; Males in the 5th and 6th grade in the following tests: the shuttle run with better results in students from rural residences; Females between 7th and 9th grade in the following tests: trunk extension with better results in students from urban residences.* ***Conclusions:*** *Significant differences were not observed between the levels of physical fitness and BMI related to the place of residence (rural and urban).*

Key words: *Physical fitness, BMI, Children, Adolescents, Physical Education, Rural, Urban.*

Introduction

In recent decades we have witnessed profound changes in the daily lives of children and adolescents. This seems to be associated with an increasing urbanization, sedentary lifestyles and consequently problems related to health and well-being, including an increase in obesity (Ewing, 1982 cited by Rodrigues Bezerra & Scott, 2005) and the decline in physical fitness levels of children and young people (Kuntzleman, 1992). According to Ezzati et al. (2005, cited in Machado-Rodrigues et al., 2012), urbanization refers to the concentration of people in towns and cities, linked to economic transformation, migration and behavioural changes.

In Portugal about 45% of the population lives in metropolitan areas such as Porto and Lisbon (Baker, 2000). At the same time it is one of the European countries with the highest prevalence of overweight children or children suffering from obesity (Campos et al, s/d; Queiroz (2006).

Regarding these statistics, as stated by Barreto (2000), social inequalities between rural communities have also become increasingly evident, specifically with regard to health resources and education. According to Muula (2007), the interest in health issues in rural areas has increased in recent years, especially when compared to urban communities. Thus, urbanization is a determinant and influential factor for physical activity, sedentary behaviours,

overweight and cardio-respiratory capacity. Intuitively it is assumed that young people living in urban centres are less active than their counterparts, which consequently gives lower levels of cardio-respiratory fitness, such as overweight and obesity levels (Springer et al, 2006;. Liu et al. (2008).

However, Rodrigues Bezerra and Scott (2005) analyzed the patterns of physical fitness among boys (7 to 10 years) from urban and rural areas and found that, regardless of environment, similar improvements occurred over the years. However, this differs according to the environment and the type of physical fitness indicator. Boys from rural areas, for example, performed higher in the shuttle run test and the boys from urban areas performed higher in the test of horizontal jump.

Seeking to establish a relationship between the periods of physical activity and inactivity and the environment (rural or urban) in which young people live, the study of Bathrellou, Lazarou, Panagiotakos and Sidossis (2007), which included a sample of 1,140 children from rural and urban areas in Cyprus found that children from rural areas are slightly more active after school and busy with outdoor tasks compared to children from an urban environment. However, children from urban areas are more inclined to the practice of weekly sport in comparison with their peers from rural areas. These data suggest that the distribution of children in relation to physical activity and inactivity is similar between urban and rural areas: the researchers found no significant differences in physical activity habits and sedentary behaviour among children in rural and urban areas of Cyprus.

Still reviewing the periods of physical activity and inactivity, as well as the cardio-respiratory fitness of young people from urban and rural areas, the study of Coelho and Silva et al. (2012) found that urban adolescents, of both sexes, spend less time in sedentary activities than rural adolescents. Thus, the study found that the area of residence was related to fitness, time spent in sedentary behaviors and cardio-respiratory fitness among young people, and that interventions seeking to improve health and active lifestyles in youth should consider the socio-geographic impact factor.

As we found in our studies, investigations concerning this issue have not been completely concordant (Cicagnami, 2008). This appears from the outset because there is no consensus on the definitions of urban and rural areas, as well as the impact this uncertainty has on the sample (students residing in rural and urban areas) and the consequent creation of groups to study. This means that when counting students in certain groups who really should not belong to such groups, we may incur a sample selection error, and this in turn affects the internal validity of our study. In this situation, the results cannot be generalized, so our study would lose the possibility of having a coherent and credible external validity.

With regard to the replication of the results obtained in existing studies for different geographical areas, we can assume that this will be limited to the characteristics of the studied context, affecting their representativeness, i.e., its external validity.

In this study, our purpose is to analyze the levels of physical fitness and obesity in students of a school in the North Interior of Portugal, whose geographical location generally allows the coexistence of students from different areas of residence within the district in which it operates. Indeed, in this study we intend to compare the levels of physical fitness and obesity at different ages and for both genders, as well as their variability depending on area of residence (urban and rural).

Methods

Sample

The population study was composed of children and adolescents attending an elementary school in Guarda district. Initially authorization to carry out the data collection was requested in person and in writing to the School Director through the Pedagogical Council, together with information concerning the objectives for the study. On the basis of this, the school board approved the research. The sample was studied according to gender, grade, and the place of residence of the subjects. Inclusion criteria were the attendance of the 2nd and 3rd cycle of education (from 5th to 9th grade) of an elementary school. We assume as sample exclusion criteria physical disability for

physical activity and identification of special educational needs, so that there are no misrepresentations of the data collected by the objective of this study. The total number of participants was 270 students, representing 86% of the total school population which was 314 students. These students were aged between 9 and 16 years of age, and in the 3rd cycle of education 83 were male (45 in urban residence and 38 with rural residence) and 80 were female (51 in urban residence and 29 with rural residence). Regarding students from 5th to 6thgrade 59 students were male (41 in urban residence and 18 in rural residence) and 48 were female (28 in urban residence and 20 in rural residence). These data were collected directly from the constant biographical record of the class.

Table I. Frequency and percentage of students according to grade, gender and residence context

Grade	Gender	Residence	Frequency	Students %
5th and 6th grade	Male	Urban	41	15.2%
		Rural	18	6.7%
	Female	Urban	28	10.4%
		Rural	20	7.4%
7th to 9th grade	Male	Urban	45	16.7%
		Rural	38	14.1%
	Female	Urban	51	18.9%
		Rural	29	10.7%
Total sample			270	100%

This is a non-probabilistic and intentional sample, because there is a deliberate choice of subjects belonging to the sample and certain characteristics that they possess have been considered.

Instruments

The data collected for the analysis of physical fitness were the values produced by the application of the battery Fitnessgram tests (NES, 2002), since these tests align with familiarity criteria, and can be used over several age levels. Furthermore, these tests offer ease of management, measurement and evaluation of these components of physical fitness with little or no equipment at all. The tests contemplated in this test battery are: the shuttle-run evaluating endurance; abdominal and extension of arms to evaluate middle and upper force; sits-and-reach and trunk extension to assess flexibility, as well as body mass index (BMI) and percentage of body fat (% BF) assessing body composition, calculated by the formula: BMI=weight/height2 (meters).

As for the biographical data of the sample participants, these were provided by the elementary school upon an appropriate written request to the School Director and access to the appropriate direction dossier for each class. Prior to collection of data concerning the research, students were informed about the objectives of this study and that their participation was voluntary and optional.

Procedures

Before any procedures were carried out, informed consent was delivered from the children's parents accepting their participation in this study.

The Shuttle-run test is a test for progressive exertion levels, namely rising from a low intensity and becoming increasingly intensive. The purpose of this is to achieve the maximum distance possible in stages of 20 meter distances, increasing speed successively over one minute. In this regard, a route of 20 meters was initially set with a cone marker and a line at each end. The researchers were always the same throughout the study, prepared with record sheets and pens. These marked the number corresponding to the sequence that the individual completed, and when the sequence was failed

they circled the number corresponding to that exercise.

The test protocol was based on instructing students to complete as many laps as possible, touching the bottom line when they heard a signal. At this point, they were expected to reverse their direction of racing to the other end. Where students reached the line before the signal, they were expected to wait for it before running in the opposite direction. The pace of running was stipulated by a set of acoustic signal intervals between them, produced by a stereo system. The running speed was 8.5 km / h at the start of the test and it was increased by 0.5 km / h every minute. A signal indicating the end time of each route and a triple signal after each minute indicated the end of each level of effort. This last signal was intended to alert students that the race pace would increase, forcing them to accelerate the race to cover the 20 meters in less time. In situations when students did not reach the line at the buzzer they were expected to immediately reverse the direction of the race. The student was then given another opportunity to try to keep pace with the race. The students repeated this procedure until they were no longer able to reach the lines at the sound of the signal. At the end of testing, students continued walking to return to rest. On the test of middle strength, the goal was to achieve the largest number of abdominal push-ups to a maximum of 75, making use of a specific cadence. To achieve this, some test material was needed, including a gym mattress, measuring tape, a CD with cadence and a stereo system.

Two students were necessary for the test run in the class so that one executed it while the other helped. The first assumed the supine position with knees bent, feet flat on the mattress, legs slightly apart and arms extended and in contact with the proximal end of the measuring tape. The second, kneeling, supported the head of their colleague and was responsible for counting and error checking. To complete an abdominal push-up it was necessary to determine if there was a slip of the finger from the proximal end to the distal end of the measurement range. The test was interrupted whenever the performer: (i) Reached the maximum number of repetitions; (ii) Rested between two executions; or (iii) Stopped the movement and / or performed a second repetition incorrectly, i.e. after the first error or failure in carrying out the movement test it would be completed. In the upper strength test, the student had to maintain the largest number of arm extensions to the sound of a particular cadence. They had to perform arm flexion and extension with no support from any part of the body, so as not to be eliminated. The dynamic test developed in pairs, each pair observing and correcting the position of the other during execution. The student then assumed a prone position on the mattress, placing their hands under their shoulders, fingers extended, legs extended, parallel and slightly apart, leaning on tiptoe. The performer was expected to rise from the mattress using the force of their arms to put them in extension, keeping their back and legs aligned (board). The body should form a straight line from head to toe throughout the test. The performer must then flex the arms to the elbows to form a 90° angle with the arms parallel to the ground. To complete an arm extension it was necessary to determine if the student was bending the arms at a 90° angle and maintaining the plank position. The test was stopped when the thrower (i) reached the maximum number of repetitions; (ii) rested between two executions; or (iii) stopped the movement and / or performed a second repetition incorrectly, i.e. after the first error or failure in performing the movement the test was terminated. On the trunk extension test, the performer positioned themselves in the prone position, supporting the maximum length of their trunk, where the distance between their chin and the ground was measured, with the position of the head neutral. The trunk extension test was performed with the performer positioned in the prone position with legs extended, hands placed under the thighs and the head fixed on an imaginary point. On the evaluator's signal, he or she performed the maximum length of the trunk, with measurements of the distance between the chin of the performer and the ground (position of the head neutral). The elevated position of the trunk was to be maintained for several seconds to provide the reading of the result. Two attempts were allowed and the best result was registered. This test required the use of a slit 50 cm long, a

mattress and a log for recording the results. Body mass index was measured by recording the height and weight of students. The height in cm was determined with a SECA 220 stadiometer in a standing position with feet together and barefoot, arms extended along the trunk, with eyes directed forward, the ear aligned with the shoulder and the back of the body in contact with the ruler. As for weight, students were also barefoot and wearing light clothing, and with the measurement taken from the scales as mentioned above. These measurements had to be carefully considered, so as to choose a time when students had not just finished lunch or ingested large amounts of water (Fragoso and Vieira, 2000). The BMI for being overweight or obese were based on the reference values of the International Obesity Task Force (IOTF, Pediatric Obesity, 2012), by gender and age.

Statistical analysis

Data analysis was performed using SPSS (Statistical Package for the Social Sciences, version 21.0 for Windows) aided by a database of values collected in Microsoft Office Excel. Initially we characterized our sample using frequency tables according to grade, gender and residence context. Later we found the data normality using the Kolmogorov-Smirnov or the Shapiro-Wilk test when the sample was higher or lower than 30 subjects respectively. The tests that followed a normal distribution were submitted to inferential analysis to identify differences on the average values, using parametric and nonparametric techniques in accordance with the prior confirmation of normal distribution of data - T-test for independent samples and the Mann-Whitney test respectively. We considered significant differences exist when the $p < .05$.

Table II. Presentation of the mean values, standard deviation and P value of physical fitness tests depending on the residence for females between 5th and 9th grade.

Test	Education Grade	Urban mean	Rural mean	P Value	Standard deviation Urban / Standard deviation Rural
BMI	5th and 6th grade	19:20	17.74	.900	4.12 / 2.73
	7th to 9th grade	19.95	21:55	.148	2.84 / 4:00
Upper strength	5th and 6th grade	10:50	8:00	.167	6.71 / 05.06
	7th to 9th grade	22:35	24.41	.182	24.12 / 23:40
Middle strength	5th and 6th grade	24.96	18.70	**.045**	12:41 / 17:00
	7th to 9th grade	27.25	28.41	.870	25.10 / 26.52
Trunk extension	5th and 6th grade	21.96	24.75	**.030**	4:29 / 4:18
	7th to 9th grade	29.80	27.31	**.012**	4.88 / 5.86
Sit and reach left.	5th and 6th grade	24.36	24:20	.932	6:38 / 6:07
	7th to 9th grade	26.63	25.24	.273	5.92 / 8.17
Sit and reach right.	5th and 6th grade	24.21	25.15	.506	6.95 / 5.86
	7th to 9th grade	25.43	25.38	.850	6:01 / 7.74
Shuttle-run	5th and 6th grade	24.93	22.85	.555	12.92 / 10:39
	7th to 9th grade	32.75	36.21	.885	9.63 / 17.70

Results

The collected data were studied and grouped according to the grade and gender of the sample participants, depending on their residence (urban or rural environment) and the values obtained in the shuttle-run tests, upper strength, middle strength, sit and reach, trunk extension and body mass index.

Presented in Table II are the average values of physical fitness and BMI tests depending on the residence of female gender from 5th to 9th grade.

With regards to students of 5th and 6th grade we found that in the results of physical fitness tests, there were no significant differences between students with urban and rural residence, with the exception of the trunk extension test with a P value=.030 and middle strength with a value of P=.045. The trunk extension test among students with rural residence obtained better results, namely 24.75,

compared to 21.96 recorded by students with urban residence. As for the mean strength test, the students with urban residence had an average of 24.96 higher than the average of the students with rural residence which was 18.70. In the group of students from 7th to 9th grade, in general, there are no significant differences in the results of the physical fitness tests analyzed, except for the trunk extension test that shows us a value of P=.012. The students with urban residence had an average of 29.80 which is higher than the average of 27.31 of students with rural residence.

Table III. Presentation of mean values, standard deviation and P value of physical fitness tests depending on residence for male gender.

Test	Education Grade	Urban mean	Rural mean	P Value	Standard deviation Urban / Standard deviation Rural
BMI	5th and 6th grade	21:27	17.84	.075	5.84 / 2.95
	7th to 9th grade	20:55	20:03	.996	4.23 / 3.57
Upper strength	5th and 6th grade	11:32	9:50	.442	5.29 / 7.82
	7th to 9th grade	31.07	31.82	.635	23:27 / 20.85
Middle strength	5th and 6th grade	25.49	28.50	.114	17:39 / 15.75
	7th to 9th grade	41.33	44.26	10:00 am	30.10 / 32.94
Trunk extension	5th and 6th grade	23:34	23:17	.373	4:49 / 6:17
	7th to 9th grade	28.73	28.47	.812	5.81 / 6:00
Sit and reach left.	5th and 6th grade	21:34	21.94	.636	7:05 / 7:47
	7th to 9th grade	21:44	21:37	.751	8.82 / 7.66
Sit and reach right.	5th and 6th grade	21.61	22:22	.665	8:02 / 6.90
	7th to 9th grade	21:44	21:42	.754	9.21 / 7.60
Shuttle-run	5th and 6th grade	26.83	36.39	**.039**	12:46 / 17:39
	7th to 9th grade	48.18	53.53	.286	06.19 / 26.43

Presented in Table III are the mean values of physical fitness and BMI tests depending on the place of residence of male subjects.

Regarding the 5th and 6th grade we have found no significant differences in physical fitness tests, with the exception of the shuttle-run test that obtained a value of P=.039. In this test students with rural residence registered an average of 36.39 which was higher than the results of students in an urban context, being 26.83.

Between 7th and 9th grade we didn´t find any significant differences in all results of physical fitness tests collected.

Discussion

The objective of this investigation was to compare physical fitness levels and BMI of urban and rural students in a school in the North Interior of Portugal. Essentially this study suggests that children residing in urban and rural areas enjoy the same amounts of activity and physical inactivity, since they do not display results with significant differences between them in most of the tests, considering these same results a consequence of active or sedentary lifestyles. In fact the absence of significant differences in the levels of physical fitness and BMI in most tests among students residing in rural and urban areas seems to be in agreement with the generality of the revised bibliography. The study of Machado-Rodrigues et al. (2012) seeks a connection between physical activity, physical inactivity and sedentary behaviors in relation to cardio-respiratory fitness of 362 adolescents (165 males and 197 females), aged between 13 and 16 living in rural and urban areas of central Portugal. The findings of this study point to the trend among urban students of both genders for expending less time on sedentary activities than rural students, showing that young urban males are more active than rural ones during the weekends. However, with regard to females, urban girls are less active than rural girls during the weekdays. Also, according to the researchers, the rural students of both genders have higher levels of cardio-respiratory fitness than their urban counterparts.

In fact, the time spent by young people in physical or sports related activity can be decisive for the results obtained in the physical fitness tests. As mentioned, our research does not corroborate with the analysis that there is a prevalence of best results for physical fitness among residents in rural or urban areas, because in most tests, no significant differences were identified between the two groups. The only differences relate to the prevalence of better results of urban youth in two tests (middle strength in the females of 5th and 6th grade, and trunk extension in females of 7th to 9th grade) and better results in rural youth in two other tests (shuttle-run in males of 5th and 6th grade and trunk extension in females of 5th and 6th grade), so even in the recorded differences, urban and rural groups are balanced (2 tests each).

Our results are also divergent from Rodrigues, Bezerra and Scott's (2005) study, conducted on the North coast of Portugal, comparing the physical fitness standards of 1,832 urban and rural boys aged between 7 and 10 years. Data from this study showed that urban and rural youth display a level of fitness which differs significantly and over age. The only point in common in relation with our study is the existence of differences in specific tests of physical fitness, specifically the shuttle-run test, middle strength and trunk extension. The divergence does not end in the studies mentioned, since the results of the research carried out by Martins and Honório (2013) - which consisted in the analysis of levels of physical fitness and the degree of association in relation to rural and urban areas of children of 1st to 4th grade in the Fundão district with a sample of 161 students - point to the existence of significant differences both in terms of BMI, or the results of physical fitness tests with higher values for urban children. However, the study carried out by Bathrellou, Lazarou, Panagiotakos and Sidossis (2007), which assessed periods of physical activity and inactivity among 1,140 children in urban and rural areas of Cyprus identify compliance with the data we obtained in the sample of urban and rural students in the North Interior of Portugal. Just as there were no differences between periods of physical activity and inactivity among Cypriot youth from urban and rural areas, neither does our study point to similar differences based on the results of physical fitness tests pertaining to periods of physical activity. It is important to note that our results should not be generalized to the rest of the Portuguese territory, so they should be examined with due reservation. In future research the inclusion of a socio-economic variable is suggested, which was not taken into consideration in this study and could induce some variability to the data collected. It is also important that the sample was not filtered according to the hypothetical differences in levels of physical activity or in so much as the practice of extra-curricular sports activity. Future studies should consider the influence of these parameters because of how they may have influenced the existence of significant differences in the investigations of Martins and Honório (2013), as well as Rodrigues Bezerra and Scott (2005). They may also have influenced the lack of significant differences in our study since they were not controlled.

Conclusions

The registered results allow us to conclude that significant differences were not observed between the levels of physical fitness and BMI related to the place of residence (rural and urban).

From a practical perspective this study can serve as a document to support this school, as it assists in defining the sports to offer in extracurricular activities (in terms of schedules, types of activities, etc.), identifying the students who lack these kinds of activities, and assessing them in relation to their residence (urban or rural). It is also useful as a tool for promoting political analysis of physical and sports activity in the district of Guarda, as it relates to subjects residing in urban and rural areas.

This is a contribution that can be added to existing literature, enabling the researcher in some way to analyze the differences in the levels of physical fitness and BMI in children and adolescents in the North Interior of Portugal according to their homes, whether urban or rural.

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Correspondence

Samuel Honório
R. Prof. Dr. Faria de Vasconcelos
6000-266 Castelo Branco, Portugal
Phone: +351 915662158
E-mail: samuelhonorio@hotmail.com

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PARENTAL INVOLVEMENT IN GRASSROOTS FOOTBALL: THE OPINIONS OF PARENTS AND THEIR CHILDREN

David Pulido

Physical activity and sport sciences research group. University of the Balearic Islands, Spain

Abstract

This research analyses the influence and conduct of the parents of young footballers belonging to the 14-16 years old league in the Balearic Islands (Spain). This study is focused on management behaviours, pressure, support, understanding and parents' active participation. The participants were 102 parents, including 63 fathers and 39 mothers who participated in the study voluntarily during the official competitions of the 2016-2017 season. These parents filled in a questionnaire entitled Análisis del Comportamiento y Actuación de Padres y Madres en el Deporte (ACAPMD). Furthermore, 176 young footballers, with an average age of 14.26 years, (SD= .48) participated voluntarily in this study during the 2016/17 season filling in a questionnaire entitled Parental Involvement in Sports Questionnaire (PISQ). The results show that, firstly, no significant differences between data obtained from fathers and mothers exist. Results also indicate that parents have high implication levels concerning their children's sport. Moreover, parents are interested in maintaining a good parent-child relationship and they value their sons' sports schools positively. On the other hand, parents don't agree with spectators' interventions from the grandstands during their children's matches.

Key words: *Parental influence; Grassroots football; Youth athletes; Parental involvement.*

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Introduction

Physical activity is a crucial element in the integral education of children, due to its socializing function and its transmission of values (Garrido, González and Romero, 2010; González and Otero, 2005). For this reason an awareness of the behaviour of the different implicated educative agents in the sportive practice is important, if what we want to understand how young athletes develop the previously mentioned educative principles and values (Arias, 2008; Garrido et al., 2010).

Authors like Garrido, González and Romero (2010), suggest that there are various researchers who have affirmed that parents are among the most influential agents in the socialization of their children (Arias, 2008; Cruz, Boixadós, Torregrosa and Mimbrero, 1996; Fraser-Thomas and Côté, 2009; Fredricks and Eccles, 2004; Ornelas, Perreira and Ayala, 2007; Pallarés, 1998 and Weiss and Fretwell, 2005).

It is relevant to highlight that aspects like the information or emotional support provided by parents are related to the quantity and quality of sportive practice (Jowett y Timson-Katchis, 2005; Lorenzo, Cubero, Jiménez and Hertting, 2017; Sánchez-Miguel, Pulido, Amado, Leo, Sánchez-Oliva y González, 2015). Hence, it must be affirmed that children are able to participate in sportive activities thanks to the support of their parents (Fredricks and Eccles, 2004; Lorenzo et al., 2017). In other words, parents become essential for the formation of the personal characteristics of the young athletes. It is evident that getting involved into the habit of practicing a sport will result in improved health and an enhanced quality of life (Gimeno, 2003; Lorenzo et al., 2017).

Thus, parents must be responsible for transmitting to their children appropriate information concerning all the possibilities they can choose in the sportive world; but obviously they must take care with regard to different aspects such as: costs, timetables, the mode of transport they'll use, the subjective evaluation of their children or the economic possibilities of the family (Gould, Lauer, Rolo, Janes and Pennisi, 2006, 2008; Lorenzo, 2016; Wolfenden and Holt, 2005).

On the basis of Gould et al. (2006), it must be emphasized that parents' role against motivation and their children's competence is truly relevant. In the same vein, it's crucial to mention those parents who interact in the sportive practice of their sons encouraging or damaging the emergence of personal and behavioural positive attitudes during the course of a sport event (Lorenzo, 2016). Therefore, Gould et al. (2006) identified that contemporary society has tended to highlight those cases of extreme bad behaviour from parents, which negatively affect the sportive experience of young athletes. In fact, some authors have carried out various research from the grandstands; such as Bowker et al. (2009) who studied spectators' conduct during grassroots hockey. These authors found that the most notorious comments were positive, and that the negative comments were directed towards the referee (Elliot and Drummond, 2015).

Omli and LaVoi (2009) carried out similar findings in grassroots football, indicating that parents shouted at their sons only moderately (Elliot and Drummond, 2015). Furthermore, it becomes essential to mention that Holt, Tamminen, Black, Sehn and Wall (2008) showed the nature of parental involvement in grassroots football, and they confirmed that approximately 35% of all the comments were related to supporting their children, while 15% were negative comments (Elliot and Drummond, 2015).

Other research, such as that carried out by Meân and Kassing (2007) show parental comments which aimed to support their sons' aggressive tactics, to underline the importance of winning, and to scold those youth athletes who made mistakes during the match (Bean, Tosoni, Baker and Fraser-Thomas, 2016). It's also remarkable that the study carried out by Shields, Bredemeier, LaVoi and Power (2005), indicates that 14% of parents involved in grassroots sport admit that they have shouted or argued with referees; that 13% of parents affirm they've criticised with anger the way their sons were playing; and 15% of young athletes have suffered angry attitudes from their own parents, because of their way of behaving in sport events (Bean et al., 2016).

Likewise, authors like Turman (2007) have also picked up negative experiences from parents in grassroots sport and, particularly, it must be emphasized that parents frequently give all kind of rewards to their sons to supplement their limited involvement. Additionally, Gould, Lauer, Rolo, Jannes and Pennisi, (2008) maintain that some parents often offer money to their children to incentivize better sportive performance from them.

Walters (2011) has revealed that the earliest research related to the impact that the comments of parents present during grassroots sports events had (Graham, Ratliffe, Faucette, Salter and Walley, 1982; Randall y McKenzie, 1987; Walley, Graham and Forehand, 1982). The same author mentions that previous studies indicated that parents didn't make excessive comments during their sons' matches. Nevertheless, Walters (2011) affirms that subsequent studies (Blom and Drane, 2008; Kidman, McKenzie and McKenzie, 1999) indicate that, even though the comments made by parents were mainly positive, the significant number of technical instructions carried out from the stands and the level of negative comments registered were enough to be concerned about it.

Many kinds of parents are involved in contemporary sports, and because of this fact Roffé, Fenili and Giscafré (2003) established a classification of them. These authors differed between uninvolved parents who are identified by their lack of interest; balanced parents who are the ideal, according to Roffé et al. (2003); overprotective parents who are recognised by the moderate pressure directed towards their sons; parents who are ex-professional athletes, parents who are obsessed with sport and fanatical parents (Garrido et al., 2010).

To sum up, it is important to highlight the existence of authors (Blom and Drane, 2008; Kidman et al. 1999) who mention the importance of future research with the objective of identifying the nature of parental attitudes in grassroots sport. Furthermore, Kidman et al. (1999) have requested that future research intervenes in the educate and informing of parents about how they could provide a more favourable and positive sporting experience for their children (Walters, 2011).

From this perspective, it becomes necessary to include parents since they have the first contact with their children's sport. This fact is crucial; it would stimulate the continuation of children's sporting practice (Cruz et al., 1996; Garrido et al., 2010; González and Otero, 2005). Therefore, it is convenient for parents to be in constant formation, because they are the main agent of socialization in their children's lives and one of the most important around their sports.

Method

Participants

This research involved the participation of 176 young footballers who belong to the 14-15-16 year old category in the Balearic Islands (Spain). As the name of the league mentions, these athletes were between 14 and 16 years old (M=14.26 years, SD=.48). Furthermore, it is important to highlight that the number of young athletes who were 14 years old and participated in the study was 135; constituting 76.7% of the total. Thus, 37 of the young athletes were 15 years old; constituting 21% of the total. And, finally, 4 of the young footballers were 16 years old; constituting 2.3% of the total. Additionally, we counted the participation of 102 parents; 63 fathers and 39 mothers.

Instruments

First of all, it must be emphasized that parental involvement was studied using a sportive questionnaire (PISQ), Lee and Mclean (1997). This questionnaire has 20 items grouped into three factors: Managerial Behaviours, Support and Understanding, and Active Involvement. Cronbach alfa's values were obtained of .87, .67 and .61 for the three respective factors. These results are quite similar to values obtained by Lee and MacLean (1997): Managerial behaviour (.82), Support and Understanding (.60) and Active Participation (.66).

Secondly, it's relevant to mention that the questionnaire used to analyse the behaviour of fathers and mothers in grassroots football was *Análisis del Comportamiento y Actuación de los Padres y Madres en el Deporte (ACAPMD)*, (Garrido, Zagalaz, Torres y Romero, 2010). This instrument has 44 items, which were answered by a Likert scale of 5 points ranking from "nothing" to "a lot". Cronbach alfa's values were obtained for .68 for the father-coach relationship, .73 father-son relationship, interventions in matches .75, interest and expectations .80.

Procedure

Firstly, it is essential to point out that permission for performing this research was obtained by the local Government. This study belongs to one part of the project of the Balearic Islands' Government (Spain) called *Posam Valors a l'Esport*. Afterwards, clubs' management teams and parents of the twelve chosen teams gave us permission; which was crucial to begin the study. The participants were informed about the confidentiality of the obtained data, accepting voluntarily participation in the study.

Questionnaires (PISQ and *ACAPMD*) were completed at the beginning of the 2016-17 season. Participants had the possibility of completing them 30 minutes before a training session in a period of time estimated by the coach who was contacted previously. One of the researchers was present at the football stadiums during completion of the questionnaires to resolve any possible doubts that could appear. The average duration to complete the questionnaires was around 20 minutes.

Data analysis

In first place, it should be highlighted that all the statistical analysis was done using the statistics program SPSS21 (IBM Corporation, 2012).

Therefore, the average and standard deviation were calculated for every variable of PISQ (Lee and MacLean, 1997) and *ACAPMD* (Garrido et al., 2010).

Concretely, three factors of PISQ have been analysed: Managerial Behaviours, Support and Understanding, and Active Involvement. A study pertaining to the averages of fathers and mothers was also carried out. This study

calculated the following variables: Father-coach relationship, satisfaction, father-son relationship, involvement, interventions in matches and interest-expectations.

Results

In table 1, we can observe how parental attitudes towards support obtain more punctuation along with managerial behaviours and parental involvement.

Table 1. Study of parental involvement (PISQ)

	X (SD)	***F(p)***	***r***
Support and Understanding	3.75(.83)	.51(.894)	.97
Active Involvement	2.86(.90)	2.09(.024) *	.95
Managerial Behaviors	3.03(.88)	.65(.780)	.96

On the other hand, we find in table 2 that the highest variable of fathers and mothers is their involvement, followed by parents-sons relationship and for the evaluation of the sport school. Otherwise, the lowest mean is the interventions in matches, followed by the interest and satisfaction. It becomes necessary to underline that there is no statistically difference between fathers and mothers in the studied variables.

Table 2. Study of averages of fathers and mothers *(ACAPMD)*

	X (SD) fathers	***X (SD) mothers***	***X (SD) Total***	***F(p)***
P-C relationship	2.34 (.67)	2.17(.59)	2.27(.64)	1.56(.214)
Satisfaction	3.27 (.59)	3.25(.67)	3.27(.62)	.32(.858)
P-S relationship	3.44(.87)	3.51(.89)	3.47(.87)	.14(.708)
Involvement	3.89(.72)	3.53(.59)	3.76(.69)	6.85(.010)
Interventions in matches	2.69(.93)	2.44(.72)	2.60(.87)	1.80(.183)
Interest/expectations	3.27(.66)	3.24(.69)	3.26(.67)	.061(.805)
School evaluation	3.61(.45)	3.43(.50)	3.54(.48)	3.53(.063)

Following analysis of the obtained data, as a result of communication skills and team workability, a significant difference has not been found in terms of comparison of participants

according to gender (p<0,05). In this respect, male students (X=3,68±,398) have higher communication skill levels than female students (X=3.48±,430). In terms of team workability comparison of participants according to gender, a significant difference has not been found (p<0,05). In this respect, male students (X=3,39±,380) have higher team workability levels than the female students (X=3.25±,421).

Discussion

The main aim of this study was to show the opinions of parents and their children concerning parental involvement in grassroots football. Now, considering the cited objective, it becomes relevant to mention that according to parents' opinions the obtained outcomes confirm that participating parents show high values of involvement in their children's sport. Moreover, these parents are interested in maintaining a positive parent-child relationship; and they value positively the sports schools of their sons. In that sense, it's remarkable that those fathers and mothers who have participated in the current research are not in favour of parents' interventions from the stands during their children's matches. It is also necessary to underline that there are no significant differences between the interventions of fathers and mothers. In the same way, Carratalà, Gutiérrez, Guzmán and Pablos (2011) manifested that there weren't significant differences between fathers and mothers concerning the perception of their own behaviour.

It is also noteworthy that parents completed the ACAPMD questionnaire noting their own conduct related to their sons' sport; and, on the other hand, young footballers manifested their points of view concerning their parents' behaviour in the sportive ambit with the PISQ questionnaire.

Carratalà et al. (2011) tried to emphasize that parents perceived more positively factors related to coaches, respect among parents and the organization of the competition; and, in contrast, they perceived factors related to referees and fair play slightly more negatively (Carratalà, Gutiérrez, Guzmán and Pablos, 2011). According to Carratalà et al. (2011) young athletes are the group who perceive more positively the factors of the sportive environment. These authors suggest that athletes appreciate educator-coaches more positively than their own parents; and, additionally, they manifest a better perception of the factor of respectful parents rather than their own parents.

The outcomes found in the present research show how parents are against their own interactions from the stands during the course of their children's matches. And, in contrast with Carratalà et al. (2011) the parents analysed in the present study think that their relationships with coaches are almost non-existent. Likewise, the results found relating to the children's questionnaire highlight that the young athletes feel that their parents are significantly involved in supporting and understanding them. However, it becomes crucial to highlight how athletes mention that while their parents' active involvement is not enough, parents feel that their involvement is one of their strengths. Thus, a controversy arises, because both groups have different opinions about parents' involvement in their children's sport.

In practical implementation, it must be considered that parents have to accept their interventions from the grandstands should be based on positive reinforcement and respect towards all the socialising agents of sport. This fact is vital if the sporting environment wants young athletes to feel comfortable about themselves and to check how their levels of self-esteem increase.

This study presents some limitations. One of the main limitations of this study is the age range of the athletes because it does not allow a wider intergroup comparison, due to the fact that it is uniquely based on the 14-15-16 years old category. Another important limitation that must be underlined is that female footballers haven't been included in the sample.

Finally, the necessity to research the present field deeply is reflected, because it will be essential to compare different results with other authors and to obtain more objective conclusions about it.

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Correspondence

David Pulido
Physical Activity and Sports. Universitat de les Illes Balears (UIB)
Ctra. Valldemossa, km 7,5. 07122, Palma (Balearic Islands), Spain
+34 662220933
E-mail: pulido804@gmail.com

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EFFECTS OF SKIING TRAINING ON SELECTED PARAMETERS OF POSTURAL BALANCE AMONG STUDENTS OF THE OPOLE UNIVERSITY OF TECHNOLOGY

Waldemar Firlus

Opole University of Technology, Opole, Poland

Abstract

It is difficult to overestimate the role of balance in the life of human beings. Postural stability plays a fundamental role in life and its deficiencies can lead to considerable difficulties in performing everyday activities. Activity is understood as a form of recreation that can promote the development of behaviour in which balance is improved so as to make everyday life easier.

The main objective of the study reported in this paper is to discuss the differences occurring during the system of balance that is maintained by subjects as a result of practicing downhill skiing and snowboarding. The study involved students of Physical Education (42 subjects, aged: 21.15±1.47) who were subjected to an experimental study concerned with the analysis of postural balance prior to and following a winter sports training program.

Throughout the study, a Kistler Force Plate was applied during experiments with subjects performing tasks with eyes open and closed and the participants either wearing ski boots or performing project trials barefoot. Subsequently, the subjects completed the Wingate anaerobic test and the entire course of the test was repeated. The following stage of the experiment involved the same test program that was repeated after completion of a 5-day ski training program by the students, whose initial phases involved the test developed by Haczkiewicz (3).

The analysis of the study's results demonstrates a degree of adaptation in the subjects with regard to postural balance that included a decrease in the regression of the results after completing the Wingate test for trials performed following the training program. This result offers a foundation for the recommendation of downhill skiing practice and snowboarding as ways of assisting postural balance control during preparation for exercise in conditions when maximum and supra-maximum effort is exerted.

Key words: *health, skiing, recreation*

Introduction

Everyday life poses considerable challenges to human movement and one key aspect that does not attract sufficient attention is associated with maintaining postural balance. Balance forms an indispensable element of all activities in which humans engage. However, it starts to attract our interest only at the time when a deficiency of balance occurs and when tasks which previously posed no problems become surprisingly complex. In such a case, deficiency of balance related to an injury or illness focuses our attention quite unexpectedly. The complex structure and multitude of organs participating in the process of balance maintenance by the human body makes the process concerned with identifying its particular elements a much impeded task. In particular, this task is difficult in terms of the conditions of experiments performed in variable external conditions or when we are faced with the need to perform a conscious control of balance following its loss.

Downhill skiing and snowboarding form some of the disciplines which offer considerable requirements in terms of postural balance control. In this context, balance is understood as the degree of precision control of the location of the body's center of mass and the height of the center of the body's gravity, when mass is

dynamically applied and relieved (2). The effect of practicing these forms of recreation on the motor skills of the individuals who practice them and the impact of these skills on the ability to learn new movement patterns seems to be beyond any doubt. The controversy emerges when real tests are performed concerned with the changes in the motor skills of skiers who are subjected to a variety of forms of training. On the basis of earlier reports focusing on this subject[1] , such an effect has been observed – the level of balance control has improved in all subjects and no significant differences between genders have been observed.

Objective of study and research questions

The principal objective of this work is concerned with verifying the impact of practicing downhill skiing and snowboarding on the level of balance control and assessment of applicability of these sports in the improvement of movement ability. The objective of researching the effects of activity on balance control and the correlation between postural balance and ability to quickly acquire skiing skills applied the following questions:

1. What balance-related parameters are related to the practice of downhill skiing and snowboarding?
2. Are there any significant changes in the balance control process of individuals subjected to a short-term downhill skiing and snowboarding training program?
3. Does anaerobic effort affect the change of balance control and what is the effect of the course of the skiing and snowboarding training program on it?
4. Which of the selected parameters can be applied to differentiate between the effects of skiing and snowboarding effort on postural balance?

Materials

The testing projected in this study was performed in July 2017 at the site of the Faculty of Physical Education and Physiotherapy, Opole University of Technology, Opole, Poland. The experiment included 42 men, students of Physical Education at Opole University of Technology (age: 21.15±1.47 years).

Methods

The individuals who participated in the experiment were subjected to testing using Kistler Force Plate. The study was performed four times: with the subjects' eyes open and closed and subsequently the tests were repeated with the subjects wearing ski boots. The test weight used for the Wingate test was 7.5% of the participant's body mass and the test duration was equal to 30s. Subsequently, the entire test program was repeated.

The following stage of the experiment involved a five-day downhill skiing and snowboarding training program conducted in the mountains. The subjects were assigned to homogenous groups with regard to their skiing skills. The tool applied for the classification was based on the Haczkiewicz test (3).

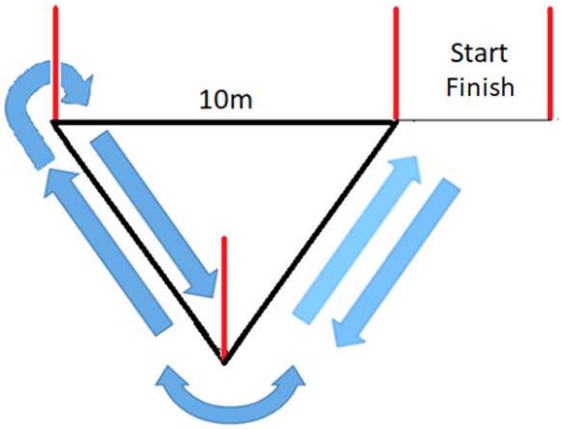

Fig. 1. Diagram of Haczkiewicz test

The test was performed on a hill with an inclination of 15 degrees. The test applied a route around an isosceles triangular shape with a base at the top of the route. The length of the sides of the triangle was 10 meters. The duration of the trials was measured with the accuracy of 0.01s. Throughout the training, the students acquired basic skiing and snowboarding skills, in

[1] Jaskólska A. 2002. Motor control by the nervous system (in Polish). [In:] Jaskólski A. (Ed.) Podstawy fizjologii wysiłku fizycznego AWF Wrocław.

particular focusing on the details of technique. The training program included:

1. Familiarization with skiing and snowboarding equipment and conditions on the piste,
2. Walking echnique on flat areas, ascending, descending, standing up and falling down,
3. Skiing stance, travelling in a straight line and traversing a piste, braking and speed control (snowplough, sideslip and lateral slip),
4. Changes of direction (snowplough, turning and edging maneuvers),
5. Methodology of side slipping with parallel skis, skidding and turning in steps,
6. Metholodogy of teaching foot maneuvers.

Statistical methods

On the day of their return to the University following the completion of winter training, the students were subjected to a cycle of testing that was identical to that completed before the skiing training. This stage involved the analysis of two parameters:

1. Standard deviation of the time series representing foot center of pressure expressed in mm;
2. Mean velocity of the time series representing foot center of pressure expressed in mm/s.

The significance level of the differences was assessed by the ANOVA test for dependent variables, with the significance level of $p< 0.05$.

In addition, the assessment was performed by using the Pearson's Correlation Coefficient for Haczkiewicz Test and for trials applying the Kistler force plate.

Results

The first of the analyzed parameters was the mean velocity of the time series representing foot center of pressure and these results demonstrate an inconsiderable deterioration with regard to the control of the body's center of mass; however, these results do not demonstrate statistical significance (Table 1).

Table 1. Standard deviation of the time series of the middle point of foot pressure for tests performed prior to and following the training classified according to the plane [mm/s]

Standard deviation of the time series [mm]				p
Test	Plane	Prior to skiing training	Following skiing training	
Eyes open; wearing boots	ml	2.35 ± 0.87	3.63 ± 3.25	0.99971
	ap	5.04 ± 1.8	6.51 ± 3.67	1.00000
Eyes open; barefoot	ml	2.8 ± 1.08	3.58 ± 1.47	0.976668
	ap	4.43 ± 2.37	5.2 ± 2.28	0.994782
Eyes closed; wearing boots	ml	2.42 ± 0.96	2.61 ± 1.16	1.000000
	ap	5.31 ± 2.17	5.71 ± 1.94	0.999888
Eyes closed; barefoot	ml	3.59 ± 1.45	4.38 ± 1.82	1.000000
	ap	5.71 ± 1.68	6.42 ± 2.08	0.999277
Wingate eyes open; wearing boots	ml	2.59 ± 1.11	3 ± 2.52	1.000000
	ap	4.78 ± 1.87	5.61 ± 2.38	1.000000
Wingate eyes open; barefoot	ml	3.31 ± 1.54	3.5 ± 1.09	0.747804
	ap	4.84 ± 1.78	5.84 ± 2.65	1.000000
Wingate eyes closed; wearing boots	ml	2.88 ± 1.17	3.52 ± 2.78	0.999916
	ap	6.57 ± 2.15	6.6 ± 3.51	0.739929
Wingate eyes closed barefoot;	ml	4.18 ± 1.93	4.32 ± 1.51	1.000000
	ap	6.22 ± 2.81	6.79 ± 2.13	1.000000

Statistically significant differences are marked by use of Italics

Table 2. Mean velocity of the time series of the middle of foot pressure for tests conducted prior to and following ski training according to the plane [mm]

Mean velocity of the time series of the middle of foot pressure [mm/s]				P
Test	Plane	Prior to skiing training	Following skiing training	
Eyes open; wearing boots	Ml	8.36 ± 3.03	10.66 ± 6.88	*0.000169*
	Ap	15.12 ± 6.34	17.31 ± 5.94	1.000000
Eyes open; barefoot	Ml	7.61 ± 2.45	8.97 ± 2.45	0.696361
	Ap	9.73 ± 2.34	13.61 ± 5.37	*0.001918*
Eyes closed; wearing boots	Ml	9.05 ± 3.01	9.28 ± 3.28	*1.00000*
	Ap	17.11 ± 5.23	18.76 ± 5.18	1.00000
Eyes closed; barefoot	Ml	9.79 ± 3.56	10.97 ± 3.33	*0.000169*
	Ap	14.25 ± 3.8	16.93 ± 5.24	1.00000
Wingate eyes open; wearing boots	Ml	9.01 ± 2.57	9.3 ± 4.55	1.00000
	Ap	17.57 ± 4.17	17.76 ± 5.26	0.999997
Wingate eyes open; barefoot	Ml	8.64 ± 2.42	9.07 ± 2.61	1.00000
	Ap	14.39 ± 3.96	15.13 ± 5.29	1.00000
Wingate eyes closed; wearing boots	Ml	10.26 ± 3.66	10.83 ± 4.32	1.00000
	Ap	20.87 ± 6.63	21.12 ± 5.33	0.996335
Wingate eyes closed; barefoot	Ml	11.03 ± 3.54	11.14 ± 3.33	0.995061
	Ap	17.1 ± 4.43	18.16 ± 4.97	0.999991

Statistically significant differences are marked by use of Italics

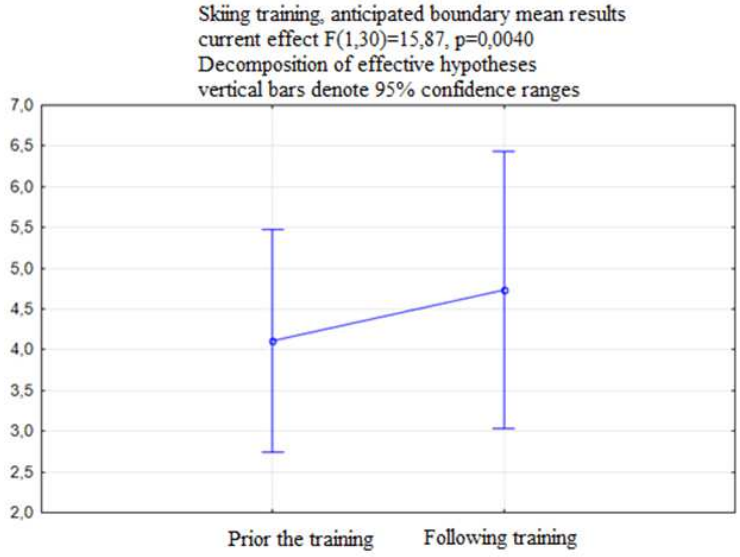

Fig. 2. Changes in standard deviation of the time series representing foot center of pressure prior to and following ski training [mm]

The trials conducted following the completion of the ski training demonstrate an increase in terms of the investigated parameter as a result of the completion of the training program.

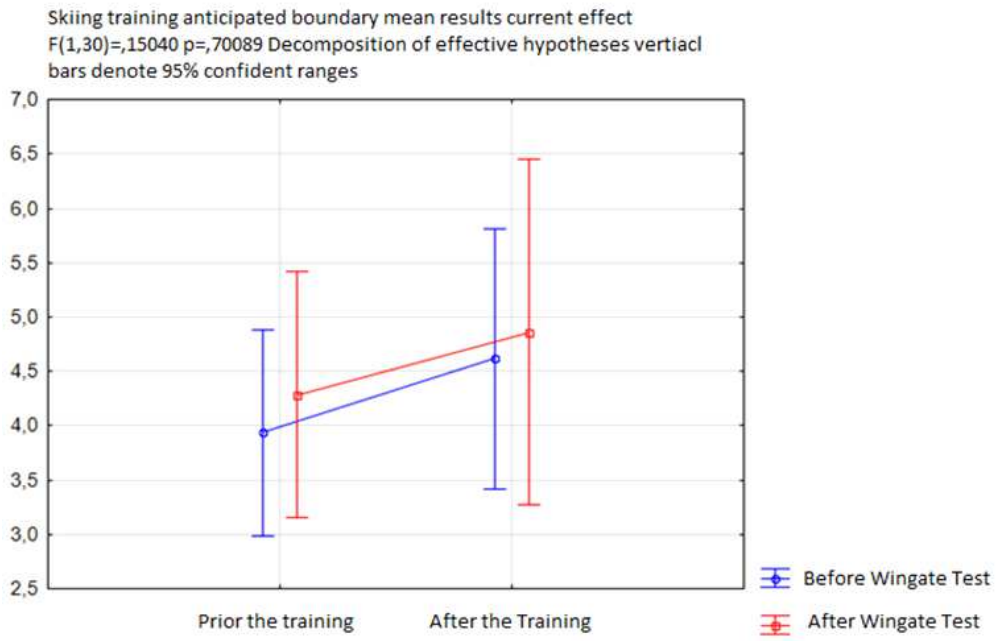

Fig. 3. Standard deviation of the time series of middle of foot pressure prior to and following ski training and before and after completing Wingate Test [mm]

The effect of fatigue after completing the Wingate Test and its impact on balance control appears to be considerably greater for trials performed prior to the ski training. The regression expressed in terms of the standard deviation of the time series for the trials performed following the training demonstrates the subjects' adaptation to anaerobic effort.

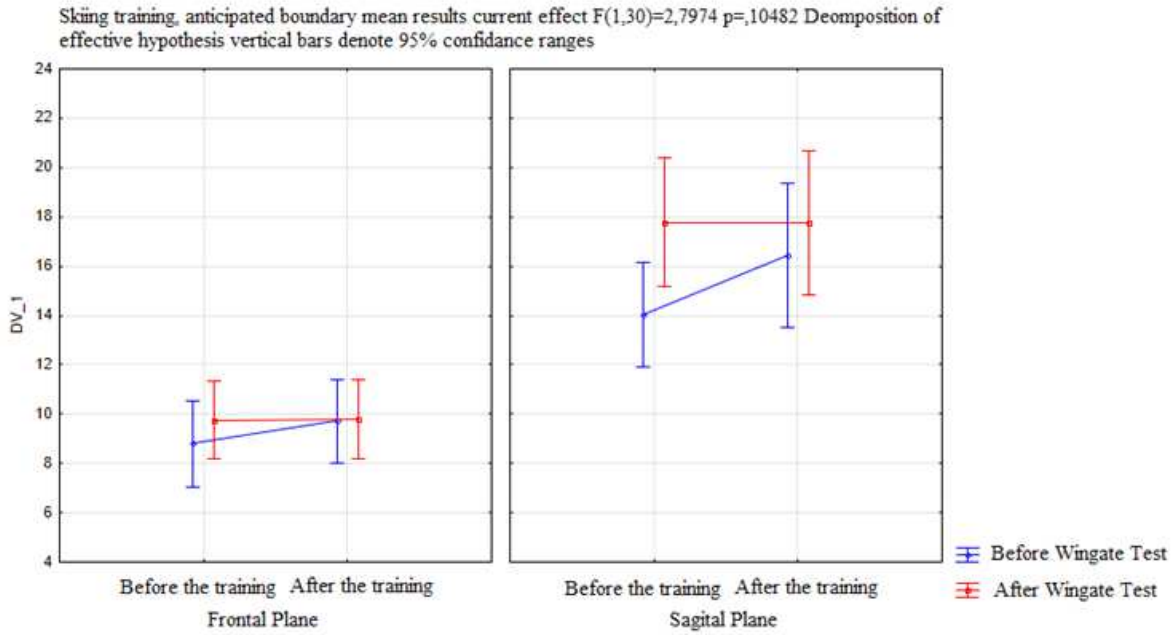

Fig. 4. Changes in standard deviation of the time series representing foot center of pressure prior to and following ski training according to planes [mm]

For the case of trials performed prior to the ski training, the completion of the Wingate Test had a more considerable impact on the results of the standard deviation of the time series of the of foot center of pressure and this effect was primarily due to greater oscillations in the frontal plane. In the case of the trials performed following the completion of the training program, the effect of fatigue proved to be of less importance and the results proved to be similar to each other.

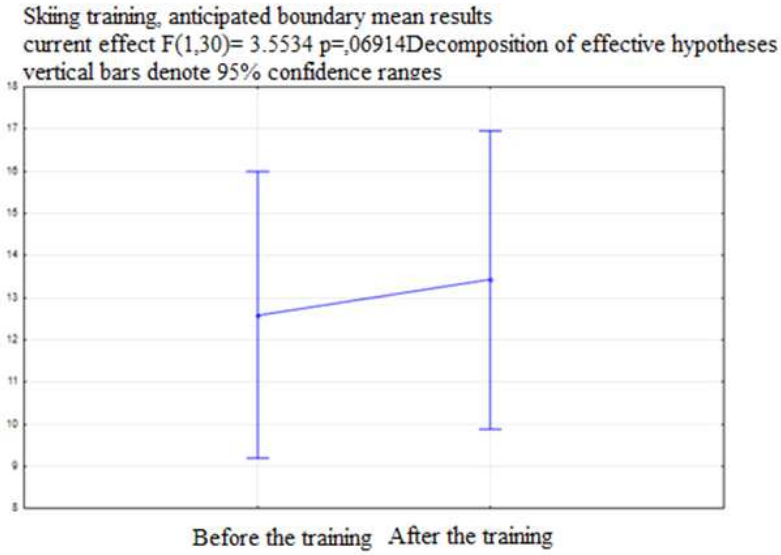

Fig. 5. Changes in mean velocity of the time series representing foot center of pressure prior to and following ski training [mm/s]

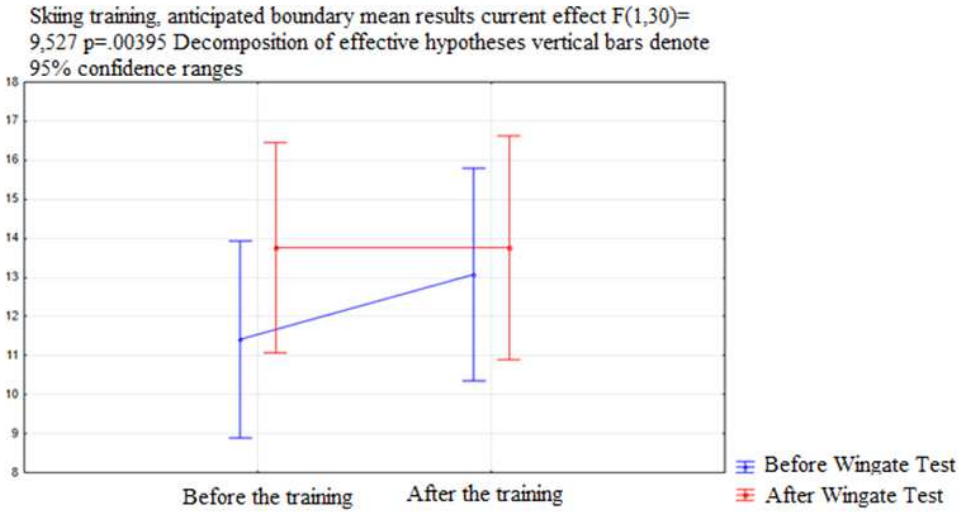

Fig. 6. Changes in mean velocity of the time series representing foot center of pressure prior to and following ski training and before and after completion of Wingate Test [mm/s]

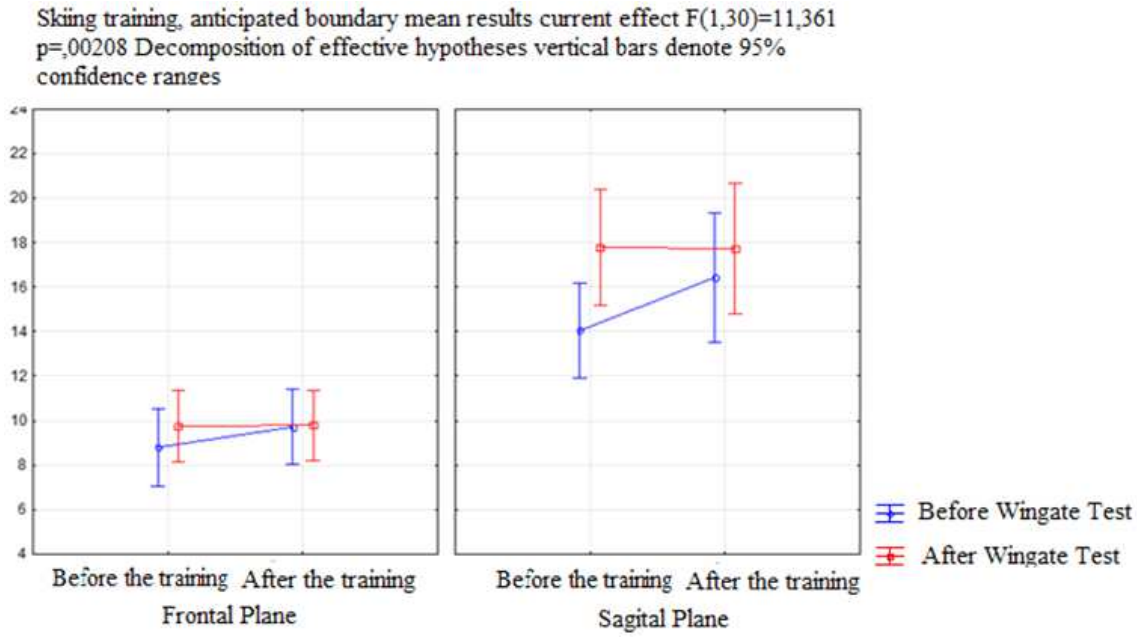

Fig. 7. Changes in mean velocity of the time series representing foot center of pressure prior to and following skiing training and before and after completion of Wingate Test according to planes [mm/s]

As with the case of standard deviation, for mean velocity the effect of the anaerobic test for trials performed prior to the ski training resulted in a more considerable increase of the mean velocity of the time series in comparison to the results recorded after completion of the ski training.

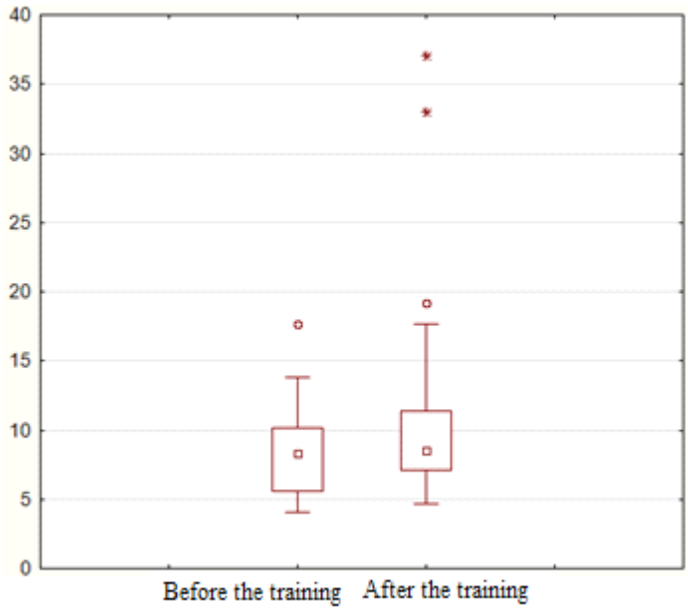

Fig. 8. Changes in mean velocity of the time series representing foot center of pressure prior to and following ski training for trials performed with open eyes while wearing ski boots, frontal plane [mm/s]

The results gained for trials performed with open eyes while wearing ski boots demonstrate that the level of balance control deteriorated, with a note that the results are not statistically significant.

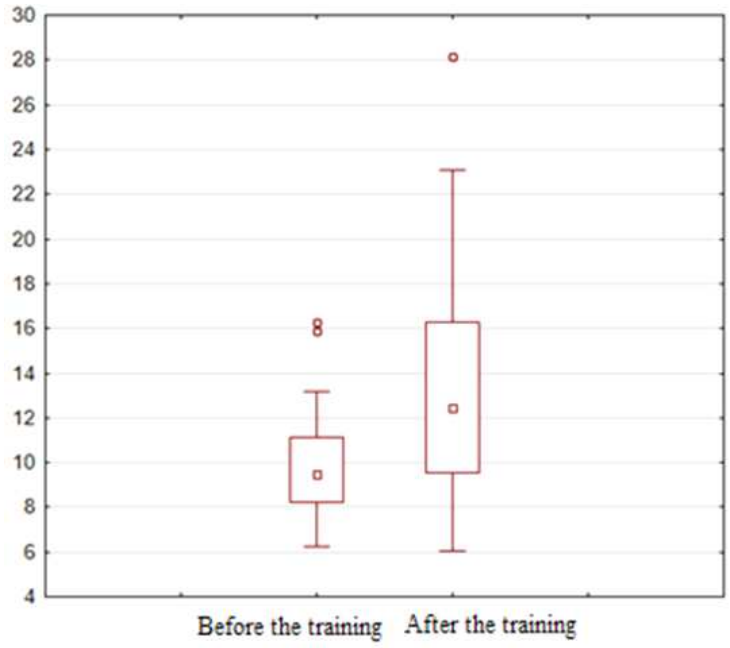

Fig. 9. Changes in mean velocity of the time series representing foot center of pressure prior to and following ski training for trials performed with open eyes barefoot, sagittal plane[mm/s]

For trials performed with open eyes while barefoot, the results in the sagittal plane demonstrate an improvement of the results in terms of the mean velocity.

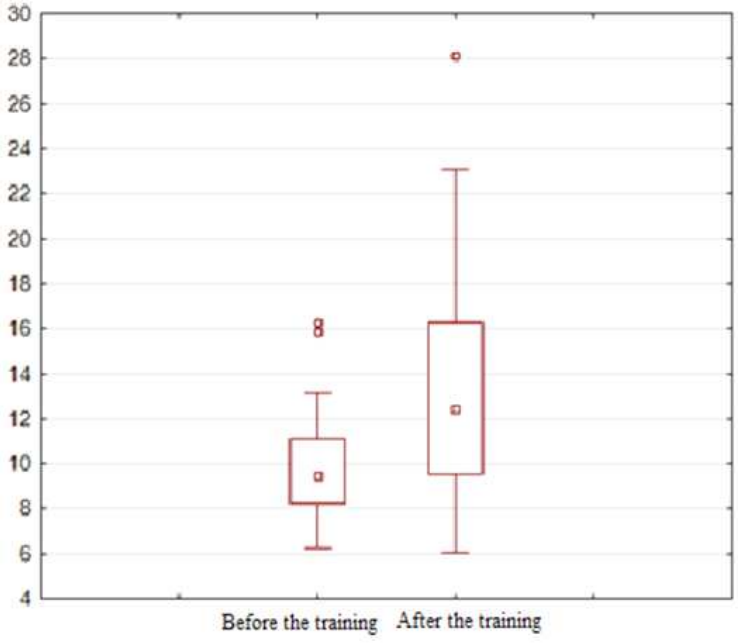

Fig. 10. Changes in mean velocity of the time series representing foot center of pressure prior to and following ski training for trials performed with closed eyes barefoot, frontal plane [mm/s]

The results demonstrate that the decrease of regression resulting from performing the exercise capacity test is primarily attributable to the movements in the frontal plane. The results for the sagittal plane are similar, yet the effect is not so visible.

The following aspect of the balance assessment applied the results of the correlation between the results of the Haczkiewicz Test and the results gathered through the use of a Kistler Force Plate. The results are presented in Table 3.

Table 3. Correlation between the results of the Haczkiewicz Test and selected parameters gathered using the Kistler force plate

Exercise	Parameter	Plane	Correlation coefficient
Trial prior to ski training – eyes closed, barefoot	Mean velocity of time series representing foot center of pressure [mm/s]	ap	0.42
Trial prior to ski training after Wingate test– eyes closed, wearing boots	Standard deviation of time series [mm]	ml	0.44
Trial prior to ski training after Wingate test– eyes open, wearing boots	Mean velocity of time series representing foot center of pressure [mm/s]	ml	0.42

The results of the Pearson correlation demonstrate an average dependency between the results of the Haczkiewicz test for the trials performed prior to skiing training, since in one trial, the existence of a dependence was established for the sagittal plane, whereas in the other trial – for the frontal plane. A similar level of correlation can be established for the trials performed following ski training after completion of the Wingate Test.

Discussion

The effect of balance control on skiing performance and the ability to gain new skills seems to be beyond any doubt, due to the very characteristics of this sport. This effect is confirmed by studies by Golema (1), who demonstrated that the process of restoring upright position to a deflected posture is similar to the maneuver performed by a skier at the phase when they steer the body to turn. However, in the process of implementing actual aspects of skiing or snowboarding, as well as during the process of assessing the effect it plays on balance control, it appears that the results are not that uniform.

The study performed by Tchórzewski (5) confirms the effect of practicing skiing disciplines on the level of balance control; yet, the results do not contain a clear statement as to whether this effect involves an improvement or deterioration of the results. The study by Mildner (4) demonstrates some level of improvement in this regard combined with differences between the skiers who practice this sport professionally and leisure skiers. The scope of the study by Wojtyczek (8) is closest to the present study in the sense that the present one focuses on the improvement in the control of the position of the body's center of mass represented by ground reaction force vector among subjects following ski training.

The issue of the control of the position of the body's center of mass represented by ground reaction force vector was also undertaken by Waśkiewicz (7), who demonstrated a decrease in the control for trials performed after completing the Wingate Test twice; however, it contains a

note that after subjects performed the anaerobic test three times, the decrease was not observed.

The research conducted for the purposes of the present study was based on the combination of methodologies developed in three studies. These included the contribution of Tchórzewski's study into applied trials performed in ski boots, Waśkiewicz's study, which offered the idea of the use of the fatigue aspect resulting from the completion of an anaerobic test, and the study by Wojtyczek, which provided the option of performing two test cycles that are separated by ski training.

The impact of the Wingate Test on the deterioration of the results in the subjects confirms the result gained by Waśkiewicz. However, an interesting conclusion is associated with the effects of ski training, which reduced the negative impact of post-exercise fatigue on the balance control results. In terms of the remaining aspects, the effect was negative, in particular in the frontal plane, in which the movement is described as similar according to the study by Golema (1).

This study was carried out on young subjects, who are physically fit at least to an intermediate level according to Nowak's study (5), although the effects of this characteristic on the present research was small. However, the existing correlation between the results of the Haczkiewicz Test and the results of trials performed following ski training means that the effect of the balance control on the ability to gain new skiing skills is moderate.

Summary and conclusions

The results of this study demonstrate that the parameters related to balance for which a dependence can be established with skiing practice include:

1. Mean velocity of the time series representing foot center of pressure for the frontal plane, with subjects wearing ski boots and with their eyes open,
2. Mean velocity of the time series representing foot center of pressure for the sagittal plane, with subjects barefoot and with their eyes open,
3. Mean velocity of the time series representing foot center of pressure for the frontal plane with subjects barefoot and with their eyes closed.

The analysis of the study results also leads to the conclusion that the effects of short-term skiing or snowboarding training on the subjects' balance systems is represented by a slight deterioration in some aspects of balance.

The anaerobic effort performed by the subjects resulted in a considerable level of deterioration of the balance parameters in all trials. Subsequently, following the short ski training this effect decreased, as the fatigue associated with the completion of an anaerobic test results in a smaller effect on the balance system of the tested subjects

In conclusion, the completion of skiing training has an effect on the control of the body's center of mass, yet this effect was negative. However, we can note the smaller effect of the Wingate Test on the regression of the results in the trials which is due to the completion of the ski training and a moderate correlation between the results of the test performed on the Kistler force plate and further results of the Haczkiewicz Test, which suggest the effect of the initial level of control over the body's center of mass on the ability to acquire new skiing skills among the subjects.

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Correspondence

Firlus Waldemar
E-mail: w.firlus@po.opole.pl

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THE INFLUENCE OF SELECTED FACTORS ON OXYGEN EFFICIENCY

Wojciech Pasiak[1], Anna Stelmach[2], Przemysław Pasiak[3], Dorota Weber[4], Marek Bańbuła[5], Tomasz Zubliewicz[6]

[1] Chair and Department of Vascular Surgery and Angiology, Medical University of Lublin, Poland

[2] Division of Rehabilitation and Physiotherapy, Department of Rehabilitation, Physiotherapy and Balneotherapy, Medical University of Lublin, Poland

[3] ANGIO-REH Vascular & Therapeutic, Lublin, Poland

[4] Department of Oncology and Environmental Health Care at the Medical University of Lublin

[5] Dalriada Urgent Care Ltd., United Kingdom of Great Britain and Northern Ireland

[6] Chair and Department of Vascular Surgery and Angiology, Medical University of Lublin, Poland

Abstract

Oxygen (aerobic) efficiency is one of the most important determinants of our physical ability, which in turn is the most significant aspect of the human body. Physical activity is very often connected with health and life long health care. The purpose of this article is to show how aerobic efficiency is affected by different lifestyles and predilections among groups selected by the researcher. This will enable the determination of those factors that influence oxygen efficiency.

***Purpose**. The purpose of this research is to establish how aerobic efficiency, being the most important determinant of physical activity, presents in the chosen groups of respondents and how it is affected by various factors.*

***Materials and methods**. 30 respondents between the ages of 18 and 24 who study or work took part in the research. All of them claimed to pursue regular physical activity.*

Based on the interview with the respondents several subgroups were indicated: males, females, smokers, non-smokers, consumers of alcohol and non-drinkers.

Table 1

GROUP	*Females*	*Males*	*Smokers*	*Non-smokers*	*Alcohol drinkers*	*Non-drinkers*
Number of people	*14*	*16*	*11*	*19*	*13*	*17*

***Results.** Research conducted for the purpose of this manuscript enabled the evaluation of how oxygen efficiency presented in the different groups selected for the purpose of this study. Respondents who took part in the research varied based on gender and use of stimulants.*

- *Cigarettes reduce the Fitness Index (FI) rate*
- *Males have a better FI rate than females*
- *Alcohol does not reduce the FI rate*
- *Those who smoke cigarettes have a lower oxygen efficiency rate then those drinking alcohol*

***Key words:** oxygen efficiency, physiotherapy, Harvard step test, physical activity, lifestyle*

Introduction

Over recent times in developed countries, fewer people feel the need to undertake physical activity. For most adults their only physical activity during the day is the walk from the car to the office and later from the car to the house.

As a result of this we see a growing number of people, including young people, experiencing various metabolic diseases, and chronic back,

head and joint pains. There has also been an increase in the rate of obesity which leads to many diseases and impairs quality of life. [3]

A very important role in raising awareness among adults, young people and children are social campaigns showing the benefits of physical activity on human development, appearance and character. Undertaking any sports activity increases one's self-esteem, belief in one's ability and knowledge that only systematic self-improvement can produce the desired effects. This in turn will have a positive impact on one's behaviour at work, and also social and family relations. Many companies have observed the positive impact of physical activity on humans. They encourage physical activity by giving out free gym or swimming pool memberships which may suggests that there is a growing community awareness of the importance of physical activity in building quality of life. [8]

Oxygen (aerobic) efficiency is one of the most important determinants determining our physical ability, which in turn is the most significant feature of a human body.[6] Physical ability is very often related health and lifelong health care.[12] The purpose of this research is to show how aerobic efficiency is affected by different lifestyles and predilections amongst members of groups selected for the purpose of this study. This will enable the determinatino of those factors that influence oxygen efficiency. [14,5,11,4], [13,16,7,10,2]

The purpose of this manuscript is to check how aerobic efficiency, being the most important determinant of physical activity, presents in the chosen groups of respondents and how it is affected by various factors.

Materials and methods

30 respondents between the ages 18 and 24 who study or work took part in the research. All of them claimed to pursue regular physical activity

Based on the interview with the respondents, several subgroups were indicated: males, females, smokers, non-smokers, consumers of alcohol, and non-drinkers

Tab. 2.

GROUP	Females	Males	Smokers and physically active	Non-smokers and physically active	Alcohol drinkers and physically active	Non-drinkers and physically active
Number of people	**14**	**16**	**11**	**19**	**13**	**17**

Research methods

Many methods can be applied to demonstrate oxygen efficiency; however the one chosen for this research is the Harvard step test because it is effective and easy to conduct.

Execution consists of stepping up onto a platform (51 cm high for men and 46 cm high for women) at a rate of 30 steps per minute over 5 minutes for men and 4 minutes for women. Stepping on to the platform follows a verbal command or sound signal. After the exercise the subject's hearbeats are counted for 1 minute, 2 minutes and 3 minutes. The heartbeat is measured for 30 seconds.

Based on the heartbeat count a fitness index (FI) is calculated as per the following equation:

FI= time until exhaustion in seconds x100 / 2x (total heartbeats counted).

Coefficient FI is a specific indication of oxygen efficiency for the Harvard step test expressed in points. The table below represents efficiency grades based on points achieved during the test. [15,9,5,1,8]

Tab. 3.

No	Fitness Index	Rating
1	50-55	Poor
2	56-64	Low average
3	65-79	Average
4	80-89	Good
5	90 or highier	Excellent

Organisation and the course of the research

Research was conducted successively in May and at the beginning of June 2015. Most of it was overseen at the Medical University in Lublin.

Subjects willing to take part in the research were interviewed regarding their use of stimulants and physical activity which helped to determine their profile.

Prestentation of the results of the resarch

During the course of the research it was established that men have better aerobic efficiency then women.

Average FI for men equals 89 and for women - 76, where standard deviation for women is 8.125729046 and for men - 10.46900186.

For female subjects the result of the Harvard step test was average and for male subjects it was good.

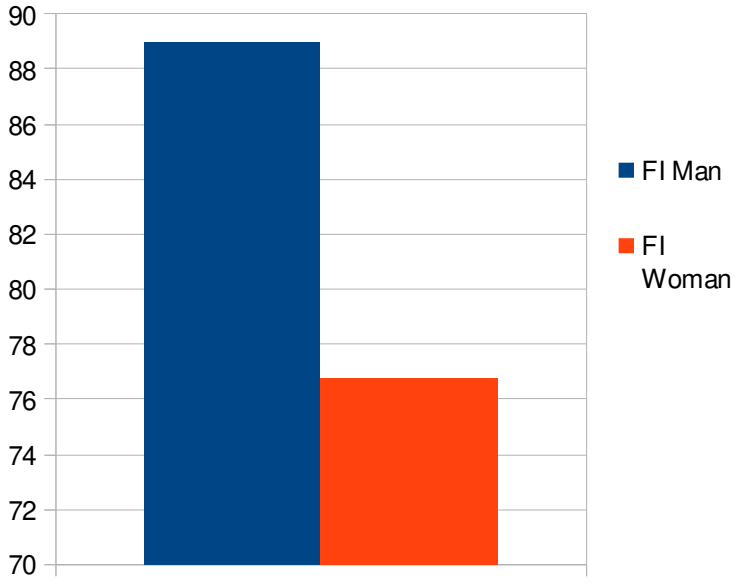
Tab. 4. All female results

No	Time until exhaustion *100s	Hb after 1-1.5 min	Hb after 2-2.5 min	Hb after 3-3.5 min	FITNESS INDEX	Result
1	24000	60	39	38	88	*good*
2	24000	60	53	50	73	Average
3	24000	54	47	43	83	good
4	24000	53	43	40	88	Good
5	24000	57	47	44	81	Good
6	24000	65	49	47	74	Average
7	24000	56	42	40	86	Good
8	24000	51	49	45	82	Good
9	24000	75	59	48	65	Average
10	24000	62	58	55	68	Average
11	24000	65	60	54	67	Average
12	24000	51	50	49	80	Good
13	24000	61	57	51	71	Average
14	24000	63	56	54	69	Average
	average				**76.8**	**Average**
	FI standard deviation				8.125729046	

Tab. 5. All male results

1	30000	55	49	43	102	Excellent
2	30000	72	67	60	75	Average
3	30000	59	53	49	93	Excellent
4	30000	59	51	45	96	Excellent
5	30000	56	52	52	83	Excellent
6	30000	67	63	52	82	Good
7	30000	58	44	38	112	Excellent
8	30000	65	53	42	93	Excellent
9	30000	62	50	41	98	Excellent
10	30000	56	55	50	93	Excellent
11	30000	67	60	57	81	Good
12	30000	66	63	61	83	Good
13	30000	57	54	54	90	Excellent
14	30000	67	64	59	78	Average
15	30000	75	69	61	73	Average
16	30000	60	53	50	92	Excellent
average	**89**					**good**
	FI standard deviation 10.46900186					

Graph 1.



Comparison of results from cigarette smokers and non-smokers

Average oxygen efficiency rate for the non-smoking respondents' group totalled **84.32** and for the smoking group it totalled **81.55**. Both results are interpreted as **good**.

Readings from the standard deviation for both groups demonstrate that the non-smoking group was more diversified (result of 12.60093749) than the smoking group (8.394803588).

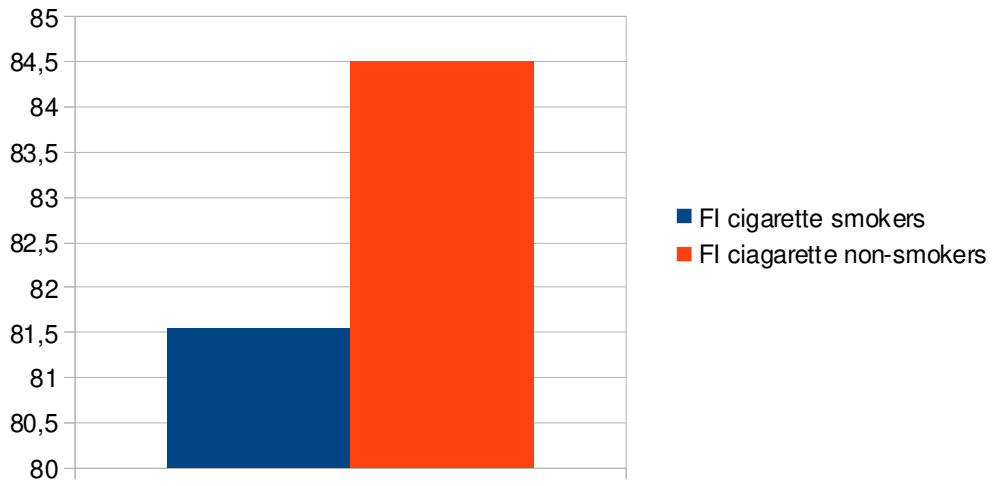
Tab. 6. Comparison of results from physically active smokers

1	24000	60	53	50	73	Average
2	24000	54	47	43	83	Good
3	24000	53	43	40	88	Good
4	24000	57	47	44	81	Good
5	24000	65	49	47	74	Average
6	30000	72	67	60	75	Average
7	30000	62	50	41	98	Excellent
8	30000	56	55	50	93	Excellent
9	30000	67	60	57	81	Good
10	30000	67	64	59	78	Average
11	30000	75	69	61	73	Average
					81.55	**Good**
	FI standard deviation 8.394803588					

Tab. 7. Comparison of results from physically active non-smokers

1	24000	60	39	38	88	Good
2	24000	56	42	40	86	Good
3	24000	51	49	45	82	Good
4	24000	75	59	48	65	Average
5	24000	62	58	55	68	Average
6	24000	65	60	54	67	Average
7	24000	51	50	49	80	Good
8	24000	61	57	51	71	Average
9	24000	63	56	54	69	Average
10	30000	55	49	43	102	Excellent
11	30000	59	53	49	93	Excellent
12	30000	59	51	45	96	Excellent
13	30000	56	52	52	83	Excellent
14	30000	67	63	52	82	Good
15	30000	58	44	38	112	Excellent
16	30000	65	53	42	93	Excellent
Average:					**84.5**	

Graph 2.



Comparison of results from physically active alcohol drinkers and physically active non-drinkers

Table 8. Comparison of results from physically active non-drinkers

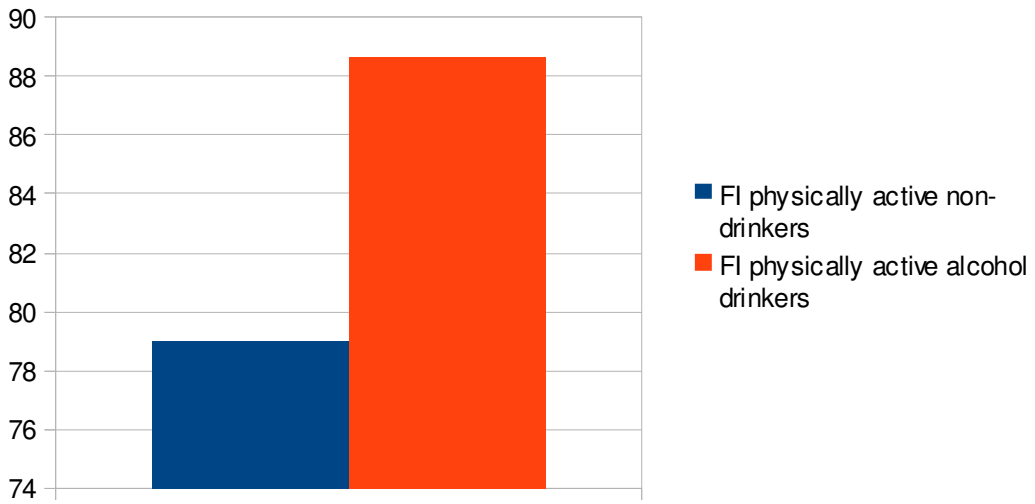
1	24000	60	39	38	88	Good
2	24000	60	53	50	73	Average
3	24000	65	49	47	74	Average
4	24000	56	42	40	86	Good
5	24000	51	49	45	82	Good
6	24000	75	59	48	65	Average
7	24000	62	58	55	68	Average
8	24000	65	60	54	67	Average
9	24000	63	56	54	69	Average
10	30000	55	49	43	102	Excellent
11	30000	72	67	60	75	Average
12	30000	67	60	57	81	Good
13	30000	66	63	61	83	Good
14	30000	57	54	54	90	Excellent
15	30000	67	64	59	78	Average
16	30000	60	53	50	92	Excellent
17	24000	63	56	54	69	Average
average					**79**	Good
Standard deviation					**10.56**	

Tab. 9. Comparison of results from physically active alcohol drinkers

1	30000	59	53	49	93	Excellent
2	30000	59	51	45	96	Excellent
3	30000	56	52	52	83	Excellent
4	30000	67	63	52	82	Good
5	30000	58	44	38	112	Excellent
6	30000	65	53	42	93	Excellent
7	30000	62	50	41	98	Excellent
8	30000	56	55	50	93	bardzo dobre
9	24000	51	50	49	80	Good
10	24000	61	57	51	71	Average
11	24000	54	47	43	83	Good
12	24000	53	43	40	88	Good
13	24000	57	47	44	81	Good
Average 88.7						Good
Standard deviation 14.15						

Research demonstrated that those who drink alcohol have a higher FI rate then the non-drinkers, and that standard deviation for those drinking alcohol equals 14.15 while for non-drinkers undertaking physical activity standard deviation equals 10.56..

Graph 3.



Comparison of results from physically active alcohol drinkers and physically active smokers

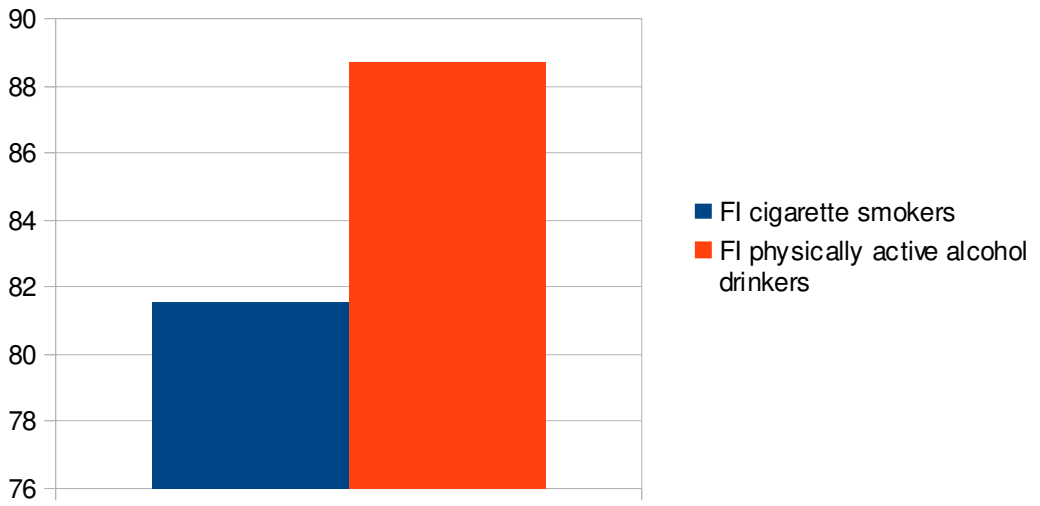
Tab. 10. Comparison of results from physically active alcohol drinkers

1	30000	59	53	49	93	Excellent
2	30000	59	51	45	96	Excellent
3	30000	56	52	52	83	Excellent
4	30000	67	63	52	82	Good
5	30000	58	44	38	112	Excellent
6	30000	65	53	42	93	Excellent
7	30000	62	50	41	98	Excellent
8	30000	56	55	50	93	Excellent
9	24000	51	50	49	80	Good
10	24000	61	57	51	71	Average
11	24000	54	47	43	83	Good
12	24000	53	43	40	88	Good
13	24000	57	47	44	81	Good
Average 88.7						Good
Standard deviation 14.15						

Tab. 11. Results from smokers

1	24000	60	53	50	73	Average
2	24000	54	47	43	83	Good
3	24000	53	43	40	88	Good
4	24000	57	47	44	81	Good
5	24000	65	49	47	74	Average
6	30000	72	67	60	75	Average
7	30000	62	50	41	98	Excellent
8	30000	56	55	50	93	Excellent
9	30000	67	60	57	81	Good
10	30000	67	64	59	78	Average
11	30000	75	69	61	73	Average
					81.55	**Good**
	FI standard deviation 8.394803588					

Graph 4.



The oxygen efficiency rate in the group of those who drink alcohol and undertake physical activity ranges between 73 and 93 giving an average of 81.55. This classifies the general physical efficiency of that group as good.

Respondents claiming to consume alcohol and undertake regular physical activity achieved an average result of 88.7 which demonstrates very good physical efficiency.

The comparison of standard deviation for both groups demonstrates that the efficiency rate for smokers is less diversified (8.39) than the efficiency rate for alcohol drinkers (14.15).

Conclusions

Research conducted for the purpose of this manuscript enabled an evaluation of how oxygen efficiency is presented in the different groups selected for the study. Respondents who took part in the research varied based on gender and use of stimulants.

The findings arising from the research conducted are as follows:

• Cigarettes reduce the fitness index rate.

Subjects who smoked had a lower oxygen efficiency rate than the non-smokers. This is a result of the harmful impact of smoking tobacco on the respiratory system which has a primary role in the metabolism of oxygen metabolism in the human body.

• Males have a better FI rate than females.

• Alcohol does not reduce the FI rate.

Research findings suggest that those who drink alcohol have increased oxygen efficiency compared to those who do not drink.

• Those who smoke cigarettes have a lower oxygen efficiency rate than those who drink alcohol.

Subjects who regularly play sport and smoke have a lower fitness index rate than physically active alcohol drinkers. Such a state of affairs is mainly due to the negative impact of tobacco smoke on the respiratory system which is important for oxygen metabolism.

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Correspondence

Wojciech Pasiak
Chair and Department of Vascular Surgery and Angiology,
Medical University of Lublin
Staszica 11
20-081 Lublin
Poland

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THE OPINIONS OF PARENTS OF DISABLED AND NON-DISABLED STUDENTS CONCERNING INTEGRATED EDUCATION

Justyna Charaśna-Blachucik

Faculty of Physical Education and Physiotherapy, Opole University of Technology, Opole, Poland

Abstract

This paper reports the results of a study concerned with the problems of integration in education at an elementary level. 130 parents of students with various types and degrees of disability and 130 parents of students without disabilities were asked to provide feedback in this area. On average, the classes applied in the study involved 17 students without a disability and 5 with a diagnosed disability.

The tool used in research was a questionnaire comprising 7 questions combined with a certificate with supplementary information (age of the child, place of residence, type of disability). Parents and teachers of integrated classes also provided information in the form of a completed questionnaire. The parents involved in the research are residents of the Opolskie Voivodeship (county) in the age range of 30-57.

The research results indicate that the level of satisfaction within an integrated setting in education is higher within the group of parents of disabled students. Both groups of parents surveyed highly value the presence of two teachers in the classroom, as well as the chance to adapt the curricula to the capabilities of students with disabilities and talented non-disabled students, as well as the opportunities provided for the development of cooperation and mutual help between students. The analysis of research results also indicates poor knowledge on the part of parents regarding the system of integrated education and their lack of confidence in the educational abilities of children with disabilities. A small group of surveyed parents did not observe any positive aspects of integrated education, and stress that the crucial task of schools is informed by the work of teachers and the selection of students.

During interviews with parents and teachers in integrated classes, we can note the lack of social education aimed at raising public awareness with regard to the problems of disabled students. An important problem is also associated with the lack of awareness of parents of non-disabled children concerning the values of pupil performance in an informal integrated setting.

Key words: *family, disability, integration, society*

Introduction

The concept of integrated education alongside mass education has been adopted as one of the basic roles of the education system in Poland over the last few decades. A number of publications, studies and reports are available in this area. Aleksander Hulek is considered the founder of integrative education in Poland, and published a number of theoretical and practical works in this field.

One of the characteristics of modern education is associated with the development of an integrated education system. This is due not only to the implementation of an ethical and humane social model, which numbers amongst its priorities a concern with the inclusive education of people with disabilities aimed at securing their active and complete participation in the society, where their subjectivity and autonomy are recognized and their social rights are guaranteed. We can emphasize that these rights arise from international documents, which include *Declaration on the Rights of Persons with Disabilities*, adopted by the General Assembly of the United Nations on December 9, 1975. The

declaration applies to every person with a disability. Apart from many other factors, education forms an inherent element of this process needed for a person to develop, realize his passions and dreams (…).[1]

The conditions for the education of students with disabilities formally changed following the reform of the educational system in Poland in 1991. However, only a few years later, when the possibility of enrolling in compulsory schooling in the integrated school system was decreed in 1993 and then in 1999 and when the document implementing the educational reform secured the right to education in a public school to every child regardless of the type and level of their disability, schools were obliged to provide conditions for inclusive education for students with disabilities[2]. Any work undertaken towards integration should strive to meet the basic needs of children with special educational needs as well as their classmates.

The outcomes of this cooperation are subject to control by institutions designed for this purpose, namely the school boards of education applied as part of the evaluation of the education system. There are 115 integration classes in 26 primary schools in the Opolskie Voivodeship.[3] After the visit of a commission whose task is to supervise the performance of the integrated setting in education, a report is drawn up and delivered to the school heads in those schools where the inspection has been carried out. It is also made available for teachers, parents and students. The inspection provides generally positive feedback from parents, and students as well as teachers. Some of the opinions are negative, but the system in general is viewed as satisfactory so that more and more integration classes are opened. It is also beyond doubt that processes of integration need to affect the model, the program of teaching and learning in integrated classes, and therefore it is extremely important to share experiences and develop this system.

The assumptions of integrated education are very similar in literature on the subject as well as in ministerial assumptions. These include:

- the integrated system is designed to bring children with different educational needs together and allow them to cooperate and learn from each other,
- it is recognized that the work of teachers in an integrated setting has to be concerned with support and work with a child in accordance with their individual needs,
- every child with a disability at school age, irrespective of their abilities, needs to be given an opportunity to attend a class that is adequate for their age, in a school located in the vicinity of where they live (i.e. a school attended by their non-disabled peers) and support should be offered to them, as well as to their family and teachers.

While literature in the area contains reports on integration at various stages of education, there has been little focus on the opinions of the participants of this education system – including parents and students.

Aim and scope

The aim adopted in the work involved the sampling and study of feedback gained from 126 parents of children with disabilities, as well as 132 parents of students without disabilities regarding the integrated setting provided for their children in primary schools. The research is typically informative based on the statements of people using integrated education, as well as the people who have developed it.

Questions

The study aims to provide answers to the following questions:

[1] www.problemy.edukacji.us.edu.pl – Wiesława Walkowska, Bartosz Gągorowski, *Założenia i bariery kształcenia integracyjnego* – October 8, 2017.

[2] J. Charaśna – Blachucik, K. Piechota, *Uczniowie ze specjalnymi potrzebami edukacyjnymi a kształcenie kadry nauczycielskiej*, [In:] Interdyscyplinarność i transdyscyplinarność w procesie kształcenia w szkole wyższej, red. Ż. Kaczmarek, Wydawnictwo Adam Marszałek, Toruń 2015, p. 204, Decree of February 15, 1999 outlining a new educational system reform, Journal of Laws no. 9, item 36), cf. I. Chrzanowska, *Pedagogika specjalna. Od tradycji do współczesności*, Impuls Kraków 2015, p. 535.

[3] Kuratorium Oświaty w Opolu - dane pochodzą z Systemu Informacji Oświatowej wg stanu na dzień 30 września 2017 r.

1. Are the parents of students without disabilities satisfied with integrated education?
2. Are the parents of students with disabilities satisfied with integrated education?

Materials and methods

The study was carried out among parents of primary school children in May, June and September 2017 in the Opolskie Voivodeship. A detailed analysis of the research provided information about the performance of integrated classes in the Opolskie Voivodeship. The research material could then be used to improve the quality of the primary school system with regard to the scope of the research that was carried out.

The survey technique was used as the basic research tool for the above purposes and oral interviews were carried out to provide parents and teachers with an additional opportunity to complement the results of the surveys. The entire material was compiled using the qualitative method (in the case of data derived from interviews) and the quantitative method (in data from surveys). The qualitative and quantitative methods that have been applied provide a comprehensive set of results with regard to the possibilities of improving the performance of integrated classes, as well as demonstrating that there is the need to create more of them as a result of the growing number of children with disabilities. Spoken reports from the teachers of integrated classes and their assistants teachers who guide students through difficulties in learning provide valuable sources of information with regard to both the shortcomings and the positive aspects of the integrated education setting.

Structure of study

Successful efforts were made to contact and interview parents of children attending 26 integrated classes in public schools. The research was carried out for cognitive purposes, among a total number of 258 parents. Each group received a questionnaire containing the same questions. A problem that arose in analysis concerned with the number of parents of children without disabilities, since on average there are 5 students in one integrated class certified with special educational needs, constituting one third of the class. On average, there are 17 students without disabilities in a class, which means that there 442 parents were to be contacted, and as a result, the ratio of both groups could be incompatible for further calculations and analysis.

Due to the fact that the research was performed in schools during regular meetings attended by the parents and that not every survey was completed correctly, the present analysis applied 130 questionnaires completed by parents of students with disabilities and the same number of parents of students without disabilities. The study consisted of 258 written and oral feedback questionnaires provided by the parents. Due to the fact that during the research it was possible also to access teachers, they were asked for their own opinions and for an indication of the strengths and weaknesses of this type of education.

Anonymity was requested by the parents, and consent was granted for the analysis of the results and information concerning the interviewees approached during the research.

Analysis of results

Reasons for **parental satisfaction** ***with*** **the integrated** ***setting***

Through analyzing the results of research aimed at learning the opinions of 126 parents of children with disabilities and 132 parents of students without disability regarding integrated activities conducted for their children in primary schools, a slight discrepancy between the opinions of the two groups can be noted. The results suggest that more than half of 204 parents are fully satisfied with the performance of integrated education, and that expectations were not fulfilled in the opinion of 56 parents. Among all parents, the number of those who hesitated but noted the progress made by the school system in terms of integrated education is equal to 40. This result was established on the basis of interviews with parents who support the organization of integrated classes, but are unwilling to send the child to an integrated education class in the given school.

However, the smallest ratio of interviewees is made up by parents, whose expectations are

not fully satisfied and who note deficiencies in the performance of this type of education system. Their opinions are valuable for the further improvement of the quality of work in such classes.

Table 1. Reasons for parental satisfaction with the performance of integrated classes. The list is organized in accordance with the order of parents' preferences.

No.	Reasons for parents to send their children to integrated classes	Number of parents of pupils without disability N = 132	Number of parents of pupils with disability N = 126	TOTAL N = 258
A	class is supervised by two teachers (improved discipline, stability during classes)	119	125	244
B	school curriculum is adapted to the needs of both children with and without disabilities	107	130	237
C	children learn from each other the values of: help, modesty, tolerance, cooperation, friendliness, etc.	98	104	202
D	my child improved their functioning within their peer group (has friends, acquaintances)	53	136	189
E	children acquire social skills (communication, personal culture, meeting other people, etc.)	76	81	177
F	only teachers with a specialization are involved in the education (specialist and therapeutic teams)	62	101	163
G	courses are taught by experienced teachers (including those who have long work experience, or have held multiple roles as class tutors, etc.)	78	72	150
H	the school has a variable teaching offer, educational and tourist activities	58	71	129
I	my child has a certificate concerning special educational needs and it is a good solution for them to function among students without disabilities	0	120	120
J	my child attended an integrated pre-school, so school forms the follow-up stage of this type of integration	31	88	119
K	other opinions provided by parents: - the integrated education system fulfills a current need and the effects are visible, - children are better prepared to interact with another person who has the same needs as everyone else; - children with disabilities want to show their skills in front of other students; - children support each other more and are likely to help and form peer groups; - the atmosphere in integrated classes depends on the teachers.	38	76	114

There are a lot of reasons why parents enroll children in integrated classes; one reason is associated with the feeling of security and care resulting from the presence of two teachers in the classroom, in particular in the group for parents of children with disabilities. As many as 125 parents of students with disabilities took the decision to register a child in integrated education due to this reason (table 1). Some of the opinions offer the

conclusion that the roles adopted by the teacher and assistant teacher may not meet the parents' expectations in every case. However, in this group, 244 interviewees consider this aspect as the greatest advantage of integrated schools.

The second important reason suggested by the parents who choose this type of education is associated with a curriculum that is adapted to the students' needs and includes the need to acquire a suitable level of work organization by the student. All of the surveyed parents of children with disabilities supported this opinion - 126, whereas for parents with children without disabilities, the number was 107. During discussions and interviews, the parents were tempted to identify certain gaps in this form of organizing integrated education. This statement takes into account feedback gained from parents of students without disabilities regarding the suitability of the school curriculum to the needs of average students and those with learning difficulties.

Students with exceptional skills and abilities and knowledge often enjoy extracurricular activities, sometimes outside school or at home, at the expense of their free time. They are often ready to prepare to participate in the 'Knowledge Olympics' or Competitions at home or with the teacher on their days off and during various projects organized by schools. Parents dislike the fact that gifted students cannot develop their special talents or abilities during lessons at school.

Among the list of reasons and positive remarks listing the positive effects of this form of education, we can observe the emphasis on benefits resulting from social aspects, which form some of the principal goals of integrated education. In the opinions of 98 parents of students without disabilities and 104 parents of students with disabilities, students acquire certain values from each other such as help, modesty, tolerance, cooperation, collegiality, etc. This is confirmed by a total number of 202 similar opinions. Similar effects were reported by the parents, including 189 opinions regarding the improved performance of children in the peer group, and offering the conclusion that pupils acquire general as well as basic social skills, according to 177 interviewees. For the most part, parents of children with disabilities positively perceive the work of specialist and therapeutic teams in their schools. Over half of these - 101 parents and 62 parents of children without disabilities - note the successes of the tutorial team. These opinions form very valuable input since such teams are able to adopt the program, conditions, and organize activities so that children with dysfunctions can use them as much as possible and learn about what they can do and what they cannot do. The Individual Program of Education and Therapy (IPET) is developed to suit a student's needs on the basis of certified special educational needs, which contains a list of the student's strengths and weaknesses and lists possible further approaches to their work. In addition, a social environmental diagnosis and an overview of the child's needs and abilities, through which the student can achieve success, has also been drawn up from September 2017. In the opinions of 78 parents of students without disabilities and 72 parents of children with disabilities, subjects are taught by experienced teachers. We can add here that the role of the main teacher is taken on by teachers who often do not have the training to work with students with special educational needs and disabilities, which also means that the supporting teacher is often left to struggle with a huge burden. Schools with integrated classes have many offers for students, including for example, trips, bonfires, special events, sports competitions, performances, etc. Remarks regarding such offers are listed in 58 surveys submitted by parents of students without disabilities and 71 parents of students with disabilities.

Following tests are performed in a psychological – pedagogical counseling center, students with various types and levels of disability receive a certificate regarding special education. However, it is their parents who choose the school and the type of educational environment for their children, and select whether their children participate in integrated or special education. This information was

obtained from 120 parents of children certified for special education. In this group there are 10 parents who think that this certificate should not have been issued to their children despite symptoms suggesting some degree of disability. For the majority of children following the integrated program to early childhood education, a school comprising integrated classes forms a follow-up from early education, and this pertains both to children with and without disabilities (88 and 31, respectively).

Reasons for parental dissatisfaction with integrated classes

Table 2 contains information gained from the parents summarizing the details of parental dissatisfaction with the performance of integrated classes. The feedback gained from the parents is in general similar to the results reported in studies concerned with problems in integrated education.

This list includes - among other issues - student exposure to inadequate learning settings, including: too many students requiring individual care, a lack of sufficient attention paid to gifted students, teaching staff with insufficient skills, too few teachers present in an integrated education class, too few specialists and the inappropriate attitude of teachers to students. In general, the number of parents who express dissatisfaction with the performance of integrated education is considerably smaller than those who are satisfied with the present system.

The approach that is assumed by those parents dissatisfied with the performance of integrated classes is perceived very positively by the general public, because on the basis of the suggestions provided by such parents it is possible to further develop and improve the system of integrated education and meet the expectations of parents and their children. The common denominator of integrated classes is concerned with the activities undertaken to the benefit of children with and without disabilities. There are also students with disabilities who demand a greater level of supervision from teachers, tutors or assistant teachers during the students' time at school. Sometimes these problems are very serious and there are circumstances where particular students cannot not find their place in the school setting. The behaviors demonstrated by such students lead to class disruption, which adversely affects high-performing students and those without disabilities. We can provide the following description of a situation involving such a student and related conflict as an example:

In the integrated class there is a student with autism and diagnosed mental incapacity all combined with being aggressive, self-harming and susceptible to various kinds of noisy stimuli, which result in the child responding with attacks of anger and attempts to run away. As a result, students within the range of standard development demonstrate reactions of fear and anxiety just as if they faced an attacker, and not a friend or classmate. And that is why, the school and this class are becoming dangerous for students, and parents are dissatisfied with the performance of this institution.

Among the types of disabilities that do not pose a threat can be included those which do not entail a diagnosed level of autism. Students with moderate and severe intellectual disabilities are granted individual hours of classes, and some only attend classes in subjects such as physical education, music, art and religion. These students do not pose such a threat as students with mental disabilities. Some of the diagnosed disabilities that are safe in everyday contact and do not pose a threat to the environment include motor disability (blindness and visual impairment, deafness and hearing loss, limb amputation or birth without part of the upper or lower limbs), somatic disorders, speech disorders, chronical illnesses and intellectual disability up to a light degree and even to a moderate or significant degree in many cases. The students in these categories seldom participate in integrated activities, as they often enjoy individual teaching. Students with Down syndrome are rarely reported to have disagreements, and we also distinguish different types of conjugate disabilities that do not interfere with normal life at school. Students with psychomotor hyperactivity and difficulties in concentration do

not pose a threat to the environment but demand attention from teachers. The reason is associated with the need to diversify the tasks every 10 minutes throughout the entire lesson.

The conclusions from this analysis suggest that students without disabilities in integrated classes, especially in the 7th and 8th grades of elementary school, and in classes I and II of the gymnasium (middle school) in the former education system also demonstrate the characteristics of friendliness and tolerance towards their disabled classmates.

Table 2. Reasons for parental dissatisfaction with integrated education

No.	Reasons for parental dissatisfaction with integrated classes	Number of parents of pupils without disability N = 132	Number of parents of pupils with disabilities N = 126	TOTAL N = 258
A	the number of children requiring individual care is too high (1 to 1)	85	15	100
B	unsuitable teachers (lack of empathy, patience, sympathy, communication)	64	33	97
C	inadequate attitude of teachers to students	62	35	97
D	a child with disabilities will never get the same results in learning as a child without disability	30	Parents with students with disabilities suggest that the word 'results' be replaced with 'progress' 57	87
E	Incorrect selection of students with and without disabilities	38	41	79
F	low levels of teaching non-disabled students	73	0	73
G	insufficient attention paid to students without disabilities	47	5	52
H	unskilled teaching and specialist staff	19	26	35
I	my child is not prepared to perform well in an integrated class	8	12	20
J	in addition to feelings and sensitivity to others, the pupils will not learn anything	18	0	18
K	- there is no possibility of working with a child who is high functioning but has an autistic spectrum of disorders - the tasks of an integrated class take away learning time from the better students, that is, we take the chances of some to give them to others	42	16	58

Conclusion

On the basis of the research carried out in the Opolskie Voivodeship, we can establish that integrated education meets the expectations of parents, but that it is necessary to close the existing gaps and oversight. The basic reason for dissatisfaction is associated with inadequate selection of students for integrated classes, and the lack of parental awareness regarding the educational and scientific benefits resulting from the activities of

integrated classes. Sometimes, there are cases of integrated classes in which five students require permanent supervision. This is much of a burden for the teachers and such circumstances form an impediment in the work of other students. If a teacher needs to deal with one of the students, they are unable to cater for the needs of others. For the most part, such students need help during various activities, such as changing into a sports outfit for a physical education lesson. The expectations of parents regarding the student's performance in the classroom are too high for a school, as it is not capable of meeting them. In some schools and classes, there are assistant teachers who can help in some activities. In this case, special schools form an alternative to integrated schools, as the program in them is adapted to the students' capabilities, but only children with intellectual and multiple disabilities are eligible for this type of institution.

Another reason for poor results is associated with the lack of adequately trained teaching staff, for instance of skilled professional to play the role of assistant teacher. Often, these people do not have training in the area, and in accordance with the law under the current Labor Code, they can perform such a function.

Another type of obstacle is associated with the variety of disabilities and other disabilities that are not revealed by parents to school authorities, which poses a problem in the selection of students in a class. On one hand, this is understandable, as parents are not likely to admit that their child is disabled, and on the other hand it poses a challenge for class and school organization. Such parents do not realize, or do not want to know that this can do harm to their child and the environment in which they function. Only after the child is subjected to a comprehensive pedagogical and psychological diagnosis, can appropriate knowledge be made available to parents regarding help and work with the child, including knowledge of the child's strengths and weaknesses. In this manner, parents could receive practical tips and support.

Sometimes a case may also arise in which a parent cannot note any positive aspects of their son or daughter's disability.

On the basis of an analysis of the answers to individual questions from the surveys and interviews we can learn a great deal about the atmosphere at school; about the teachers' willingness to cooperate and engage in work with students and parents, about the duty of sharing ways of looking for help and their outcomes. It would be worthwhile to conduct research on students of integrated classes at various levels of education.

The material that was collected helped with answering the following questions and concerns:

1. **Are parents of children without disabilities satisfied with integrated education?**

In general, we can say that they are satisfied and the schools meet their expectations, but they have some concerns about the teachers' work with their children.

2. **Are parents of children with disabilities satisfied with integrated education?**

This group of parents has several educational options to choose from. The child can attend any general class, integrated class and special school. Parents can choose the school depending on the type of disability. The parents reviewed are satisfied with the available alternatives of integrated classes, but also provide suggestions and propositions regarding the possibilities of improving the performance of the system.

3. **What types of disabilities are accepted in education?**

There is a large number of students who do not pose a threat to other students in the classroom, e.g. ones with intellectual disability up to a moderate degree, ones with physical disabilities, some individuals with mental disorders with high-functioning autism, some cases of Asperger's syndrome, attention deficit hyperactivity disorder, as well as with chronic diseases.

4. **What types of disabilities are problematic or even harmful to the system of integrated education?**

Some students with mental disorders: autism, behavioral disorders – aggression with multiple disabilities can form a threat.

5. Do integrated classes entirely fulfill parents' expectations?

In most cases, parents of children with and without disabilities are not fully satisfied with the system of integrated education. Therefore, we should draw conclusions, improve, develop the school system and integrated classes on the basis of feedback from the stakeholders involved in this education. There are probably many other defects that were not listed by the current parents, but the faults identified should provide hints for the improvement of the process of education, care, therapy and, above all, to adapt the course of the teaching program for students with and without disabilities.

Students with physical disabilities (limb amputees, amblyopia, hearing loss) do not differ in intellectual level from non-disabled students. Limitations they have to face and cannot cope with are partly associated with the school's architecture and participation in physical classes such as physical education. Typical limitations involve a situation when a student moves in a wheelchair, or relies on external help, i.e. assistance needed to help him or her change to a sports outfit for a PE lesson.

Difficulties in integration occur in children with mental disorders such as autism, autistic symptoms, and schizophrenia. The students with the Asperger syndrome demonstrate considerable social limitations, but in terms of intellectual abilities sometimes they are ahead of other students.

Advantages of the integrated setting in education forms an extensive topic. The cooperation of two teachers and a small number of students offers individual work, constant adaptation of the program to their abilities, the graduation in terms of difficulty of tasks, and the application of interesting methods aimed at student activation. Individualization of the trajectory in education also applies to exceptionally able students for whom additional tasks are developed. During the lesson, students have an opportunity to speak more often and discuss their opinions. The cooperation between well-functioning, average, talented and ambitious students is known to assist, help and guide but most often motivate students with special educational needs to work.

Conclusions

1. The majority of the surveyed parents are satisfied with the performance of integrated classes. This system meets the expectations of parents of children with disabilities. Schools with integrated classes support the development of children both with and without disabilities. Children acquire *social and emotional* skills *most* effectively when *they* attend such classes.
2. A small proportion of parents, especially those with non-disabled children are convinced that students receive a lower level of teaching in the integrated class and that teachers do not have time during lessons for the more gifted and talented students (i.e. they do not receive enough attention). The reason for this conclusion is not fully clear, as many students in the investigated integrated classes are models in terms of learning achievements and receive a promotion to the next level with a certificate with a red stripe indicating high academic achievement.
3. Success in the adequate functioning of the class largely depends on the selection of students in a class, the type of disability, as well as communication and cooperation between teachers and parents.
4. Amongst the parents interviewed are those who observe that the work of the school comprises the running of integrated classes. These parents compare, research, and realize that the conditions provided by the education system – i.e. by the school - offer attractive learning conditions for their children. An important issue considered in selecting an integrated school is associated with safety, the atmosphere in the classroom and at school, easy access, trained teaching staff and the availability of specialist teams. Some parents experience anxiety and fear with regard to the

possibility of their children being mocked or harmed.

The growing problem is associated with the reluctance of parents of children without disabilities to enroll their sons and daughters in integrated classes.

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Correspondence

Justyna Charaśna-Blachucik
E-mail: charasnaj@wp.pl

INFORMATION FOR THE PAPER AUTHORS

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