

# GEOSPORT

for

# SOCIETY

Volume 12/ no. 1 / 2020



Oradea-Debrecen-Gdansk



© GEOSPORT FOR SOCIETY

ISSN 2393-1353

Edited by Oradea University Press  
1, University street, 410087 Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro/geosport.html>



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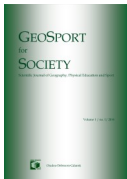


# GEOSPORT for SOCIETY

Volume 12/ no. 1 / 2020



Oradea-Debrecen-Gdańsk



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Scientific Journal founded in 2014 under aegis of University of Oradea  
(Romania), University of Debrecen (Hungary), University of Gdansk (Poland)  
and published by Oradea University Press  
ISSN 2393-1353  
Journal homepage: <http://geosport.uoradea.ro>



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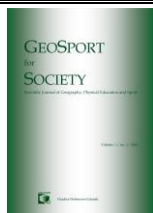
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Journal homepage: <http://www.geosport.uoradea.ro>



## GEOSPORT FOR SOCIETY

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ISSN 2393-1353

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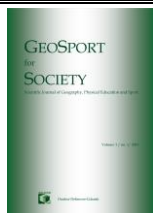


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# Trends in the lifestyle of students. Case study of a high school in Oradea, Romania

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**Citation:** Erdely, Ș., Caciora, T., Șerbescu, C., Papp, B.M., Tamas, F.A., Bujorean, E., Baidog, A., Furdui, S., Ile, M., & Herman, G.V. (2020). Trends in the lifestyle of students. Case study of a high school in Oradea, Romania. *Geosport for Society*, 12(1), 1–12. <https://doi.org/10.30892/gss.1201-052>

*Article history:* Received: 20.09.2019; Revised: 12.11.2019; Accepted: 20.01.2020, Available online: 03.02.2020

**Abstract:** In a society found in a continuous movement and development, children and teenagers face a more increased predisposition to adopt a messy lifestyle. Considering this background, the scope of the present study was to analyse the trends regarding the lifestyle of students from a school in Oradea Municipality, Bihor County, Romania. For the study were considered 591 students with ages comprised between 10 and 19 years. The research method used was that of the questionnaire which comprised 15 items regarding their perception of health, the practice of physical and sedentary activities, rest and nutritious habits. The interpretation of results brings forward the fact that students face great deficiencies regarding their health as a result of a messy lifestyle characterised by unhealthy nutritious habits, lack of physical activity and corresponding rest and the increase predisposition towards a sedentary lifestyle. The study materializes as an alarm signal regarding the unhealthy

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habits of today's students. They do not comply with the standards related to the healthy lifestyle, which can lead in time to the appearance of diseases. In guiding students towards adopting a healthy lifestyle, the most important roles are played by the family and the school.

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**Keywords:** healthy lifestyle, nutrition, student health, health promotion, physical education

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## **Introduction**

Teenagehood is one of the most significant periods in the life of an individual, a period in which ideas, concepts, behaviours and habits develop and may persist for the rest of their life (Post et al., 2001). Modern society faces a great problem concerning the messy lifestyle children and teenagers choose which is characterised by inactivity and a poor nutrition. The results of an undisciplined lifestyle are more and more severe, being the cause of the appearance of chronic diseases such as diabetes, cardiovascular diseases, obesity, different types of cancers or arterial hypertension (Baidog and Herman, 2018; Papp et al., 2019). School, together with family, due to the central role they have in the daily life of each child and teenager, influencing their decisions and shaping their character as future adults (Viner et al., 2012; Buhaș, 2015), represent the key to success in what the promotion of positive habits and of a healthy lifestyle is concerned. If it is difficult to control how the family deals with this type of education, through a structured educational system students may be given an insight into positive habits and behaviours concerning nutrition and the practice of physical activities in order to improve and maintain their overall health.

In order to maintain a physical, mental as well as a social wellbeing of the child in an environment which is becoming full of sedentary alternatives, the activity and physical condition play a major role in the context of preventive medicine (Loprinzi et al., 2012; Martinez-Gomes et al., 2010). Moreover, studies carried out in the field (Janssen and LeBlanc, 2010; Verburch et al., 2013; Biddle and Asare, 2011; Buhaș et al., 2017) have shown that a superior health in adulthood is the result of regulate and systemic practice of physical activities during childhood. One of the primary prophylactic strategies for the improvement of students' physical condition is the increase of physical education classes during a week of study (Moller et al., 2014; Klakk et al., 2013; Demirturk and Kaya, 2015; Buhaș et al., 2018), number of lessons which is relatively low in the curriculum for middle and secondary education in Romania (generally 1 to 2 classes per week).

In what the nutrition is concerned, it represents a fundamental element for an optimum development of children and teenagers (Washi and Ageid, 2010; Moreno et al., 2014). A poor intake of the main nutrients may contribute to a delayed and improper development (Schneider, 2000). As the childhood is the



period when most of the nutrition habits of an individual are formed, it is important that the school provides its students with support and guidance concerning nutrition and healthy lifestyle (Townsend et al., 2010; Peralta et al., 2016). One of the best known methods used in schools to encourage students to adopt adequate nutrition habits is observed through the implementation of the concept of nutritional education (McKenna, 2010; Graziose et al., 2017; Porter et al., 2017), providing healthy meals for students (Utter et al., 2016) and vitamins (iron, zinc, calcium, vitamin A, vitamin D, vitamin C) which provide the necessary supplement for an optimum development (Salam et al., 2016; Noguchi et al., 2018).

Thus, the purpose of the present study is to deal with the analysis and assessment of the tendencies concerning the lifestyle and nutrition of “Ady Endre” High-school students in Oradea, Bihor County, Romania.

## **Materials and Methods**

### ***Participants:***

The present study is based on the results obtained from the consultation, between the 1<sup>st</sup> of February 2019 and the 29<sup>th</sup> of March 2019, of 591 students of the “Ady Endre” Theoretic High-school of Oradea, Bihor County, Romania. The target group comprised 591 students (254 boys and 337 girls) from grades 5 to 12 with ages comprised between 10 and 19 years.

### ***Procedure:***

The used research method was the sociologic survey based on a questionnaire, which is a quantity collection and data analysis method (Babie, 2010; Herman et al., 2019; Ilies et al., 2015; Oneț, 2020; Tătar et al., 2018; Vlăsceanu, 2013; Wendt, 2019). The questionnaire that was used comprised 15 items grouped in two parts. The first part comprises 6 items and assesses the perception of health, the practice of sport, respective sedentary activities and rest (sleep), while the second part comprising 9 items focuses on information regarding the students’ dietary habits.

### ***Statistical analyses:***

Data analysis and interpretation was carried out with the help of a statistic analysis software – SPSS. The information thus obtained was analysed (according to their options, sex and grade), in correlation to the results obtained in other speciality studies regarding the analysed elements and the implications they have on health.

## **Results and Discussions**

At the beginning of the form, the students were required to self-assess their own health by answering the following question “How do you assess your own health?” being able to choose from 5 answers from excellent to unsatisfactory. Studies carried out in this domain prove that the family support is a powerful

predictor of perception on the health of a teenager (Peres et al., 2010; Meireles et al., 2015; Dragoș et al., 2018), indicating thus the importance of the family during the development of the individual. The question being increasingly subjective, as it has been already expected, more than three quarters of the respondents (86.28% - 510 students) declared to be pleased with their health, choosing the answers “excellent”, “very good” and “good”. The percentages are rather balanced considering the satisfaction degree of the health according to gender; with a slight difference, girls are 2.45% more satisfied than boys. To be noticed the increase tendency of the dissatisfaction once they get older. If 90.7% of the students from grades 5 – 8 are satisfied with their health, the proportion decreases in the case of high-school students (grades 9 - 12), where only 82.9% are satisfied (table 1).

In order to have a healthy lifestyle and an optimum development, children and teenagers should practise at least 60 minutes of physical activity every day, with an intensity from moderate to vigorous (Hills et al., 2015; Martinez-Gomez et al., 2010; Tătar et al., 2018; Marcu and Buhaș, 2011).

Following the analysis of the results obtained by applying the questionnaire, there were observed deficiencies regarding the time allotted by the students to practice physical activities. Most of the students answered the question “How often do you practice physical activity?” with 2-3 times per week (41.45% - 235 students), followed by those who practice it daily (25.67% - 150 students) and once a week (15.13% - 94 students). Out of the total of 591 respondents, 75 rarely practise a physical activity, while 37 do not practise an activity at all. A 15% deficit is observed between the two education cycles, therefore, in grades 5 to 8, 89.9% practise a sport weekly, while at a high-school level the proportion decreases to 74.5%. The 7<sup>th</sup> graders are the students who practise a physical activity the most, where 90.56% practise it daily or at least twice per week. The 12<sup>th</sup> graders are at the opposite pole, where 14.89% do not practice any sport, while 21.28% declared that they do practise a sport but very rarely. The percentages are balanced when analysing the genders; 83.08% of the boys practise a physical activity at least once a week (31.34 – daily, 41.96% - 2-3 times a week, 9.78% – once a week), while the percentage for girls is 80.75 (18.76% - daily, 42.67% - 2 – 3 times a week, 19.32% - once a week).

Sleep is essential for the body to recover and to increase the attention span and memorisation capacity. A report of the National Sleep Foundation, published in 2000, reveals that teenagers require between 8.5 and 9.25 hours of sleep every night. Decreasing the effective sleep period may lead to metabolic imbalances and hormonal changes in time (Pulido-Arjona et al., 2018), contributing also to the appearance of obesity (Magee and Hale, 2012). Most of the students questioned (44.90% - 265 students) declared that they sleep less than 8 hours per night, while

those who sleep between 8 and 9 hours per night are 312. Considering the optimum number of hours slept in relation with the grade, it may be observed that there is a continuous decreasing trend. Therefore, most of the 5<sup>th</sup> graders (86.49%) respect the recommendations concerning the sleep period while only 11.11% of the 12<sup>th</sup> graders sleep between 8 and 9 hours per night.

**Table 1.** Students' answers to questions about their lifestyle

Questions	Answer options	Students answers by classes (%)								Total (no.)	Average (%)
		V	VI	VII	VIII	IX	X	XI	XII		
How do you assess your own health?	excellent	9.30	0.00	5.56	5.88	3.74	3.92	2.88	0.00	23	3.91
	very good	32.56	36.11	53.70	50.98	32.71	33.33	36.54	31.25	227	38.40
	good	48.84	47.22	33.33	39.22	47.66	47.06	38.46	50.00	260	43.97
	satisfactory	9.30	13.89	7.41	3.92	14.95	14.71	17.31	14.58	71	12.01
	unsatisfactory	0.00	2.78	0.00	0.00	0.94	0.98	4.81	4.17	10	1.71
How often do you practice physical activity?	daily	36.36	19.15	45.28	27.27	36.96	17.82	9.71	12.77	150	25.67
	2-3 times/week	45.45	53.19	45.28	47.27	26.81	34.65	53.40	25.53	235	41.45
	1 times/week	11.36	12.77	1.89	14.55	16.67	22.77	15.53	25.53	94	15.13
	rare	6.82	10.64	3.77	9.09	13.04	16.83	14.56	21.28	75	12.00
	don't practice	0.00	4.26	3.77	1.82	6.52	7.92	6.80	14.89	37	5.75
How many hours do you usually sleep at night?	less than 8 hours	5.41	35.14	21.57	21.15	47.68	62.64	76.70	88.89	265	44.90
	8 hours	56.76	24.32	54.90	36.54	18.54	29.67	22.33	11.11	188	31.77
	9 hours	29.73	35.14	19.61	40.38	33.77	7.69	0.97	0.00	124	20.91
	10 hours	5.41	0.00	3.92	1.92	0.00	0.00	0.00	0.00	8	1.41
	more than 10 hours	2.70	5.41	0.00	0.00	0.00	0.00	0.00	0.00	6	1.01
What time do you go to bed in the evening?	before 9 o'clock	22.73	13.89	11.32	1.85	4.03	4.85	0.98	0.00	44	7.46
	22:00	50.00	63.89	41.51	38.89	18.55	21.36	17.65	14.89	197	33.34
	23:00	27.27	22.22	43.40	46.30	41.13	32.04	40.20	34.04	211	35.83
	24:00	0.00	0.00	3.77	9.26	30.65	34.95	32.35	36.17	109	18.39
	after 12 o'clock	0.00	0.00	0.00	3.70	5.65	6.80	8.82	14.89	30	4.98
How often do you have problems with the sleep?	daily	11.36	8.33	20.37	15.09	37.78	23.30	15.00	19.57	111	18.85
	2-3 times/week	36.36	36.11	27.78	35.85	32.59	40.78	33.00	26.09	198	33.57
	1 times/week	15.91	16.67	3.70	11.32	11.85	14.56	19.00	17.39	82	13.80
	rare	29.55	13.89	42.59	22.64	12.59	13.59	23.00	26.09	136	22.99
	never	6.82	25.00	5.56	15.09	5.19	7.77	10.00	10.87	64	10.79
How many hours a day do you spend at the computer/smartphone/television?	less than 2 hours	30.95	27.78	23.08	20.41	16.79	20.20	11.34	6.52	116	19.63
	2 hours	33.33	41.67	42.31	32.65	30.53	37.37	25.77	21.74	196	33.17
	3 hours	14.29	13.89	21.15	22.45	38.93	25.25	34.02	17.39	138	23.42
	4 hours	16.67	11.11	9.62	20.41	8.40	10.10	8.25	26.09	82	13.83
	more than 4 hours	4.76	5.56	3.85	4.08	5.34	7.07	20.62	28.26	59	9.94

There is an irregularity which might be observed following the analysis of the data collected for the following question "What time do you go to bed in the evening?". Studies have revealed that the optimum sleep interval for children and teenagers is between 9 o'clock in the evening and 7 – 8 o'clock in the morning (Short et al., 2011), while the people who go to sleep between 9 and 10 o'clock at night obtain better results in attention, memory and creativity tests compared to those who sleep the same number of hours but go to sleep later. Only 40.80% of the students of "Ady Endre" High-school of Oradea comply with the recommended norms and go to sleep by 10 o'clock at night. The rest of 59.20% go to sleep later, some of them exceeding 11 o'clock at night. The middle school students respect the recommendations the most (61% go to sleep before 10 o'clock) especially students in 5<sup>th</sup> and 6<sup>th</sup> grade, while the percentage for the students in high-school drops to

20.58%, with the minimum value in the last grade of high-school (14.89%). The sleep deficiencies are also frequent in students, 66.22% of them reporting sleep problems every week. Approximately 111 (18.85%) of the questioned students have sleep problems every night, 198 (33.57%) twice or three times per week and 82 (13.80%) students once a week. Having analysed the data in relation to the education cycles it is revealed that high-school students are predisposed to having frequent insomnias (72.73%), compared to middle school students (59.71%). This is a problem which requires serious treatment both by the students as well as by their parents as insomnias may have devastating effects on health. Teenagers who lose nights are prone to develop chronic depression, behavioural imbalances, social adaptation deficit, dealing with intellectual performances decrease, lack of reactivity and cognitive functions (Owens, 2014; Buhaș, 2015).

Together with the progress of digital technology, teenagers have started to occupy their free time surfing the web, communicating with each other through socialising networks or simply watching television. The American Paediatric Academy does not recommend that students spend more than two hours using their smartphone, computer or television (Rosen et al., 2014). Abuse may lead in time to psychologic stress, manifested through depression, withdrawal, anxiety, attention problems, aggressiveness, sadness, suicidal thoughts, as well as physical imbalances (backpain, migraines, obesity) (Bailin et al., 2014). Half of the students questioned (52.81% - 312 students) reported using electronic devices no more than two hours a day. This has been especially reported by middle school students (63.05%) and less by high-school students (42.57%). But the later are more predisposed to abuse than the small ones; 42.11% of the high-school children use their devices between 3 and 4 hours every day, while 15.32% use their devices more than 4 hours every day.

The analysis of the answers for the questions which assess nutrition and dietary habits of students and teenagers (table 2) reveal a series of irregularities, as well as corresponding behaviour towards the consumption of food; which is hopeful for the present and future health of children.

Not to serve breakfast is a worldwide phenomenon, while teenagers from the target group of the present study carry out this unhealthy habit. Only 111 (18.85%) students of the total of 591 have breakfast every day, while 82 (13.80%) do this thing twice or three times per week. Most of them (33.57%) eat in the morning once a week, and in special cases (22.99%), or skip breakfast (10.79%) (table 2). Recent studies (Alexy et al., 2010; Sila et al., 2019; Fayet-Moore et al., 2016) have raised a warning signal concerning this unhealthy habit which may lead to obesity, attention deficit and the decrease of school performances.

Table 2. Students' answers to questions about the nutrition habits

Questions	Answer options	Students answers by classes (%)								Total (no.)	Average (%)
		V	VI	VII	VIII	IX	X	XI	XII		
How often do you serve a consistent breakfast?	daily	11.36	8.33	20.37	15.09	37.78	23.30	15.00	19.57	111	18.85
	2-3 times/week	15.91	16.67	3.70	11.32	11.85	14.56	19.00	17.39	82	13.80
	1 times/week	36.36	36.11	27.78	35.85	32.59	40.78	33.00	26.09	198	33.57
	rare	29.55	13.89	42.59	22.64	12.59	13.59	23.00	26.09	64	22.99
	never	6.82	25.00	5.56	15.09	5.19	7.77	10.00	10.87	136	10.79
How often do you eat vegetables?	daily	11.63	33.33	27.45	46.15	40.48	27.45	25.74	29.79	179	30.25
	2-3 times/week	53.49	53.85	62.75	44.23	46.03	55.88	58.42	61.70	322	54.54
	1 times/week	13.95	10.26	7.84	7.69	10.32	11.76	10.89	6.38	59	9.89
	rare	11.63	2.56	1.96	1.92	2.38	3.92	4.95	2.13	23	3.93
	never	9.30	0.00	0.00	0.00	0.79	0.98	0.00	0.00	8	1.38
How often do you eat fruit?	daily	38.64	50.00	35.85	22.22	40.80	29.41	34.00	44.68	218	36.95
	2-3 times/week	38.64	27.78	45.28	66.67	41.60	49.02	44.00	42.55	263	44.44
	1 times/week	11.36	16.67	11.32	11.11	13.60	16.67	13.00	8.51	76	12.78
	rare	9.09	5.56	7.55	0.00	3.20	3.92	7.00	2.13	28	4.81
	never	2.27	0.00	0.00	0.00	0.80	0.98	2.00	2.13	6	1.02
How often do you eat meat or meat preparations?	daily	31.11	30.56	18.52	20.75	38.35	23.30	14.71	12.77	140	23.76
	2-3 times/week	37.78	19.44	40.74	32.08	33.08	43.69	43.14	48.94	221	37.36
	1 times/week	17.78	11.11	18.52	16.98	9.02	10.68	5.88	6.38	71	12.04
	rare	8.89	27.78	12.96	15.09	15.04	17.48	23.53	17.02	102	17.22
	never	4.44	11.11	9.26	15.09	4.51	4.85	12.75	14.89	57	9.61
How often do you eat sweets?	daily	32.56	25.00	33.33	50.00	45.13	41.00	25.49	25.53	205	34.76
	2-3 times/week	34.88	38.89	45.10	38.46	39.82	42.00	33.33	38.30	230	38.85
	1 times/week	16.28	16.67	13.73	3.85	9.73	11.00	23.53	21.28	86	14.51
	rare	16.28	16.67	7.84	5.77	5.31	6.00	16.67	14.89	66	11.18
	never	0.00	2.78	0.00	1.92	0.00	0.00	0.98	0.00	4	0.71
How often do you eat pastry?	daily	18.18	8.33	5.77	18.52	34.69	6.73	6.00	9.30	79	13.44
	2-3 times/week	50.00	36.11	40.38	38.89	36.05	50.96	44.00	32.56	243	41.12
	1 times/week	22.73	30.56	34.62	27.78	19.73	27.88	28.00	25.58	160	27.11
	rare	9.09	22.22	15.38	14.81	9.52	14.42	21.00	32.56	103	17.38
	never	0.00	2.78	3.85	0.00	0.00	0.00	1.00	0.00	6	0.95
How often do you eat foods with high saturated fat and cholesterol?	daily	9.09	0.00	7.55	5.66	7.14	10.38	7.07	4.35	38	6.41
	2-3 times/week	38.64	55.56	47.17	49.06	39.61	60.38	60.61	56.52	301	50.94
	1 times/week	52.27	41.67	45.28	45.28	20.13	29.25	31.31	39.13	225	38.04
	rare	0.00	2.78	0.00	0.00	33.13	0.00	1.01	0.00	27	4.62
	never	8.89	27.78	9.43	17.31	18.52	23.53	20.19	17.02	105	17.83
How often do you eat high processed foods (carbonated drinks, fast food etc.)?	daily	24.44	27.78	41.51	30.77	28.15	36.27	38.46	29.79	190	32.15
	2-3 times/week	24.44	22.22	13.21	19.23	37.78	18.63	12.50	19.15	124	20.90
	1 times/week	42.22	22.22	35.85	32.69	14.07	18.63	27.88	31.91	166	28.18
	rare	0.00	0.00	0.00	0.00	1.48	2.94	0.96	2.13	6	0.94
	never	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
How much water do you drink during a day?	less than 1,5 litre	20.93	33.33	19.23	13.21	19.85	25.00	22.55	32.65	138	23.34
	1,5 litre	44.19	33.33	40.38	43.40	30.15	38.00	42.16	24.49	219	37.01
	2 litre	27.91	13.89	26.92	22.64	37.50	21.00	27.45	28.57	152	25.74
	2,5 litre	4.65	16.67	13.46	13.21	6.62	8.00	6.86	14.29	62	10.47
	more than 2,5 litre	2.33	2.78	0.00	7.55	5.88	8.00	0.98	0.00	20	3.44

A satisfying thing is the fact that the students questioned acknowledge the importance of fruit and vegetables for a balanced and healthy diet. Over 80% of the students declare they eat fruit and vegetables at least twice a week, while 30% of them do it daily. Only 8 subjects do not eat vegetables at all, while 6 do not eat any fruit. Even if vegetables are a good source of fibres, they stimulate the transit with essential implications for the somatic and psychic balance, but also meat has an important role in a diet. Meat consumption also has beneficial effects, providing the proteins and nutrients essential for the organism, but it has to be consumed wisely and to avoid excesses in order to avoid heart problems and arterial hypertension (Wyness, 2015); also, the choice of the type of meat is very important. The majority of the students (37.36%) maintain an optimum ratio of meat in their diet, consuming it two to three times per week. Approximately a quarter of the students

abuse it, consuming it daily, while 57 students never eat meat or meat produce. The biggest consumers are the students of the 5th grade, 86.67% eating meat weekly, followed by 9<sup>th</sup> graders (80.45%) and 7<sup>th</sup> graders (77.78%); while on the opposite pole are the 6<sup>th</sup> graders (61.11%) and the 12<sup>th</sup> grades (68.09%).

Sweets, as it was expected, are the students' favourite, approximately a third (34.76% - 205 students) consume them daily, while 38.85% twice or three times per week. This is the question which has received the lowest number of "never" answers, only 4 subjects never consume sweets.

Bakery products are also present in the weekly menu of children and teenagers, being consumed especially during school days. Over 80% (482 students) have reported to consume this type of products at least once per week, most of them (41.12% - 243 students) even two to three times per week. A decreasing trend of the number of consumers in middle school may be observed, until the last grade of high-school where the minimum threshold is recorded (67.44%).

Students frequently consume foods rich in saturated fats and cholesterol, as well as highly processed foods. Approximately 95% eat produce rich in saturated fats at least once a week, the favourite answer being "2 - 3 times/week" with 301 respondents. Only 4.62% of those questioned rarely consume such types of foods; most of them are 9<sup>th</sup> graders, 33% of the total. Highly processed foods such as frozen semi-cooked foods, carbonated drinks, fast food, etc. are consumed on a weekly basis by most of the students. Therefore, an average of 70.88% of the 591 students consume this type of foods at least once a week, the largest number (32.15%) even twice or three times a week, while 17.83% consume them daily. The analysis based on education cycles reveals that high-school students (75%) are most likely prone to consume this type of products compared to the percentage of middle school students (66.75%).

Sweets, bakery products, foods rich in saturated fats and highly processed foods, due to the fact that they are nutritionally imbalanced (Louzada et al., 2015), frequently consumed and in large quantities may represent a real danger for children and teenagers. The most frequent negative effects are obesity, different types of cancer (hepatic, colic, renal etc.), increase in the level of cholesterol and triglycerides, fatigue, lack of concentration, decrease in focus and reaction speed (Powell and Nguyen, 2013).

Water is an essential nutrient for optimal functioning of the body. The 2010 report of the European Food Safety Authority (EFSA) regarding Dietetic Products, Nutrition and Allergies reveals that for a healthy lifestyle, children and teenagers are required to drink between 2 and 2.5 litres of water per day, depending on their sex, age, weight and physical activity. Only 39.65% (234 students) of those questioned

meet the requirements of this standard. The majority (37.01%), consume only 1.5 litres of water per day, which is quite a small amount of water even for a middle school child. As it was expected, the water consumption increases in direct relation with the age, high-school students consume more water than middle school students. There is an alarming issue concerning the water consumption of students, because the effects of dehydration are very dangerous. EFSA reveals as a consequence of low water consumption, symptoms such as: headaches, irritability, concentration difficulties, drowsiness, muscle cramps, etc.

### Conclusions

The inadequate lifestyle, lack of physical activity and an unhealthy diet may contribute in time to the serious degradation of children's health. This study is seen as an alarm signal concerning unhealthy behaviours of children and teenagers nowadays. A series of problems which the students face were identified as a result of the application of the questionnaire. Concerning the feeding habits few of the teenagers questioned respect the standards and norms imposed by the main intake of nutrients. Their nutrition is a chaotic one, sprung either from their or their parents' carelessness. Also, students prefer to use electronic devices instead of practicing a sport, they sleep less and most of them have sleep related problems. All these may contribute in time to the decrease in school performance as well as the increase in a predisposition to develop different affections. The school has a major role considering the fight against this negative trend related to an unbalanced diet and an unhealthy lifestyle, which seems to have been appropriated by a large number of children and teenagers. Also the introduction within the curricula of diet related classes, as well as a greater number of physical education lessons ensures the promotion of a healthy lifestyle and also assists children and parents to counteract present lacks.

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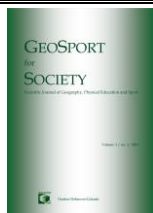
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Scientific Journal founded in 2014 under aegis of University of Oradea (Romania),  
University of Debrecen (Hungary), University of Gdansk (Poland)

ISSN 2393-1353

Edited by Oradea University Press  
1, University Street, 410087, Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro/geosport.html>



# The spatial characteristics of the infrastructural background of physical education (PE) classes in Hungarian kindergartens

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**Citation:** KOZMA, G. (2020). The spatial characteristics of the infrastructural background of physical education (PE) classes in Hungarian kindergartens. *Geosport for Society*, 12(1), 13–23. <https://doi.org/10.30892/gss.1202-054>

*Article history:* Received: 17.12.2019; Revised: 05.01.2020; Accepted: 22.01.2020, Available online: 05.02.2020

**Abstract:** Kindergarten physical education (PE) plays an important role in the development of the age group concerned for a number of reasons; however, it is only possible in case of certain infrastructural conditions, which make it possible to have PE classes even in case of unfavourable weather conditions. In the spirit of the above, the primary objective of this paper is the examination of the spatial distribution of these facilities (smaller gym rooms and larger gyms) used for kindergarten PE classes in Hungary. The following could be emphasised from the research findings. Firstly, the infrastructural conditions of kindergarten PE are not very favourable in Hungary: hardly more than 50% of all institutions have suitable infrastructure. Secondly, from among the factors influencing the spatial distribution of the available facilities, at both the district and the settlement levels, the size of the population can be considered as particularly important: as the population size increases, an improvement of the conditions can be seen. Thirdly, the level of economic development hardly has any influence on their position.

**Keywords:** kindergarten, physical education, Hungary, spatial characteristics

## Introduction

Kindergarten PE plays an important role in the development of the age group concerned for a number of reasons (Csányi, 2011; Lemos et al., 2012; McEvelly et al., 2013; Rétsági and Ekler, 2011; Temple, 2016; Végyvári, 2013; Wiebelhaus and Fryer-Hanson, 2016). Firstly, by way of getting children to enjoy regular physical activity, it promotes a healthy lifestyle and a lifelong desire for engaging in sports; secondly, it contributes to the locomotor development of children. Thirdly, by establishing good

and preventing bad posture, it also has a positive effect on the later life/health condition of the children.

In the light of the above, it is hardly surprising that in Hungary Government Decree 363/2012 (XII. 17.) on the national basic programme of kindergarten education also devotes attention to this issue. Even though the words “sport” or “physical education” are not used in the above mentioned provision of law, in the chapter titled “Forms of activity in kindergarten and the tasks of kindergarten teachers”, the sub-chapter titled “Physical activities” discusses in detail the advantages and positive consequences of physical activity.

The high-quality organization of kindergarten PE, however, requires proper infrastructural conditions. In the spring and autumn months, in case of dry weather, the outdoor playground of the kindergarten offers good opportunities, with the advantages of physical activities performed outdoors, as well as the availability of more diverse and flexible conditions (Balogh, 2015). On days of rain or other precipitation, as well as in winter, however, when it is not possible to dress up the children every time in suitable clothes, the most optimum place to satisfy kindergarteners’ need for physical activity is a dedicated gym (the conversion of normal kindergarten classrooms for this purpose is very time consuming, and still does not offer optimal conditions). In the spirit of the above, Schedule 2 to Ministerial Decree 20/2012 (VIII. 31.) EMMI on the operation of institutions of education and teaching, as well as the names used by institutions of public education (LIST of mandatory (minimum) items and equipment to be available at institutions of education and training), in kindergartens (in case of units consisting of several institutions, at each site), it is required to have, in addition to the playground/courtyard, also a gym room with equipment storage (the required equipment includes gymnastic benches, mats and wall bars).

At the same time, the examination of this issue also offers some conclusions from a geographical perspective, since the facilities concerned can be regarded as a type of those sports facilities the spatial distribution of which has become an important area of research in the field of sports geography, a sub-discipline of increasing significance (Bánhidi, 2011; Ilies et al., 2014; Kozma, 2014; Wise and Kohe, 2020). The analyses conducted in this topic yielded quite varied results. According to the results of a survey of the situation in Scandinavian countries (Rafoss and Troelsen, 2010), rural areas have better results in relative terms (per capita) than urban areas; at the same time, in terms of facilities appearing in the 1990s (e. g. fitness centres, ice rinks, multifunctional activity centres), which make different forms of physical activity possible than before, the advantage of cities and more densely populated areas is quite clear.

A research project exploring the conditions in the Netherlands (Hoekman et al., 2016) yielded partly similar and partly different results. On the one hand it was also

clearly shown by this study that with the decreasing level of urbanization, the relative (number per 10,000 inhabitants) value of the sports facilities was increasing (at the same time, the average distance from these facilities was much lower in urban areas); on the other hand, in terms of the how widespread certain types of sports facilities (e.g. fitness centres, golf courses, sport halls, swimming pools) are, no major differences could be established between the rural and the urban areas.

A Canadian research project that looked at conurbations pointed out, on the one hand, that the relatively higher value of large cities is followed by a lower value in the first suburban zone, while more distant suburbs once again have a higher value (O'Reilly et al., 2015). On the other hand, differences could also be observed in terms of the quality characteristics (e.g. number of parking spots, number of change rooms, quality of services) of the facilities: while relatively less attractive facilities are typical in larger cities (primarily due to these facilities being of older construction), followed by higher values in the first suburban zone, and then by somewhat lower values in the second zone, which were nonetheless better than those in the large cities themselves.

In the spirit of the above, the primary objective of this paper is the examination of the spatial distribution of the facilities used for kindergarten PE classes in Hungary to find out which districts/settlements offer the worst conditions for children, and to what factors this unfavourable situation may be traced back. Due to the facts outlined in the previous paragraph, in the course of the research project, special attention has been given to the analysis of the availability of gym rooms and dedicated gyms.

### **Methodology**

In the course of the research, the most important source was the Public Education Information System (KIR) database operated by the Educational Authority, from which data related to sports infrastructure at each kindergarten, in a breakdown according to campus, or “place of task performance”, to use the official terminology) could be obtained for January 2019 (does it have a gym room, a gym, a swimming pool and/or a sports track). The database also included information on the capacities of the individual units, as well as the actual number of children enrolled (hereinafter, the word “kindergarten” will mean a “place of task performance” of a kindergarten). In addition, I have also reviewed the pedagogical programmes of the kindergartens, and through their use made the data more accurate. The database thus generated included 4,586 kindergartens, and these data were analysed with the use of Excel and IBM SPSS Statistics 23 software.

### **Results**

In general, the analysis of the data revealed a rather unfavourable situation (table 1). Only slightly more than half of the kindergartens operating in January 2019

had infrastructure serving the purpose of physical education; however, a positive finding, someone counterbalancing the above, was that these units represent nearly 2/3 of both the capacities and the actual number of children in these kindergartens. From among the individual infrastructural elements, gym rooms were available in most kindergartens, followed by full-scale gyms and sports tracks (the difference between a gym room and a gym is fundamentally in size: on the basis of standard no. MSZE 24203-2:2012 currently in effect, a facility of 225 m<sup>2</sup> is still considered a half-sized gym). The least frequently available infrastructural elements are swimming pools; of the 4,586 institutions, only 33 institutions had such a facility.

**Table 1.** The availability of physical education infrastructural elements at kindergartens, on the basis of different criteria (certain elements may be simultaneously available in a kindergarten, %)

Source: KIR database of the Educational Authority

	existing physical education infrastructural element	gym room	gym	sport track	swimming pool
number of kindergartens	56.32	43.35	14.52	4.43	0.72
capacity of kindergartens	65.50	47.62	19.71	5.59	0.74
actual number of children	65.10	47.28	19.06	4.69	0.69

In case of the three least frequently available facilities, it can be clearly observed that they are typically linked to larger public education institutions (table 2): in all three cases, the proportion of institutions that also include a school alongside a kindergarten was much higher. What we can find in the background of this fact, in case of gyms and sports tracks, is that in the interest of satisfying the needs of schoolchildren (as well as the statutory requirements), it is necessary to establish such facilities, and once they are available – at certain occasions – kindergarteners can also use them.

**Table 2.** The percentage of institutions including a kindergarten and a school and a kindergarten only that have the three less frequently available PE facilities (%)

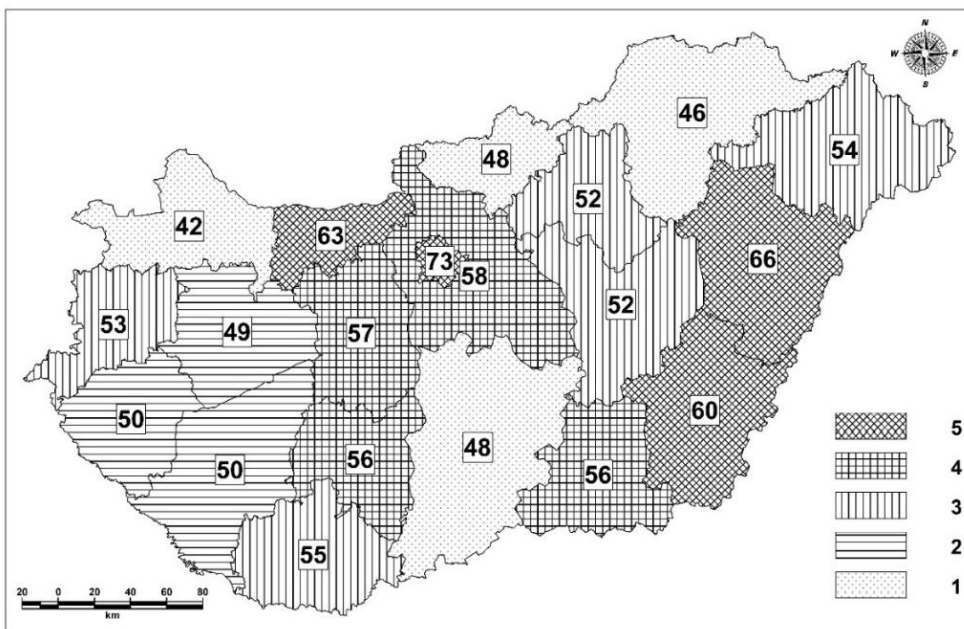
Source: KIR database of the Educational Authority

	institution including a kindergarten and school	institution operating as a kindergarten only
share within all kindergartens	3.10	96.90
share within kindergartens with a gym	14.86	85.14
share within kindergartens with sports tracks	44.83	55.17
share within kindergartens with a swimming pools	18.18	81.82

In the course of the research of the territorial characteristics – for the reasons mentioned in the Introduction (e.g. statutory requirement) – special attention was devoted to the availability of gym rooms and gyms (in the following, the concept of facilities serving the purpose of kindergarten PE activities refers to these facilities).

According to the data 55.9% of all kindergartens had such facilities, which institutions represent 65% of all kindergarten places (in terms of capacities) and 64.6% of the number of kindergarteners. The above – already not very positive – values are further deteriorated by the fact that without the data of Budapest, the city with the best indicators (see below), the above numbers would be the following: 53.3% of all kindergartens, 62.1% of kindergarten places and 61.6% of kindergarteners.

If we analyse the data on the level of counties (figure 1), a clear tendency cannot be observed: counties with the lowest and those with the highest levels also have territorial units that are in the category of more economic and social development, as well as areas that are lagging behind.



**Figure 1.** The proportion of kindergartens having facilities of PE activities, on the county level, in January 2019

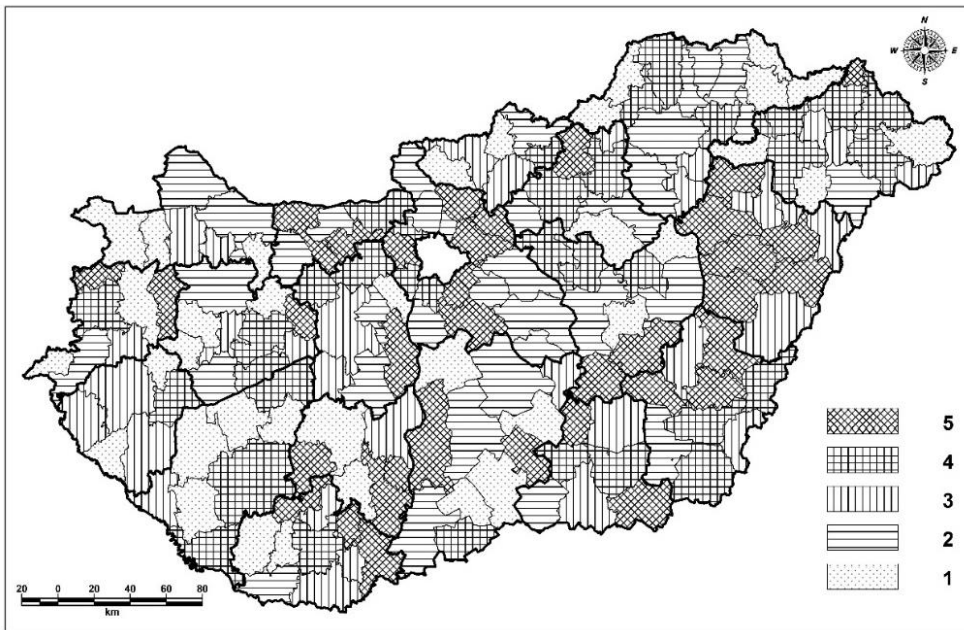
1: - 48%, 2: 49-51%, 3: 52-55%, 4: 56-59%, 5: 60%-

Source: KIR database of the Educational Authority

The next territorial level of the research project was administrative districts, in Hungarian terms “járás” (in this case, Budapest was excluded). The analysis of the location of PE (figure 2) facilities once again could not be used for drawing a clear conclusion: districts with the lowest as well as with the highest values are located scattered across the country.

Establishing the given facilities requires an investment of a certain amount; therefore, the question may arise to what extent the availability of such facilities is

influenced by the social-economic development of the district. On the basis of the data, the effect of this factor cannot be regarded as too strong. On the one hand, after putting the districts in 10 categories based on this factor (table 3) it can be seen that with the increasing level of development, the proportion of kindergartens with PE facilities only increases to a very small extent. This same fact is also reinforced by the result of calculating the correlation (figure 3): in case of the exponential correlation showing the strongest link, the value of  $R^2$  is 0.0445, which suggests a rather relationship.

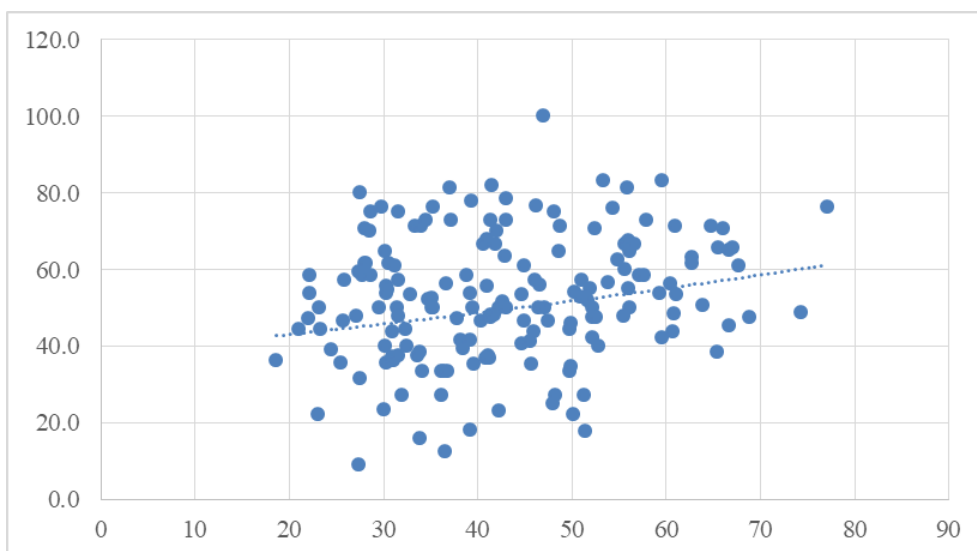


**Figure 2.** The proportion of kindergartens having facilities of PE activities, on the administrative district level, in January 2019  
 1: - 39%, 2: 40-49%, 3: 50-55%, 4: 56-66%, 5: 67%-  
 Source: KIR database of the Educational Authority

**Table 3.** The relationship between the development of the district and the availability of kindergarten PE facilities  
 Source: KIR database of the Educational Authority, 290/2014. (XI. 26) on the classification of beneficiary districts

the development of the districts	the proportion of kindergartens with PE facilities (%)
first decile	44.3
second decile	56.8
third decile	45.1
fourth decile	51.7
fifth decile	48.0
sixth decile	53.5
seventh decile	51.9
eighth decile	51.3
ninth decile	61.5
tenth decile	57.2





**Figure 3.** The relationship between the development of the district and the availability of kindergarten PE facilities (x axis: complex value of administrative districts, y axis: the proportion of kindergartens with PE facilities - %) Source: KIR database of the Educational Authority, 290/2014. (XI. 26.) on the classification of beneficiary districts

**Table 4.** The relationship between the average population size of districts and the proportion of kindergartens with PE facilities

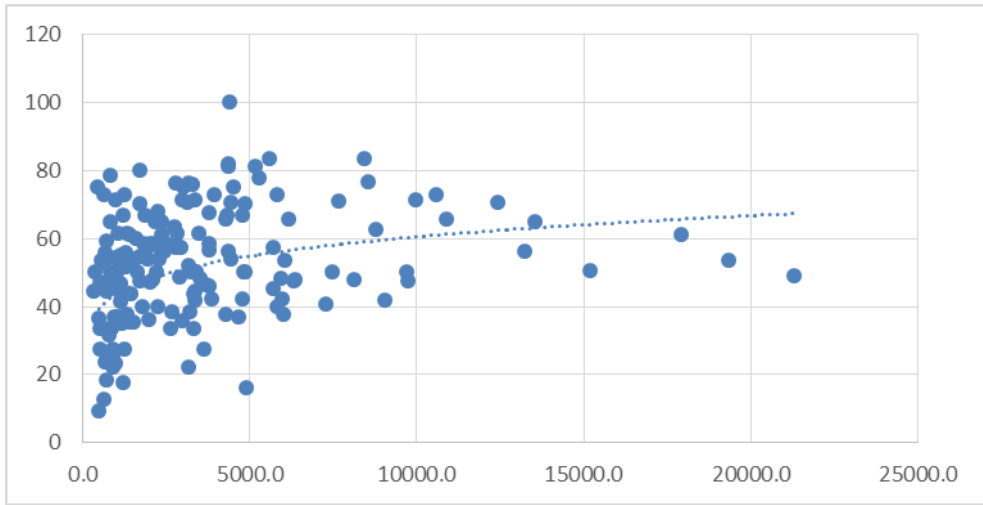
Source: KIR database of the Educational Authority, National Territorial Development and Spatial Planning Information System

average number of settlements of administrative districts	the proportion of kindergartens with PE facilities (%)
less than 1,000 inhabitants	43.2
1,000 – 1,500 inhabitants	48.5
1,500 – 2,000 inhabitants	53.2
2,000 – 3,000 inhabitants	53.9
3,000 – 4,000 inhabitants	55.6
4,000 – 5,000 inhabitants	57.3
5,000 – 10,000 inhabitants	55.1
more than 10,000 inhabitants	60.5

Another perspective of the settlement-level examination of districts was population. According to the data, a stronger link can be observed in this respect, as the proportion of kindergartens with PE facilities was higher in case of districts with larger populations (table 4). The result of the correlation calculation also reinforces this fact: the value of  $R^2$  in case of the logarithmic correlation showing the strongest link is 0.1162 (figure 4).

In the course of the settlement-level analyses, we examined the effect of the two factors mentioned above (population size and level of development). From the point of view of the former, the interrelationship can be seen quite clearly (table 5): in case of bigger settlements, the conditions of kindergarten PE are also better. Values below the national average (55.9%) can only be observed in case of settlements with

populations below 2000, while the worst access to such facilities was found in case of settlements with less than 1000 residents.



**Figure 4.** The relationship between the population of the districts and the number of kindergarten PE facilities (the figure does not include the values for the Debrecen district (x – 107350; y – 71,2), because it would have significantly distorted the diagram)  
(axis x – the number of people per settlement in the district, axis y – the proportion of kindergartens with facilities for PE activities - %)

Source: KIR database of the Educational Authority, National Territorial Development and Spatial Planning Information System

**Table 5.** The relationship between the number of inhabitants of settlements and the proportion of kindergartens with PE facilities

Source: KIR database of the Educational Authority, National Territorial Development and Spatial Planning Information System

number of inhabitants of settlements	the proportion of kindergartens with PE facilities (%)
less than 500 inhabitants	31.6
501 – 1,000 inhabitants	34.2
1,001 – 1,500 inhabitants	47.7
1,501 – 2,000 inhabitants	54.3
2,001 – 3,000 inhabitants	57.2
3,001 – 5,000 inhabitants	61.2
5,001 – 10,000 inhabitants	56.0
10,001 – 15,000 inhabitants	64.0
15,001 – 20,000 inhabitants	64.5
20,001 – 30,000 inhabitants	61.2
30,001 – 50,000 inhabitants	66.5
50,001 – 100,000 inhabitants	65.0
more than 100,000 inhabitants	56.9
Budapest	72.7

If we examine the effect of the settlements’ level of development, a clear relationship cannot be established (table 6): from among the eight categories of population size, beneficiary (i.e. less developed) settlements have better access in case

of three groups and worse access in case of five groups, which means that neither a positive, nor a negative relationship can be identified.

**Table 6.** The relationship between the level of development of settlements and the proportion of kindergartens with PE facilities

Source: KIR database of the Educational Authority, Government Decree 105/2015. (IV. 23.) on the classification of beneficiary districts and the conditions of classification

number of inhabitants of settlements	the proportion of kindergartens with PE facilities (%)	the proportion of kindergartens with PE on beneficiary settlements in the given category of population size (%)
less than 500 inhabitants	31.6	33.6
501 – 1,000 inhabitants	34.2	33.8
1,001 – 1,500 inhabitants	47.7	51.5
1,501 – 2,000 inhabitants	54.3	51.1
2,001 – 3,000 inhabitants	57.2	60.0
3,001 – 5,000 inhabitants	61.2	58.7
5,001 – 10,000 inhabitants	56.0	48.5
10,001 – 15,000 inhabitants	64.0	63.2

The relationships outlined above (i.e. the more significant effect of the population size) can, in my opinion, be attributed, on the one hand, to the fact that the kindergartens of smaller settlements were built earlier, when the construction of PE facilities (gyms and gym rooms) was not yet an expectation. In addition, these are typically kindergartens of smaller capacities and actual enrolments, and consequently, from an economic point of view it is less worth making major investments in them. On the other hand, on larger settlements, there is a much higher proportion of kindergartens built in the past few decades (from the 1970s), in which case much more attention was devoted to the creation of conditions that would satisfy the need of the children for physical activity. The assumption formulated in the previous few sentences is also underlined by the results shown in table 7: the larger a kindergarten is, the more the conditions necessary for physical education are available in every season.

**Table 7.** The relationship between the size of kindergartens (number of places for children) and the availability of PE facilities

Source: KIR database of the Educational Authority

capacity of kindergartens (number of places for children)	the proportion of kindergartens with PE facilities (%)
0-25	34.7
26-44	40.2
45-50	39.9
51-64	52.8
65-75	53.8
76-90	59.6
91-100	69.2
101-125	67.2
126-150	76.5
more than 150	79.7

The next determining factor related to population size is the trend of the population change (table 8). In case of settlements where the population size increased in the 2010s, the proportion of kindergartens with PE facilities is higher, and this is particularly true for settlements with an increase of at least 20%. In all likelihood, the above can be attributed to the fact that, in the interest of satisfying the needs arising with the increasing population size, new kindergartens were also built, in which the law already prescribed the creation of gyms/gym rooms.

**Table 8.** The relationship between the extent of population change on settlements between 2008 and 2018 and the availability of kindergarten PE facilities (the table does not include the values for Budapest).

Source: KIR database of the Educational Authority

the extent of population change between 2008 and 2018	the proportion of kindergartens with PE facilities (%)
below 100%	52.7%
above 100%	55.0%
within that, above 110%	57.3%
above 120%	65.2%

The smaller effect of the level of development on the levels of both the districts and the settlements can, in all likelihood, be attributed to the fact that the investments are realized decisively with the help of subsidies from the central budget, and therefore, the influence of the settlement's economic-financial position (which is closely linked to their level of social-economic development) is much smaller. In addition, a significant part of kindergarten developments realized in recent years with the use of EU grants were also implemented in beneficiary areas (districts and settlements).

## Conclusions

The most important results of the study could be summarised as follows. The infrastructural conditions of kindergarten PE cannot be considered very favourable in Hungary: hardly more than 50% of the institutions have facilities that would make it possible to engage in physical activity also in case of bad weather. From among the factors influencing the spatial distribution of the given facilities, at both the district and the settlement levels, the size of the population can be considered as particularly important, while the level of economic development hardly has any influence on their position.

## Acknowledgements

This study was supported by the EFOP-3.6.2-16-2017-00003 project which is financed by the European Union and the European Social Fund.

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## GEOSPORT FOR SOCIETY

Scientific Journal founded in 2014 under aegis of University of Oradea (Romania),  
University of Debrecen (Hungary), University of Gdansk (Poland)  
ISSN 2393-1353

Edited by Oradea University Press  
1, University Street, 410087, Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro/geosport.html>



# What Do Physiotherapists Know About Techno-Therapy?

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**Citation:** Huzmeli, E.D., Gokcek, O., Bezgin, S., Cam, Y., Hallaceli, H., Urfali, S., Guntel, M., Karanki, I. (2020). What Do Physiotherapists Know About Techno-Therapy?. *Geosport for Society*, 12(1), 24–30. <https://doi.org/10.30892/gss.1203-055>

*Article history:* Received: 03.01.2020; Revised: 05.02.2020; Accepted: 20.03.2020, Available online: 25.03.2020

**Abstract:** Aim: The aim of this study was to examine the knowledge of the physiotherapists about techno-therapy, so we want to take attention on the importance of updating the physiotherapist themselves about new rehabilitation devices that the physiotherapists use and to encourage the in-service training regularly. Methods: The study group consists of 24 physiotherapists working in Hatay. The survey consisted mostly of open-ended questions. These are the questions that were asked to the physiotherapists: Q1: Do you know what is the virtual reality?, Q2: What does augmented therapy mean?, Q3: What do you know about technological equipment to help patients that have communication problems?, Q4: What do you know about wearable rehabilitation technology ?, Q5: What do you know about robotic rehabilitation ?, Q6: Do you use any technologic equipment in your treatment ?, Q7: Did you have courses about technology during your university education ?. The first 5 questions' answers were assessed as "false", "true" or "do not know" and the last two questions as "yes" or "no" by an assistant professor. Results: Fourteen females, ten males aged between 22-60 years (X+SD=29.83±8.8) totally 24 individuals were included in the study. Questions (Q) results are following: Q1: 23 of their answers were true, 1 was false; Q2: All of them answered as do not know; Q3: 1 of them answered as false, 1 of them as true and 22 of them as do not know; Q4: 1 of them answered as false, 1 of them as true and 22 of them as do not know; Q5: 18 of them answered as true, 6 of them as false; Q6: 6 of them answered as yes, 18 of them as no; Q7: 5 of them answered as yes, 19 of them as no. Discussion: As a result, we learned that most of the

physiotherapists do not have sufficient knowledge about techno-therapy devices and that they have heard some applications for the first time during the survey. We concluded that physiotherapists need to follow up on current practice and devices and that universities can assume the role of mentors and organize instruction at regular intervals to help physiotherapists to update their knowledge about new technologies.

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**Keywords:** physiotherapist, techno-therapy, rehabilitation technology

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## **Introduction**

Techno-therapy is a movement in which health researchers, clinicians, technologists, and entrepreneurs can collaborate on the establishment of a new approach to therapy. This approach has been developed according to the therapist and patient relationship and major innovations have been recorded in recent years. Due to ongoing changes and innovations in the nature of the professional work, physiotherapists need to improve themselves on evidence-based practices continually (Schultheis and Rizzo, 2001; Breines, 2002 ; Sherman et al., 2018).

It is stated in the studies that techno-therapy methods based on information and communication technologies such as tele-physiotherapy (Howard, 2017), which can make to provide management of the rehabilitation process easier and, are effective and usable in many disease groups (Wiederhold et al., 1998; Bohil et al., 2011; Laufer et al., 2011). Robotic techno-therapy methods, which increase the reproducibility, productivity, and efficiency of movement, can significantly assist the therapist in the process of administering the treatment (Poli et al, 2013; Hesse, 2003; Diaz et al., 2011), but techno-therapy equipment is rarely used in small cities and in small rehabilitation centers. Therefore, a physiotherapist may be unaware of techno-therapy and patients may not find the chance of having the benefit of this equipment. This study aimed to examine the knowledge of the physiotherapists about techno-therapy that work in Hatay, Turkey, so we want to take attention on the importance of updating the physiotherapists themselves about the rehabilitation technology, and to encourage the in-service training regularly.

## **Methods**

The research is a qualitative study that aimed to examine the knowledge level of individuals working as physiotherapists about technological devices used in the field of physiotherapy (Yildirim and Simsek, 2008). The study consists of 24 physiotherapists working in Hatay. 30 physiotherapists that work in rehabilitation centers for pediatric, public hospitals, and private hospitals were invited to participate the study. 24 physiotherapists accepted the interview (Yildirim and Simsek, 2008). We questioned their institution, working duration, and working area.

In this study, a structured interview technique was used as a data collection method. This approach consists of a series of carefully written and ordered questions

and each interviewee is asked in the same manner and order. Before the interview questions were prepared, a national and international literature review related to the research topic was conducted. After the subject was designed, the items that were thought to be included in the form were determined. The survey consisted mostly of open-ended questions. These are the questions that were asked to the physiotherapists: Q1: Do you know what is the virtual reality?, Q2: What does augmented therapy mean?, Q3: What do you know about technological equipment to help patients that have communication problems?, Q4: What do you know about wearable rehabilitation technology?, Q5: What do you know about robotic rehabilitation ?, Q6: Do you use any technologic equipment in your treatment ?, Q7: Did you have courses about technology during your university education ?. The first 5 questions' answers were assessed as "false", "true" or "do not know" and the last two questions as "yes" or "no" by an assistant professor.

Three faculty members, three physiotherapists, and three physiotherapy students were interviewed in order to evaluate these items in terms of purpose, meaning, and scope. After these steps, the form was finalized using the information obtained and the interview questions were directed to the participants in the research. Data related to the study were collected from the determined physiotherapists by interviewing in 2018. Information about the research was given during the interview. In the research, we dealt to provide an appropriate interaction environment, in which participants could feel comfortable and confident and express their views sincerely during the interview. In addition, it is stated that individuals may not write names on the paper they write in a comfortable and uncensored manner.

## Results

Fourteen females, ten males aged between 22-60 years ( $X \pm SD = 29.83 \pm 8.8$ ) totally 24 individuals were included in the study. Their occupation duration's mean was  $6.58 \pm 7.67$  years (table 1).

**Table 1.** Descriptive results of the physiotherapists

		<b>X±SD (n=24)</b>	
<b>Age (Years)</b>		30.40±8.99	
<b>Working Duration (Years)</b>		7.09±7.73	
		<b>n</b>	<b>%</b>
<b>Institution</b>	Rehabilitation Center for Children	14	58,3
	Private Hospital	4	16,7
	Public Hospital	6	25
<b>Working Area</b>	Pediatric Physiotherapy	14	58,3
	General Physiotherapy	10	41,7



Questions (Q) results are following: Q1: 23 of their answers were true, 1 was false; Q2: All of them answered as do not know; Q3: 1 of them answered as false, 1 of them as true and 22 of them as do not know; Q4: 1 of them answered as false, 1 of them as true and 22 of them as do not know; Q5: 18 of them answered as true, 6 of them as false; Q6: 6 of them answered as yes, 18 of them as no; Q7: 5 of them answered as yes, 19 of them as no (table 2).

**Table 2.** Results of the physiotherapist’s knowledge about techno-therapy

QUESTIONS	True		False		Do not know	
	(n)	%	(n)	%	(n)	%
1. Do you know what is the virtual reality?	23	95.83	1	4.16	0	0
2. What does augmented therapy mean?	0	0	0	0	24	100
3. What do you know about technological equipment to help patients that have communication problems?	1	4.16	1	4.16	22	91.52
4. What do you know about wearable rehabilitation technology?	1	4.16	1	4.16	22	91.52
5. What do you know about robotic rehabilitation?	18	75.04	6	24.96	0	0
	<b>Yes</b>			<b>No</b>		
	<b>(n)</b>	<b>%</b>	<b>(n)</b>	<b>%</b>		
6. Do you use any technologic equipment during your treatment of the patient?	6	24.96	18	75.04		
7. Did you have courses about technology during your university education?	5	20.8	19	79.2		

**Discussion**

This study was planned to evaluate the level of knowledge of physiotherapists about the technological devices and applications used in the rehabilitation field who are actively working in different units in Hatay and to determine the extent to which they update themselves. As a result, we learned that most of the physiotherapists do not have sufficient knowledge about techno-therapy devices and that they have heard some applications for the first time during the survey. We concluded that physiotherapists need to follow up on current practice and devices and that universities can assume the role of mentors and organize instruction at regular intervals to help physiotherapists to update their knowledge about new technologies.

Technology is developing day by day. We see the effects of this rapidly developing technology on our lives in many areas. With the rapid advancement of technology, it has provided great opportunities for evaluating, monitoring, treating and researching patients in the field of physiotherapy and rehabilitation. Virtual reality applications, robotic rehabilitation, motion sensor evaluation devices, which have attracted attention with their use in many areas especially in recent years, are also frequently used in the field of physiotherapy and rehabilitation (Peacock and Hooper, 2007). In order not to be left behind by the developing and advancing technology, physiotherapists need to know for what purposes, how and in which disease states these devices can be used. This information can be provided in the basic education curricula or can be provided by the continuation of the education process within personal interests (Lum et al., 2002).

As a result of our study, it was concluded that techno-therapy applications in the field of physiotherapy and rehabilitation, in general, are not known by the physiotherapists and are not included in the treatment process. Physiotherapists except virtual reality applications; augmented therapy, wearable rehabilitation technologies and technological applications for communication problems do not know and do not use in the treatment. So it is an important deficiency for the patients. There are many different problem-solving devices, but the patients could not attain that device, because the health professionals do not know those devices and do not guide them.

Apart from physiotherapy and rehabilitation, virtual reality applications are now encountered in many areas from entertainment to education in daily life (Timmermans, 2009). Unlike other techno-therapy applications, this is thought to be one of the reasons why it is more familiar to physiotherapists. Apart from this, virtual reality applications have a more widespread usage area in the rehabilitation process which is relatively easier to access than other methods (Kittipanya-ngam et al., 2009). Thanks to inexpensive equipment, many clinics have this techno-therapy (Zhou et al., 2005; Zheng, 2005). For physiotherapists working with children, having a safe and entertaining approach increases its use in treatment (Rusell, 2011). Thanks to these advantages, it is an expected result that physiotherapists know to a greater extent about virtual reality.

Robotic rehabilitation practices seem to be rapidly embarking on rehabilitation programs, particularly in the last decade. It is used in many different disease groups due to its positive aspects such as the timing of movement, coordination and supporting the motor learning process (Tejima, 2011). Rapid advances in technology have led to the development of different robotic systems. Although it is not easy to have information about all systems in this wide range, knowing the areas of use, in general, provides ease of use for patients and physiotherapists in rehabilitation.

However, the cost of robotic systems reduces their availability (Huang and Krakauer, 2009). As a natural consequence of this, recognition is diminishing. Although the cost of the systems constitutes an obstacle to its spreading, it can be ensured that information can be provided with the education that can be taken after the license or post-license. Physiotherapists, who know as a result of the education, are expected to get a benefit from robotic rehabilitation in their workplaces and this will facilitate their spreading.

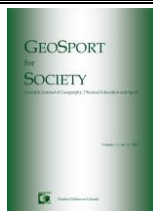
When the physiotherapists were asked whether they took courses related to techno-therapy applications at the undergraduate level; it was concluded that this training was not taken at the undergraduate level. This result shows that the source of the lack of information and the limitation in use is the inadequacy of undergraduate education.

As a result of our study, it was concluded that physiotherapists do not have knowledge about techno-therapy applications sufficiently and do not use these technological tools in the treatment. Since it is not known about the technological devices, it is considered that because its purpose, place, and importance in treatment are unknown it cannot be used. It is thought that with a course to be given at the undergraduate level, awareness can be created in physiotherapists and it is possible to create working areas on the subject after the undergraduate education. Also, we concluded that there should be education for graduate physiotherapists to help them to update themselves about new methods that both the patients and national economy get a benefit, and the universities should accept it as a mission to provide education for graduated health profession about new devices and new treatment methods.

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## GEOSPORT FOR SOCIETY

Scientific Journal founded in 2014 under aegis of University of Oradea (Romania),  
University of Debrecen (Hungary), University of Gdansk (Poland)

ISSN 2393-1353

Edited by Oradea University Press  
1, University Street, 410087, Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro/geosport.html>



# The appearance of sport as a travel motivation in traveling habits

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**Citation:** Tütümkov-Hrisztov, J., Müller, A., Molnár, A. (2020). The appearance of sport as a travel motivation in traveling habits. *Geosport for Society*, 12(1), 31-43. <https://doi.org/10.30892/gss.1204-056>

*Article history:* Received: 20.01.2020; Revised: 10.02.2020; Accepted: 20.03.2020, Available online: 25.03.2020

**Abstract:** Traveling habits and tourism motivations are constantly changing and re-shaping. Because of this reason their examination is indispensable for the tourism industry, as the response to these changes is one of the defining elements of competitiveness and product innovation. In our research, we examined the traveling habits of young workers (average age=29,1 yrs, sd=24,00) in the context of destination choice and sport tourism motivations (N=1182). The survey found that the most popular destination was the European continent, with 71.5% of respondents choosing an EU country and 7.5% choosing a non-EU but European destination. 9.3% of the respondents have chosen only domestic (Hungarian) destination for their holiday in the past 2 years. The results show that only 36.3% of the respondents have taken part in a holiday without sport purposes, while the majority of them (63.7%) have taken part in a sport holiday with some frequency in the last 2 years. There was a difference regarding gender, with significantly more men reporting that they took part in sporting holidays than women (P=0.000). The most typical sporting activities of these types of holidays were swimming and water sports (22.2%), cycling (19.4%) and hiking (11.6%). In tourism product development, the development of leisure sports is of great importance, as it provides the health, entertainment and active recreation that guests demand, thus influencing the choice of destination.

**Keywords:** travel habits, tourist motivation, sport purposed holidays, sport tourism

## Introduction

Nowadays, nothing illustrates better the steady rise of the tourism industry than the increasing number of tourist arrivals around the world. According to data from the

World Tourism Organization (UNWTO) (2019), the demand for tourism is growing steadily. World tourist arrivals in 2018 were 1.326 billion, up with 86 million from 2016, an increase of 7% (UNWTO, 2018), and the 672 million tourists arriving on the European continent in 2017, an 8% increase over the previous year. In 2018, the world's tourist arrivals already exceeded 1.4 billion, an increase of 5% compared to 2017. The most popular tourist destination is still the European continent, with 710 million tourist arrivals, with the majority of them arriving in EU countries.

The UNWTO's long-term prediction also indicates a positive trend in the number of tourist arrivals around the world, with an average annual growth rate of 3.3% per year over the period from 2010 to 2030 and an estimated 1.8 billion tourist arrivals worldwide by 2030 (Tourism Towards, 2030). Several studies report on the importance of the tourism sector in the national economy and its role in stimulating the economy and increasing employment rate (Darabos, 2015; Herman et al., 2017, 2018; Ilie et al., 2017).

Demand is not only expanding but re-shaping as well. The needs of travelers are changing, instead of passive travel, active leisure time activities are getting more prevalent during travel (Smith and Puczko, 2010; Michalkó et al., 2011; Csirmaz and Petó, 2015; Bíró and Müller, 2017; Lövei and Kalmár, 2017; Lenténé et al., 2019a), as health awareness is appreciated more and more in leisure and travel trends as well as in travel motivations (Sóres et al., 2012; Müller et al., 2005, 2009; Müller and Szabó, 2009; Lengyel, 2015; 2019; Kalmar et al., 2016; Gödény et al., 2018; Laoues et al., 2019; Lengyel et al., 2019). Several national and international studies report that sport plays a dominant role in travel motivations (Müller and Bácsné, 2018). There are studies that analyze the link between passive sports consumption that is, traveling and spectating sporting events, and travel. Travelers to mega-sport events are found to be highly prone to spending, have a high average length of stay and require a variety of leisure services, with some target groups preferring the packages (Bottero et al., 2012; Bíró et al., 2017; Dansero and Puttilli, 2010; Gibbson et al., 2012; Borbély and Müller, 2015; Bánhidi, 2015; Müller et al., 2016).

Travelers require unique services, entertainment attractions and novel features that also influence the motivation of destination choices (Boda et al., 2018; Ráthonyi et al., 2018; Ráthonyi et al., 2019).

### **Systematic Review**

In 2018, the Hungarian population spent 347 billion HUF on domestic multi-day tourist trips, an increase of 5.7% at current prices compared to 2017. Last year, Hungarians spent 888 billion HUF abroad, 8.7 percent more than in 2017 (KSH, 2018).

According to the KSH's (Hungarian Central Statistical Office) Tourism and Hospitality Analysis of 2018, Hungarians traveled within Hungary in the same number as in the previous year, but for a longer period of time: 14.4 million domestic multiday trips in 2017, the average duration of these increased by 4,1 percent to 60.3 million. According to the data of the domestic tourism trips, with regard to the purpose of the trip, the main travel motive is mostly entertainment, relaxation (61%) (Bíró et al., 2019a).

In 2018, the Hungarian population made 23 million trips abroad, 12% higher than in the previous year. Time spent increased by 8.7 percent to 62 million days. The most popular destinations for overnight trips were the neighboring countries, as well as Germany, the Czech Republic and the Mediterranean countries, Italy and Greece.

Many tourism studies have long been concerned with motivation of travel with a considerable amount of research studying leisure tourism (Gnoth, 1997; Chen, 1998; Buckley, 2012; Chang et al., 2014; Bansal and Eisel, 2004; Mahika, 2011).

Several domestic tourism researches confirm the popularity of active tourism products, the demand for which is constantly evolving, that requires the continuous development of services (Sulyok and Magyar, 2014; Michalkó, 2002; Michalkó and Vizi 2002; Müller et al., 2019).

Among the definitions of sports tourism, many authors emphasize that the main purpose regarding travel motivation is to live through the experience of sporting activities, coupled with the purchase of tourism services. The definitions distinguish between active and passive variations of sports motivation, which may be aimed at recreational or competitive sports, or participation in sporting events where the tourist is passive in sporting activities but enriched by the experience of cheering (Hall, 1992; Hudson, 2003; Weed and Bull, 1997; Hinch and Higham, 2001; Kurtzmann, 2005; Gibson, 1998, 2003, 2006; Robinson and Gammon, 2004; Bánhidi, 2007; Dobay et al., 2011; Hudson, 2012; Borbély and Müller, 2015).

Dobay et al. (2018) examined the traveling habits and previous experiences at sports camps of 2965 Slovak and 2404 Hungarian adults. 84.5% of Slovaks and 92% of Hungarians participated in summer swimming and water camps, where more than 60% of respondents (in both nations) gained positive experiences. The survey proved that the destination chosen by the respondents is waterfront, lakeside, with water-based services, which shows a strong correlation with positive travel experiences during childhood. Those who enjoyed participating in these activities during their childhood still seek to plan their holidays near waterfront, and the sea, where swimming, hiking, and sporting activities dominate. Müller et al. (2007) found and demonstrated that positive attitudes and positive experiences with sports camps will continue to determine sports travel habits and motivation.

Müller (2009) studied the recreational sports habits of 260 major college students, 43% of whom stated that they regularly hike during the holidays, which is one of the most typical activities of young adults. Müller and Kórik (2009) examined the leisure habits of bathers in the Northern Great Plain region (N = 457), with 66.5% of respondents associating exercise (swimming, water sports) with time spent in the spas.

Lenténé et al. (2019c) studied the recreational needs of guests arriving in the North Great Plain region (N = 140). Their research confirmed that recreational facilities are important to guests during their stay, as 23.4% of the respondents are influenced by the existence of a recreational program in hotel accommodations and 19.1% by the existence of sports facilities. 62.4% of guests found it important to have a recreational program during their stay, and 70.2% of them participated in it as well during their stay. Hiking and bicycle tours were, according to the guests' answers, the two most important program alternatives to offer guests during their stay. Music and dance-based activities and fitness room offerings were also popular, where the authors clearly pointed out the gender difference. Women preferred yoga, and the treadmill, while men preferred to use free weights.

Lenténé Puskás and colleagues (2019d) also confirmed that the offerings of the hotels in the North Great Plain region (N = 39) are in line with active holiday trends, with 35.7% of 4-star hotels and 37.5% of 3-star hotels offering some type of recreational activities to their guests.

## **Material and Method**

A questionnaire survey was conducted in Budapest to examine the travel habits of young workers. The questionnaires were filled out on paper and the snowball method was used for sampling. Tourism and Catering students had to fill out a questionnaire with 10 of their friends, which were followed by a short interview. The criteria for participating in the study was that they had to take part in some kind of travel in the past 2 years, ie they could answer questions and travel motivations as tourists. Of the 1,200 completed questionnaires, 1182 were evaluated after data cleaning. We chose Budapest for the survey because the KSH's Tourism and Catering Survey of 2018 showed that the participation of people living in Budapest and Pest, as well as in Central and Western Transdanubia, exceeded 50%, while data from people living in other areas of the country lagged behind (KSH, 2018). We targeted young adults, as Gibbson et al. (1998), when segmenting sports tourists, found that active sports tourism motivation is the most characteristic of early adulthood.

After the digitalization of the questionnaires, the data were processed using SPSS software. In addition to the basic statistics (mean, standard deviation, median,



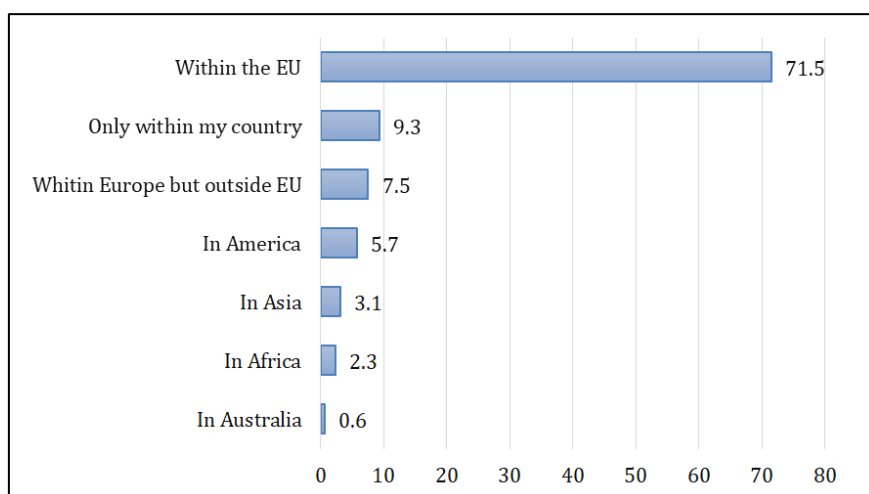
mode) we also performed a correlation study. Due to the sufficiently large number of items a gender connection was examined using the Chi2 test.

The questionnaires were filled out by 1182 person, whose average age was 29.1 years (sd = 24.00), of whom 41.3% (488 person) were men and 58.7% (694 person) female.

## Results

As the respondents have been on holiday as a tourist in the past 2 years, we were interested in finding out what are the most popular tourist destinations that Hungarian tourists have preferred. The results are illustrated in figure 1. As multiple choice was possible, the results are presented in percentages. 9.3% of the respondents had chosen only a domestic destination as their destination in the last 2 years. The European continent was the most popular destination, with 71.5% of respondents choosing an EU country and 7.5% choosing a non-EU but European destination. 5.7% of Hungarian respondents chose the American continent, 3.1% the Asian, 2.3 % the African, while only 0.6% the Australian for their destination.

Destination rankings and KSH 2018 database showed that the US has become a less attractive destination for Hungarians, as the popularity of the United States as a destination has declined compared to previous years. This is due to the fact that prices for overseas flights have not fallen, while flights to European countries have become more favorable, and in the United States the price of accommodation and hospitality is much higher than we have seen in European destinations. Hungarian consumers are price sensitive, which is also true in the products and services market (figure 1).



**Figure 1.** The proportion of trips made in the last 2 years in regard to tourist destinations  
Source: Own editing, 2020

We asked how many times during the past 2 years their holidays were related to sports motivation (table 1). The results show that only 36.3% of the respondents have not taken part in a sporting holiday, while the majority of them did (63.7%). The response of young workers with regards to gender differs, with the Chi2 test showing a significant difference in gender responses. 46.4% of women (288 people) and only 30.6% of men (141 people) stated that they did not take part in sporting holidays. Thus, greater activity of men in the field of sporting holidays can be recognized. Men prefer active holidays and some form of sport during their stay. This result coincides with the fact that by examining the recreational sport activity of different target groups, similar results can be obtained, ie in their spare time, men spend more time participating in sporting activities than women (Herpainé et al., 2017; Boda et al., 2019; Kovács, 2011).

**Table 1.** The evolution of sports vacations in the last two years

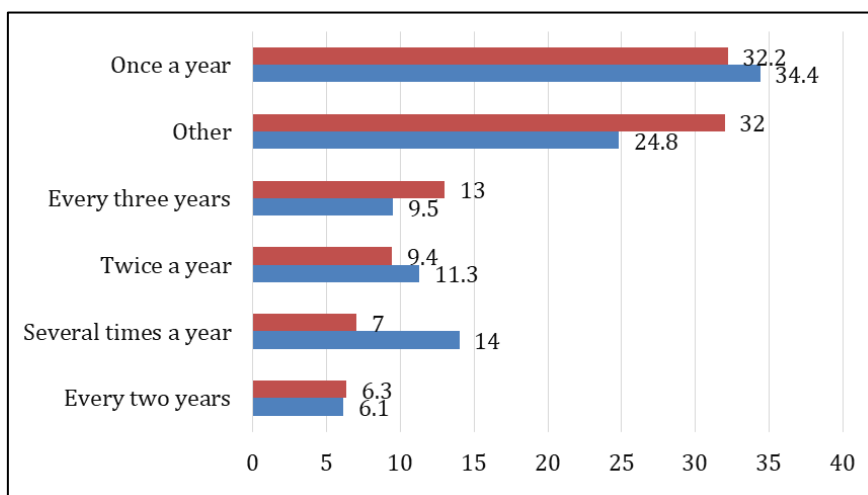
Source: Own editing, 2020

Participating in sporting holiday (/times)	Male person (%)	Female person (%)	All person (%)
Once	116 (25,2%)	121 (19,5%)	237 (20,1%)
Twice	93 (20,2%)	104 (16,7%)	197 (16,7%)
Three times	32 (6,9%)	32 (5,2%)	64 (5,4%)
More	79 (17,1%)	76 (12,2%)	155 (13,1%)
I didn't participate	141 (30,6%)	288 (46,4%)	429 (36,3%)
All	461 (100%)	621 (100%)	1182 (100%)

chi2=1212,7, df=10, p=0,000

The next question examined the frequency of sporting vacations (figure 3). The results show that most respondents chose the annual frequency (once, twice a year and several times a year) for domestic or foreign destinations. It can be stated that the active form of leisure time, the integration of sport into the lifestyle means that these consumers not only demand it every day, but they do not give up sporting or active recreation even during their holiday or vacation.

We asked about the most typical sporting activities on holiday (figure 4). As more than one answer could be given to this question as well, the results are presented in percentages. Swimming, water sports (22.2%) are the most common sporting activities. The reason for this may be that most of the vacations are scheduled for the summer period, where water (lake, river, sea, bath) appears to be a central element of motivation. Studies focusing on Spas and Baths also confirm that pool services are one of the most popular elements during spa visits, where the role of swimming as a sport or activity is dominating (Müller et al., 2009; Müller and Kórik, 2009; Bíró et al., 2019b; Lenténé et al., 2019b). Another reason is that recreational swimming is a preventive exercise that supports health (Bíró et al., 2007; Bíró, 2011; Bíró et al., 2015).



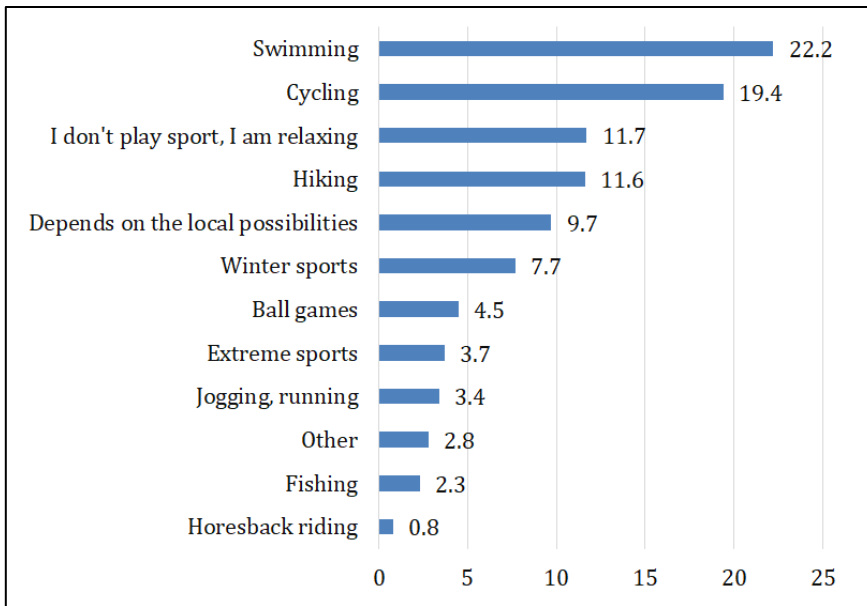
**Figure 2.** Frequency of participation in sports holidays (%)

Source: Own editing, 2020

The second most popular activity is cycling (19.4%) the third is hiking (11.6%). Several studies have confirmed the increasing motivation for cycling and hiking (Ritchie et al., 2010; Sulyok and Magyar, 2014; Lenténé et al., 2019d).

9.7% of respondents said that what they do depends on the destination. Winter sports (7.7%) were also mentioned relatively high. It is true that Hungary has limited opportunities due to the lack of high mountains and low snow cover days, but the surrounding countries offer good opportunities for winter sports and the KSH 2018 publication proved the popularity of this as well. Ball games were marked by only 4.5% of respondents. As a new type of exercise extreme sports was chose by 3.7%. While 3.4% of respondents mentioned running, jogging, 2.3% of fishing and only 0.8% of horseback riding. 11.7% of the respondents stated that they were resting passively and did not engage in any sporting activities.

Mosonyi et al. (2013) studied the recreational activities and traveling habits of college students (N = 140) and found that young adults prefer swimming (76%) during their travels, as 86% of their trips are tied to the lakeside or water. 24.7% of the students go cycling, 46% hike during the holiday and only 10% go fishing. These data show that the most typical sporting activities for students were similar to our findings, except that they had a much higher rate of participation in these activities. Winter sports did not appear in responses of the students, probably because it is a costly sport that requires a high discretionary income that most students do not yet have. In high altitude countries in Europe, due to the favorable conditions, winter sports play a much larger role in both recreation and tourism (Alexandris et al., 2009; Matter-Walstra et al., 2006; Dobay and Bánhidi, 2013).



**Figure 3.** Frequency of participation in sports holidays (%)  
 Source: Own editing, 2020

In order to examine the motivation of sport tourism, we made various statements, which had to be rated on a 1-5 Likert scale. For example: "To what extent do the following statements apply to you? During the holidays I try to try active, sporty programs."

This statement is more typical for men who prefer a sporty program during their stay. 32.1% of male respondents stated that this statement is mostly common and 14.1% that it is completely true, while 20.8% of female respondents stated this is mostly common and 11.8% that the statement is completely true. The holiday activity of men is significantly higher than that of women ( $\text{Chi}^2 = 1209.7, \text{df} = 10, P = 0.000$ ).

The statement: "I choose a tourist destination that is suitable for sports and has sports facilities" is also more typical of men. 22.1% of them said that this statement is mostly true, while 10.4% that it is completely true. At the same time 16.7% of women respondents stated this is mostly common and only 7.2% answered that this is completely true. Men tend to choose a destination that offers opportunities for sport ( $\text{chi}^2 = 1202.2. \text{Df} = 10, p = 0.000$ ).

The statement: "Visiting sports as a spectator, during the holidays" is also more typical of men than of women. For 12.4% of male respondents stated it is mostly true, while for 6.1% them that it is completely true. 6.8% of the female respondents stated that this statement is mostly true, while 2.9% of them that it is completely true. 52.5% of female respondents that the statement does not apply to them at all, while only

39.7% of men said the same. The difference between the sexes is significant ( $\chi^2 = 1211.3$ ,  $df = 10$ ,  $P = 0.000$ ), the passive sporting holiday, when traveling is supported by men rather than spectating.

Next statement: "In the summer, I prefer water sports during the holidays" is also more typical of men, as 28.2% of men, 24.1% of women fully agree, 24.8 % of them states this is mostly true and 21.4% that it is completely true, which is a significant result ( $\chi^2 = 1186.5$ ,  $df = 10$ ,  $p = 0.000$ ).

The statement "I take part in a winter skiing holiday" is also more typical for men, as 11.9% of respondents answered with "mostly true", 22.3% of them with "completely true". At the same time 8.9% of women answered with "mostly true", and 16.3% of them with "completely true" ( $\chi^2 = 1195.8$ ,  $df = 10$ ,  $p = 0.000$ ).

Contextual studies have shown that sporting activities during holidays and sporting leisure activities also tend to dominate men's travel motivation over women. This result may not be surprising, as studies of leisure or sporting habits have found in different populations that men are more active, that is, they will be more active during the holidays (Herpainé et al., 2017; Boda et al., 2019; Kovács, 2011, 2017, 2019, Laoues et al., 2019; Eurobarometer, 2014, 2018) and passive sports consumption, that is, spectating sport events is also a dominant trend among men (Bácsné et al., 2019).

## **Conclusions**

The needs of travelers are changing, instead of passive travel, active leisure time activities are getting more prevalent during travel. As health-conscious behavior increases, guests will also need recreational activities during their travels, where sport plays a central role.

The survey found that the European continent remains the most popular destination for Hungarian travelers, with 71.5% of respondents choosing to travel to an EU country and 7.5% to a non-EU but European destination for their holiday. The strengthening of domestic demand was confirmed by the fact that 9.3% of the respondents have chosen only domestic destination as a tourist destination in the last 2 years. The results of our study also confirmed that the majority of young adults (63.7%) had participated in sporting activities with some frequency during the past 2 years, which showed different results by gender. In this aspect the greater activity of men can be justified in the field of sporting holidays, as they prefer active holidays and some form of sports in the chosen tourist destination ( $P = 0.000$ ). Thus, in men's preference system, active holidays are more prominent. Men are more interested in active and passive forms of sport tourism than women. The most characteristic sporting activities of sporting holidays are swimming and water sports (22.2%), cycling (19.4%) and hiking (11.6%). In tourism product development, the development of leisure sports supply is extremely important, as it

offers opportunities for health preservation, entertainment and active recreation (Ráthonyi et al., 2016), which is demanded by the guests, thus influencing the motivation for choosing a destination.

### Acknowledgment

This study was supported by the EFOP-3.6.2-16-2017-00003 project which is financed by the European Union and the European Social Fund.

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## **GEOSPORT FOR SOCIETY**

Scientific Journal founded in 2014 under aegis of University of Oradea (Romania),  
University of Debrecen (Hungary), University of Gdansk (Poland)  
ISSN 2393-1353

Edited by Oradea University Press  
1, University Street, 410087, Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro/geosport.html>



# **Association of Physical Activity (Sport) and Quality of Life: A Literature Review**

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**Citation:** Devita, S., & Müller, A. (2020). Association of Physical Activity (Sport) and Quality of Life: A Literature Review. *Geosport for Society*, 12(1), 44-52. <https://doi.org/10.30892/gss.1205-057>

*Article history:* Received: 28.01.2020; Revised: 14.02.2020; Accepted: 23.03.2020, Available online: 25.03.2020

**Abstract:** Physical activity, especially in a form of sport, is known to improve life quality. Somehow studies comparing the effect of physical activity on quality of life in patients with health problems and healthy people are limited. The aim of this study is to provide an insight and evidence of association between physical activity and life quality in a group of people with health problems and a group of healthy people.

**Keywords:** physical activity, sport, life quality, healthy people, people with health problems

## **Introduction**

Physical activity is highly correlated with improved well-being. It gives positive effects not only for physical health but also mental health. Furthermore, physical activity can improve functional performance and can be used as an intervention for the prevention and treatment of various diseases such as hypertension (Pereira et al., 1999; Hanashiro and Ceria-Ulep, 2011; Juhász et al., 2015), heart diseases (Newschaffer et al., 1998; Powell et al., 1987; Franco et al., 2005), diabetes (Ekelund et al., 2007; Apor, 2009; Baidog and Herman, 2018; Tătar et al., 2018; Papp et al., 2019), and bone problems like osteoporosis (Gregg et al., 2003). Moreover, exercise which is one type of physical activity, can have the same effect to antidepressant treatment which given for people with moderate or mild depression (Knapen et al., 2014).

Health Organization (WHO) stated that around 3.2 million people died each year because of insufficient physical activity which results in the increase of the burden of global disease (Pratt et al., 2014; Ding et al., 2016; Gabnai et al., 2019). People with higher physical activity are known to have better life quality. Despite the fact that the benefit of physical activity to health is widely known somehow, the sedentary lifestyle still dominates the behavior and lifestyle especially in all generation (Müller et al., 2019; Biro et al., 2019; Laoues et al., 2019), especially young people population. The study by Kinmonth et al. (2008) showed intervention which facilitate the behavior change actually did not show more results compare to health promotion of physical activity given by using leaflet. There are other factors too that need to be considered like socioeconomic background and parents role in influencing lifestyle since people with higher socioeconomic background have more benefit in accessing sport service (Müller et al., 2019).

Besides the lack of motivation, the decline of physical activity also might be caused by certain health conditions. For example, people with respiratory health problems often feel reluctant to do physical exercise because of some factors like the decline of lung function and atrophy of leg muscles due to disuse, where they are struggled with exercise intolerance (Oga et al., 2003). Somehow it seems that improving physical activity in a long term could also be beneficial for people with respiratory problems like asthma and cronic obstructive pulmonary diseases (COPD) (Esteban et al., 2010; Müller et al., 2011; Müller et al., 2018).

Some studies investigated the correlation between these two variables, physical activity and quality of life, either in a population of elderly or young people (Rejeski and Mihalko, 2001; Bize et al., 2007; Dinyáné and Pusztai, 2016). Somehow studies comparing the effect of physical activity on quality of life in patients with health problems and its impact on the cost of illness are limited (Chomistek et al., 2013). So that re-examining the correlation between physical activity and life quality and the cost of illness in a group of people with health problems and a group of healthy people is essential. The main goal of this research is to provide an insight of association between physical activity (sport), and life quality. Also, the result of the study could be used as a reference for making guidelines related to physical activity (sport), to increase the quality of life and minimize the cost of illness. Furthermore, it can also be used as references for further studies.

### **Methodology**

We searched for studies related to physical activity (sport), and life quality based on online journal databases including google scholar, Pubmed, and BMC with no restrictions on publication date so we can find comprehensive information. Search terms included the following: physical activity, sport, and life quality.

**Table 1.** Physical activity and quality of life in a group of people with health problems

Authors	Sample	Sample size	Design	Physical activity questionnaire	Life quality questionnaire	Results
Katayama et al., 2014	Chronic hemodialysis patients	31 men and 17 women	Cross sectional	Accelerometers	EuroQol questionnaire (EQ-5D)	In patients with non-hemodialysis treatment days, life quality is influenced by physical activity more than 4 METs
Aidar et al., (2011)	Stroke survivors	Belo Horizonte (N=48) Montes Claros (N=29)	Cross sectional	IPAQ short version	SF-36	Active people have better score of SF-36 compared to people with insufficient PA
Jepsen et al., 2013	Obese individuals Western Norway	49	Intervention	Accelerometer	SF-36	PA has positive correlation to physical functioning and life satisfaction. Somehow no association found between mental health and PA
Rand et al., 2010	Adults with chronic stroke	40	Cross sectional	Self-report questionnaire	SF-36	Association between PA and mental health was not found. Functional ability was related to the amount of daily PA performed. A number of daily PA contribute to the physical score of life quality independently.
Hebestreit et al., 2014	Cystic fibrosis (age $\geq 12$ years, FEV1 $\geq 35$ %)	70	Intervention	Accelerometry & 7-day Physical Activity Recall Questionnaire	German version of CFQ-R questionnaire for adults and adolescent	Life quality was related with physical fitness, specifically on aerobic
Kallings et al., 2007	Patient in primary health care	481	Cohort	Self-reported exercise	SF-36 EuroQol EQ-5D	Prescription of physical activity can be used as a treatment to promote active lifestyle in primary health care.
Deenik et al., 2017	Inpatients	184	Cross sectional	Accelerometer (ActiGraph GTX+)	EuroQol-5D WHOQol-Bref	Correlations were found between physical activity and all domain of life quality except character of diseases, independent of patient, and environmental domain.
Blom et al., 2019	Attendee of primary care in Norway	835	Cross sectional	ActiGraph accelerometer	SF-36	Light PA was positively related with some domains of life quality (role emotional, physical functioning, vitality, role physical, and general health) while moderate and vigorous had the same positive associations but without role emotional. Sedentary time found to have negative correlation with life quality in all dimensions

**Table 2.** Physical Activity and Quality of Life in a Group of Healthy People

Authors	Sample	Sample size	Design	Physical activity questionnaire	Life quality questionnaire	Results
Acree et al., 2006	Healthy older adults	112	Cross sectional	Johnson Space Center physical activity scale	SF-36	Life quality was increased in all domains for the group who performed more physical activity, specifically bodily pain, vitality, physical functioning, role-physical, social functioning
Shibata et al., 2007	Japanese adults	1,211	Cross sectional	IPAQ short version	SF-8	People who performed PA based on the recommendation had better life quality on some dimensions.
Balboa-Castillo et al., 2011	People aged 62 and over	1,097	Cohort	PA questionnaire used in the Nurses' Health Study and the Health Professionals' Follow-up Study	SF-36	People who performed light PA in the upper quantile had better scores of SF-36 in the domain of mental health, bodily pain, vitality, linear trend, physical role, linear trendsocial functioning, emotional role and physical functioning
Omorou et al., 2013	French adult	4,909	Cross-sectional data	IPAQ short version	WHOQOL-BREF	Higher positive correlation was found between sport and life quality for people who performed high and low PA compare to people who did moderate PA. Dose-response association was found between social relationships and psychological health in women group
Anokye, et al, 2012	40–60 years old	5,537	Cross-sectional data	Accelerometer & Questionnaire related to sports and exercise, housework, walking, and occupational activity	EQ-5D	People who performed higher levels of PA had better quality of life. Even better life quality was shown in the objective measurement of PA compared to subjective measurement.
Motamed-Gorji et al., 2019	Students	23,043	Cross sectional	Physical Activity Questionnaire for Adolescents (PAQ-A)	Adolescent Core version of the Pediatric Quality of Life (PedsQL)	Significant correlation was found between total score of life quality and PA while sedentary time associated with lower score of life quality.
Nowak et al., 2019	University students	595	Cross sectional	IPAQ long version	Comprehensive Quality of Life Scale—Adult (ComQol-A5)	Household physical activity had more positive correlation to life quality. Negative relation was found between subjective and objective life quality and sedentary behavior at the weekend while sedentary during the week had positive relation with subjective life quality.
Chang et al., 2019	Taiwanese adults	6182	Cohort	2008 Physical Activity Guidelines for Americans (PAGA)	SF-36	Positive dose-response effects was found between life quality on the physical domain and regular exercise. More positive effects on life quality on mental domain was related with regular exercise. While irregular exercise improve life quality on mental and physical domain

We also used manual search from bibliographies of the articles we identified before. The inclusion criteria for this study are: the article was written in the English language, the study focused on physical activity (sport) in relation with quality of life. Cross-sectional studies, prospective cohort studies were considered for inclusion. Studies were excluded if they did not focus specifically on physical activity (sport) and quality of life. Protocol, secondary research, editorial articles, and studies with intervention were excluded as well.

The search identified 16 studies that fulfill the selection criteria which listed in the table 1 with detailed in the year and characteristics of the sample and methodology used in the studies. Most studies used cross-sectional design (n=11). Three studies used cohort design and two studies used interventions.

Instruments used to measure physical activity a accelerometer, Active Australia Survey, IPAQ, short form ipaq, physical activity scale of Johnson Space Center, 7-day Physical Activity Recall Questionnaire. Rand et al. (2010) used two kind of physical measurements accelerometer for objective measure and self-report questionnaire for subjective measure named PA Scale for Individuals with Physical Disabilities (PASIPD). Study by Balboa-Castillo et al. (2011) using spanish version of PA questionnaire that had been used and validated before in the Nurses' Health Study and the Health Professionals' Follow-up Study.

## **Discussion**

From 16 studies on the review we identified seven instruments used to measure life quality. Those are EuroQol questionnaire (EQ-5D), SF-36, SF-8, World Health Organization Quality of Life Questionnaire abbreviated version (WHOQol-Bref), CFQ-R questionnaire, Adolescent Core version of the Pediatric Quality of Life (PedsQL), and Comprehensive Quality of Life Scale-Adult (ComQol-A5). SF 8 is abbreviated version of SF 36. Most of the studies used SF-36 scale. It has eight domain: physical functioning (PF), social functioning (SF), role physical (RP), role emotional (RE), bodily pain (BP), mental health (MH), general health (GH), vitality (VT).

Studies showed associations between physical activity (PA) level and quality of life (QOL). That higher PA resulted in a higher quality of life (Aidar et al., 2011; Shibata et al., 2007). Hebestreit et al. (2014) explained in more detail that life quality related to health was associated with aerobic exercise or sport (Omorou et al., 2013). While the study by Nowak et al. (2019) said it is the physical activity in the household, which was most positively correlated to the quality of life.

Physically active participants had higher life quality on physical functioning domain (Aidar et al., 2011; Acree et al., 2006; Jepsen et al., 2013; Rand et al., 2010), mental health (Chang et al., 2019), role-physical, vitality, social functioning, and bodily

pain (Acree et al., 2006). Different with studies by Jepsen et al (2013) and Rand et al (2010) that said no association between mental health and PA. While performing less frequent PA showed moderate reduction in psychological stress (Hamer et al., 2008). It seems physical exercise might have positive effect on mental health, however, the evidence base for it is limited (Biddle and Asare, 2011). Mindfulness however has positive impact on physical performance (Blair-Resnick, 2015), physical health (Murphy et al., 2012) and mental health (Prazak et al., 2012), hence its integration into curriculums is highly recommended (Lengyel, 2017; Lengyel et al., 2019a; Lengyel et al., 2019b). PA was not related with the environmental domain, independent of patient and disease characteristics (Deenik et al., 2017). In contrast with physically active time; sedentary time is known to be causing a negative impact. Sedentary time duration had a significant inverse association with total QoL (Motamed-Gorji et al., 2019). More specifically, time spent sedentary was negatively associated with physical functioning, general health, vitality, social functioning and mental health (Blom et al., 2019) while Nowak et al. (2019) explained that sedentary behaviour at the weekends was negatively related to objective and subjective quality of life but sedentary behaviour during the week related positively with the subjective quality of life.

Insufficiently active is defined as physically involved in moderate-intensity activity or activities for minimum ten continuous minutes per week but do not meet active classification which defined as equal or more than 150 minutes per week of moderate intensity activity (Carlson et al., 2015). Physical activity recommendation guideline used in study by Shibata et al (2007) was 23 METS per hour per week for adult. Somehow it could be varied based on individual conditions. This prescription of PA, can be a proper treatment in primary health care settings (Kallings et al., 2007). Even for people with health problems, physical activity still gave positive effect to life quality (Aidar et al., 2011; Blom et al., 2019; Deenik et al., 2017; Jepsen et al., 2013; Hebestreit et al., 2014; Kallings et al., 2007; Katayama et al., 2014; Rand et al., 2010).

## **Conclusions**

Physical activity improves people's life quality in general. Some domains of quality of life that improved could be varied. Mental health as one domain of quality of life, in some studies related to physical activity but some studies did not show association between these two variables. Somehow doing physical activity as recommended which defined as moderate intensity of PA for 150 minutes per week or more, evident to improve life quality for all groups, including people with health problems. There are some limitations of this study. First the literature limited to english only. Bias in concluding the result could be affected by the difference of instruments used to measure variables. The strength of this study is that we searched in the online database without constriction of published years to have more comprehensive results.

## Acknowledgement

The publication is supported by the GINOP-2.3.2-15-2016-00005 project. The project is co-financed by the European Union under the European Regional Development Fund.

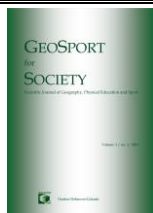
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## GEOSPORT FOR SOCIETY

Scientific Journal founded in 2014 under aegis of University of Oradea (Romania),  
University of Debrecen (Hungary), University of Gdansk (Poland)

ISSN 2393-1353

Edited by Oradea University Press  
1, University Street, 410087, Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro/geosport.html>



# Recreational Activities and Motivation Among Young People

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**Citation:** Kinczel, A., Maklári, G., & Müller, A. (2020). Recreational Activities and Motivation Among Young People. *Geosport for Society*, 12(1), 53-65. <https://doi.org/10.30892/gss.1206-059>

*Article history:* Received: 10.03.2020; Revised: 20.04.2020; Accepted: 18.05.2020, Available online: 20.05.2020

**Abstract:** These days, a sedentary lifestyle lacking in exercise has been dominating people's lives, and very few people are motivated to do sports. Motivation is a highly important factor, as it plays a role in people's daily lives, actions or even in sports. As for our free time, both passive and active recreational activities appear, corresponding to trends. In terms of an active lifestyle and prevention, the role of recreational sports is becoming increasingly appreciated among health-conscious consumers, who prefer to practice them. Several studies have shown that regular recreational sports represent prevention against several lifestyle-related diseases (such as diseases resulting from stress, obesity, cardiovascular diseases, type 2 diabetes, certain tumorous conditions, etc.). This is why recreational sports are a great means of prevention, being able to preserve individuals' health in a cost-efficient manner. Methodology: Our study used a questionnaire to examine the recreational habits of inhabitants in Romania and Hungary, in which we focused mainly on their sporting habits (N=612). The results obtained in the questionnaire were processed and analysed using the SPSS software. We calculated some basic statistics (mean, dispersion, median, mode). A chi<sup>2</sup> test was used to examine the correlations. Results: The results confirm that passive recreational activities (watching TV, listening to music, reading, surfing the internet) are popular in people's lives. Hungarian respondents' activeness in sports is also confirmed as opposed to Romanian respondents. Those who do sports in their free time have noticed several positive effects on themselves. Eighty percent of respondents would be open to new methods, willing to participate in sports-related events at their workplace / school / university. The majority of respondents would do more sports if there were a person in their lives or among their acquaintances who could motivate them.

**Keywords:** recreational sports, prevention, motivation

## Introduction

Recreational sports have many known positive effects on a person's physical, mental, and social well-being, which has been confirmed by several Hungarian (Apor, 2011; Juhász et al., 2015; Müller and Bácsné, 2018; Simon et al., 2018) and international (Dobay et al., 2017; Bendíková et al., 2018; Baidog and Herman, 2018; Erdely et al., 2020) literature sources. Nowadays, stress and stress-related diseases prevail because people's lives are characterized by performance and work pressure (Dajnoki et al., 2018; Héder et al., 2018; Dajnoki et al., 2019), which is accompanied by high stress levels. This is why those recreational activities have become increasingly popular that are able to reduce stress levels, such as massage (Bíró et al., 2019) or certain exercise programs (Csörgő et al., 2013; Bodolai et al., 2016; Molnár, 2019). An increasingly greater part of society is affected by various lifestyle-related diseases like stress, anxiety, obesity, stroke, hypertension, cardiac diseases, various bad postures and deformities, which could be reduced by increased recreational sports and physical activity (Ding et al., 2017; Iski and Rurik, 2014). Sport as a "medicine of exercise" teaches a lot of things and helps to develop many positive personality traits such as perseverance, selflessness, the ability to come to terms with successes and failures, fatigue tolerance, a realistic self-esteem, tolerance, while at the same time it improves will power, socialization, the development of social relations and courage. In many people's lives, sport provides the motivation to perform other tasks, as well. Active exercise could reduce the risk of the subsequent development of several diseases (Bíró, 2018). Many people die both in Hungary and Europe from cardiovascular diseases, tumorous diseases, early coronary artery diseases or suicide, which could be prevented by sport.

Many people are aware of the positive effects of sport, but they still prefer to spend their free time on passive recreational activities (Czabai et al., 2007; Kovács, 2011; Horkay et al., 2018a). Because we are overloaded, we usually do not have the mood or motivation to do sports after a long and hard day. Several studies have examined sporting habits among university students (Murányi, 2010; Kovács, 2016; Fenyves et al., 2019). Children are so engaged by the world of smartphones and the internet that they spend less and less time outdoors, do less exercise, while their personality also changes in a negative direction. Research on recreational habits draws attention to the trends affecting leisure consumption (Gódey et al., 2018; Horkay et al., 2018b; Fenyves et al., 2018; Gósi et al., 2019; Bácsné Bába et al., 2018a, b, c). Recreation is still strongly dominated by passive leisure activities (watching TV, reading, surfing the internet, listening to music), which is also confirmed by our research.

If we are able to increase people's active physical exercise and provide sufficient motivation for them, several diseases could be prevented. It is a huge problem in

health education that people are unable to imagine the experience of a disease or the risk of even a serious damage to health (Dajnoki, 2011, 2014, 2015) during the period when they could still do the most about it, when it is not too late to change their lifestyle (Buda, 1994). We need to build a society that consciously plays sports and pays attention to its health.

### Methodology

To examine the spending of free time and the presence of motivation, we designed a questionnaire-based research, in which we included questions regarding the system of recreational preference and motivational tools of the persons involved in the study. Regarding recreational habits, we also examined the frequency of the active and passive forms of activity, as well as the positive changes participants felt after doing sports. We also asked how they would act or feel if there were more sports opportunities at the workplace / school / university, what kind of lectures they would like to attend, and who motivating factors are for them.

65% of respondents were female and 35% were male. 64.4% live in Hungary, while 35.6% in Romania. Table 1 show that there were more male respondents in Romania than in Hungary.

68.1% of respondents were aged 19–25, 13.1% were under 18, and the rest (18.8%) were above 26 years of age (table 2).

**Table 1.** Proportion of men and women according to country

			In which country do you live?		Total
			Hungary	Romania	
Your gender:	Male	No.	119	95	214
		%	30.2%	43.6%	35.0%
	Female	No.	275	123	398
		%	69.8%	56.4%	65.0%
Total		No.	394	218	612
		%	100.0%	100.0%	100.0%

**Table 2.** Breakdown by age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<18	80	13.1	13.1	13.1
	19-25	417	68.1	68.1	81.2
	26-30	27	4.4	4.4	85.6
	31-35	20	3.3	3.3	88.9
	36-40	15	2.5	2.5	91.3
	41-45	14	2.3	2.3	93.6
	46-50	12	2.0	2.0	95.6
	51-55	16	2.6	2.6	98.2
	56<	11	1.8	1.8	100.0
	Total	612	100.0	100.0	

In order to be able to find a correlation between spending their free time and their work, first we asked respondents what kind of work they do. 70.9% are students, i.e. do sedentary work, 10.6% are not students but do sedentary work, 5.6% do physical work, while 12.9% do mixed (physical and sedentary) work. We might think that since many people lead a sedentary lifestyle, they do a lot of sports in their free time to be able to balance their lifestyle. Unfortunately, we are wrong. Most people still spend their free time with passive recreational activities. The world of media is immensely popular, also confirmed by our research, as 67.5% of respondents spend their free time with surfing the internet (on a computer, smartphone or tablet). The second most popular spare-time activity also belongs to passive recreation, as 62.7% of respondents watch TV or listen to music to relax from fatigue and try to recharge. This is followed by active recreational activity; 49.5% of respondents do sports in their free time. 46.9% like to spend their spare time in bed with passive rest and lazing around. Our research is in line with other Hungarian research findings where samples of young adults are also dominated by passive recreational activities (Müller et al., 2011; Mosonyi et al., 2013; Boda et al., 2015; Boda et al., 2019; Laoues et al., 2019). Other popular free-time activities include reading or meditation (40.7%), housework (cleaning, cooking, doing the laundry, emptying the bins, gardening, etc.) (38.2%), walking and playing with a pet (32.2%), studying (25.5%) and shopping (22.9%), while less popular activities include attending sports events as a spectator (20.9%), religious activities, going to church, attending diocesan programs, religious education, etc. (16.8%), health preservation (sauna, spa) (13.2%), playing music (8.8%), fishing (5.7%) and hunting (1.3%). Several studies confirm the increased appreciation of and demand for meditation and spirituality (Lengyel, 2016, 2019). Respondents do not always do the same free-time activities, they could choose more than one answer, which is the reason of the above percentages. These figures show that although 81.5% of the people do sedentary work or both sedentary and physical work, they still spend little time with more active recreational activities. It is understandable that those who do physical work prefer to read, relax, or listen to music in their free time.

### **Sports**

68.3% of respondents do some exercise outside of their physical education class of duration of at least thirty minutes. This value is better than what was published earlier in a 2018 Eurobarometer study on Hungarian data, which found that in the EU, only 7% of the population do sports five or more times a week, 33% one to four times

a week, while 14% even more rarely. In the study, 46% was the proportion of adults who never engage in regular sporting activities (Eurobarometer, 2018).

91.3% of respondents are aware of the sporting opportunities in their environment (clubs, outdoor and indoor gyms, etc.), but still few of them go to these places.

**Table 3.** Are they aware of sporting opportunities?

		In which country do you live?		
		Hungary	Romania	
Are you aware of the sporting opportunities in your environment (clubs, outdoor and indoor gyms, etc.)?	Yes	Count	360	199
		% within In which country do you live?	91.4%	91.3%
	No	Count	34	19
		% within In which country do you live?	8.6%	8.7%
Total		Count	394	218
		% within In which country do you live?	100.0%	100.0%

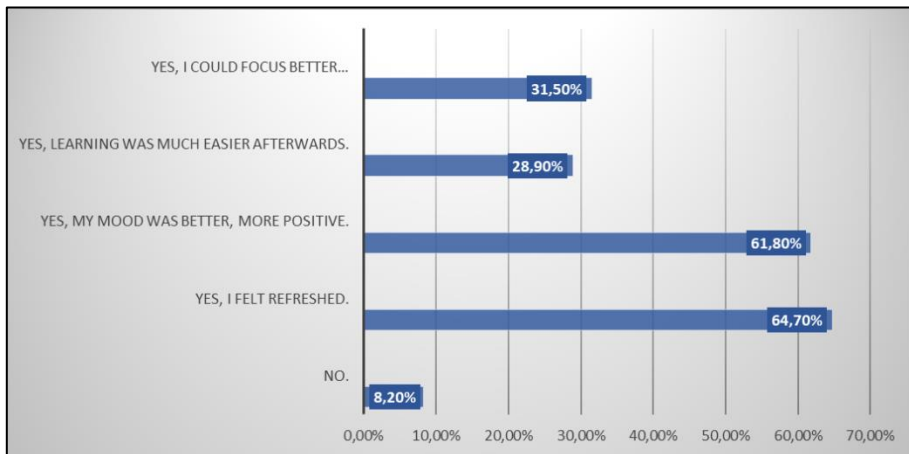
The most popular sports that people nowadays like to do include fitness (Gódnéy et al., 2018; Müller et al., 2019), running, swimming, Zumba, aerobics, football (Bácsné Bába et al., 2018b; Balogh et al., 2019), while less popular sports include basketball, tennis, and handball. These statements are also supported by our research. Most people prefer walking, hiking, Nordic walking, running, cycling, or going to fitness workouts. The least popular sports among respondents are ice hockey, golf, chess, archery, tennis, and fencing.

Note that those sports are more popular that can be done outdoors, in the nature, or even while going to school / university / work. Natural sports also play an important role in skill development and stress relief (Borbély-Müller, 2015). 21.7% of respondents like to do their exercise outdoors, in parks. They can thus devote themselves to nature and better wind down. 20% do sports at home, possibly because they do not like to go out, and this is a cost-efficient method. Since fitness is one of the popular sports, it is obvious that many people go to fitness and wellness centres to do sports. Several people do not do sports because they do not have enough spare time, so many of them do sports on their way to school / work / university. 15.7% do sports in an association or club.

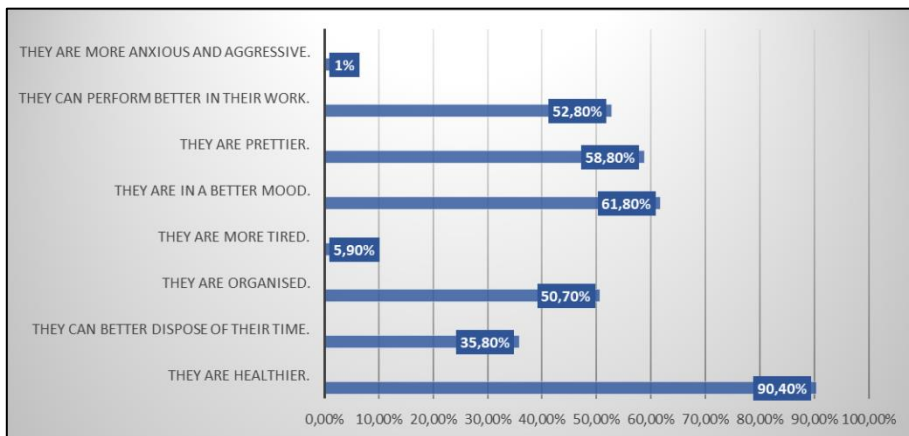
Respondents mainly do sports to preserve their health and general well-being (292), but at the same time, sports make them happy (245), and furthermore, to lose weight or improve their appearance (218), but many respondents selected the “exciting and entertaining activity” option (180) as well. Very few of them do sports because others expect them to do so (18).

**Table 4.** Why do you do sports? (scale 1-7)

	N	Minimum	Maximum	Mean	Std. Deviation
To preserve my health and general well-being.	612	1.0	7.0	5.632	1.7079
To spend time with others	612	1.0	7.0	3.755	2.1534
To improve my appearance, to lose weight.	612	1.0	7.0	5.118	1.9685
It makes me happy.	612	1.0	7.0	5.312	1.8973
I can get to know myself and my boundaries.	612	1.0	7.0	4.722	1.9929
It is an exciting, entertaining activity.	612	1.0	7.0	4.922	1.9663
Because of others; it is expected from me.	612	1.0	7.0	1.742	1.4805



**Figure 1.** Positive changes after doing sports



**Figure 2.** What are people doing sports like?



458 people claimed that they had opportunities to do the sport they like. 115 people claimed that they would have the opportunity, but they did not have enough free time to do the active exercise. In addition, 56 people cannot afford to do sports they like.

The majority of respondents like to do sports alone (386), while 287 of them prefer to do active exercise with their friends, and 262 in a team. 87 respondents do sports within a club, 37 with a trainer. This may be due to the fact that several trainers have not yet been able to establish a close relationship with their competitors.

If the university / school / workplace organized various sports days, 80.6% of respondents would attend them. They think such events would be good entertainment opportunities, they would strengthen relationships, help them relax, improve the community, and people would be healthier and could recharge. It would be an effective method if the various companies held as many sports days as possible to get workers to do some exercise, which would result in a positive effect, as people would perform their work much more actively in the same amount of time (Hidvégi et al., 2017).

People who have already done sports felt refreshed afterwards, their mood was better, they had more positive thoughts, learning was much more efficient after sports, and they could focus better on the tasks ahead.

According to the respondents, people who do sports are healthier, their mood is better, they are prettier, more organised, they can perform better in their work, and they can better dispose of their time.

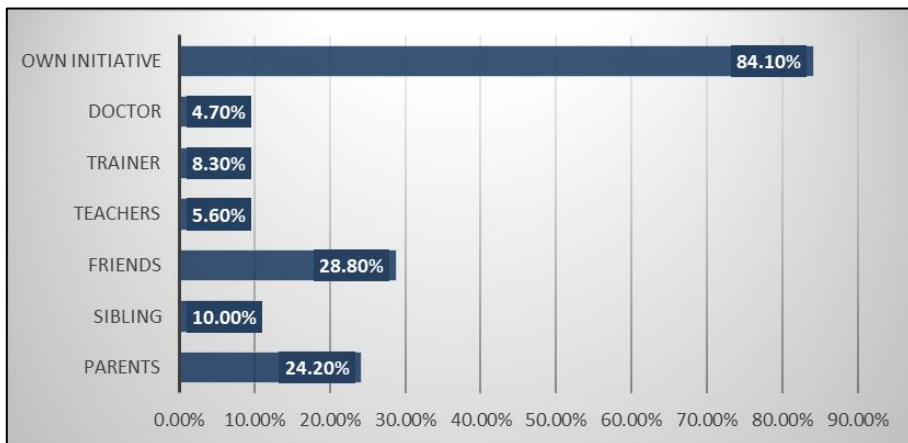
### **Motivation**

The term 'motivation' is used to describe the psychological process underlying any behaviour (Gage and Berliner, 1991; Nagy, 2000); nevertheless, the detailed description of this process is rarely attempted, which is obviously related to the complexity of the phenomenon of motivation (Józsa, 2007).

Motivation as an umbrella term consists of various motives. It determines the degree of activity of the body, the organisation and effectiveness of behaviour, and also includes all the internal factors that encourage actions or behaviours. The internal urge that affects an individual can be of different origins. It is called a need if the sources of the stimulus are biological motives (hunger, lack of oxygen, etc.); however, if the internal urge is of a psychological origin, we speak about drive (Freud's "instinct"), which is a kind of psychological driving force to achieve an individual's set goals or an organization's internal state of equilibrium or so-called "homeostasis". There are, however, motivational "channels" that are unique to the human race. We can distinguish two types. One is "intrinsic" motivation where the stimulus for action is the inherent enjoyment in the act itself. The other group of human motivation is

“extrinsic” or performance-driven motivation where the urge comes from the achievement of a goal (e.g. breaking out of poverty) or an external factor (Lenténé, 2014, 2017). These can appear in various forms in the different areas of life.

The presence of adequate motivation is particularly important for sports (Fyodorov et al., 2019; Bendíková and Dobay, 2017; Kozma et al., 2015; Tătar et al., 2018; Buhaş-Stance, 2017). Many people do not do sports because they are not motivated. We asked respondents who had motivated them to start to do sports. 518 of them started to do sports on their own initiative. 176 people were encouraged by friends, while 148 of them by parents. Few of them were motivated by siblings, teachers, trainers, or doctors. There should be an increase in the number of parents motivating children to do sports, as several studies discuss the determining role of the family or parent (Laoues, 2019; Mező and Mező, 2017; Herpainé, 2018; König-Görögh et al., 2019). The more parents do active physical exercise, the more children would be involved in the world of sports.



**Figure 3.** Who motivated them to do sports?

Motivation is essential in sports, since it affects all factors that influence performance: these include physical fitness, technical and tactical training, mental preparation, as well as everyday lifestyle. Respondents are aware of the positive effects of sport, and probably that is why they responded that if they have or will have children, they would motivate them to do sports (99.5%).

Most people have found the person with whom they would like to train, as 78.6% of respondents replied that there is a person in their environment whom they could ask to motivate them to do sports, or if this person invited them to do sports, they would gladly join them.

People are interested in many topics. We asked what kind of lectures they would like to attend. 292 respondents are interested in the topic of the appropriate trainings and losing weight, 287 would participate in personality development trainings, 276 in motivational lectures, and 252 people would be attracted most to lectures on healthy eating.

### Of the experience of correlation analysis

Sporting activity of Hungarians was higher than that of Romanians, as 71.6% of Hungarian respondents (282 people), while 62.4% of Romanians (136 people) claimed that they do sports (defined as doing recreational sports at least once a week, at least for 30 minutes). The chi2 test also confirmed the higher sporting activity of Hungarians (chi2= 5.473, df=1, p=0.013).

A significant difference was found between Hungarian and Romanian respondents also regarding the frequency of doing sports (chi2=13.521, df= 5, p=0.019). There are more Hungarians who do sports as frequently as 2–3 or 3–5 hours a week, and there are fewer people among them who do not do sports at all, compared to Romanians (table 5).

**Table 5.** How much sports do you do?

	Romanian	Hungarian
I do sports for 3–5 hours a week. No.	33	84
I do sports for 3–5 hours a week. %	15.1%	21.3%
I do sports for 2-3 hours a week. No.	45	112
I do sports for 2-3 hours a week %	20.6%	28.4%
I do sports for 5-8 hours a week. No.	39	56
I do sports for 5-8 hours a week. %	17.9%	14.2%
I do sports for 8-10 hours a week. No.	19	34
I do sports for 8-10 hours a week. %	8.7%	8.6%
I do not do sports. I walk or cycle sometimes, not more than 1 hour. No.	68	82
I do not do sports. I walk or cycle sometimes, not more than 1 hour %	31.2%	20.8%
I do sports for more than 10 hours a week. No.	14	26
I do sports for more than 10 hours a week. %	6.4%	6.6%

Health as a motivation for sports is a stronger motivation among Hungarians than the Romanian respondents, as 52.3% of Hungarians rated it '7', i.e. being fully characteristic of them, while only 39.4% of Romanians rated it '7' on the Likert scale (chi2=22.03, df=6, p=0.001). The results show a strongly significant difference between the nationalities.

"Spending time with others", i.e. community as a motivation for sports showed no significant difference.

The motivation of appearance and losing weight in recreational sports is also more characteristics of Hungarians, as 21.3% of them (84 people) rated it '6' and 38.6% of them (152 people) rated it '7', while only 12.8% of Romanian respondents rated it '6' and 30.3% of them (66 people) rated it '7' ( $\chi^2=33.82$ ,  $df=6$ ,  $p=0.000$ ).

Sport as a happiness factor also appears more dominant in Hungarian respondents' system of values, as 20.1% of Hungarians rated it '6' and 42.9% (169 people) rated it '7', while only 12.8% of Romanians (28 people) rated this motivational factor '6' and 34.9% (76 people) rated it '7'. ( $\chi^2= 37.548$ ,  $df=6$ ,  $p=0.000$ ).

The motivation that "I can get to know myself and my boundaries" also appears more strongly in Hungarians' motivation for sports, as there were more respondents among Hungarians who rated this motivation '5', '6' or '7' ( $\chi^2=25.567$ ,  $df=6$ ,  $p=0.000$ ).

Being an exciting and entertaining activity as a motivation for recreational sports is also much stronger among Hungarian respondents than among Romanians, as 20.8% of Hungarians (82 people) rated it '6' and 32% (126 people) rated it '7', while 15.1% of Romanian respondents (833 people) rated this motivation '6' and 24.8% (54 people) rated it '7'. ( $\chi^2=19.136$ ,  $df=6$ ,  $p= 0.004$ ).

"It is expected from me" as a motivation had a low average among both nationalities, i.e. it is a less important aspect in doing sports. Respondents were consistent in this response, as we could show no significant difference.

## **Conclusions**

It is important to increase participation in regular recreational sports in Hungary because we perform below the EU average for all age categories.

Our research proves that although recreational sports do appear among people's recreational activities, passive free-time activities are still more common. It would be desirable to train experts who could provide sufficient motivation for people, because if we increased motivation for and interest in sports in people's lives, we would reduce the risk of certain diseases, and we could improve people's physical, mental and social well-being. As doing sports is a personality development activity that psychologically connects people, enhances physical fitness, has antidepressant and energizing effects, active exercise can affect our mood and relationships.

## **Acknowledgements**

This publication was supported through project no. EFOP-3.6.2-16-2017-00003. The project was supported by the European Union and co-financed by the European Social Fund.

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## GEOSPORT FOR SOCIETY

Scientific Journal founded in 2014 under aegis of University of Oradea (Romania),  
University of Debrecen (Hungary), University of Gdansk (Poland)  
ISSN 2393-1353

Edited by Oradea University Press  
1, University Street, 410087, Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro/geosport.html>



# Wildlife tourism as a developing recreational activity option in Hungary's North Great Plain region and Bihar-Bihar Euroregion

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**Citation:** Pucsok, J.M., Hidvégi, P., Lenténé, A.P. & Bíró, M. (2020). Wildlife tourism as a developing recreational activity option in Hungary's North Great Plain region and Bihar-Bihar Euroregion. *Geosport for Society*, 12(1), 66-71. <https://doi.org/10.30892/gss.1207-058>

*Article history:* 05.03.2020; Revised: 25.04.2020; Accepted: 22.05.2020, Available online: 25.05.2020

**Abstract:** According to recent statistical data outdoor adventure activities play an important role in today's tourism industry. This growing tendency based on several factors. Primarily there are more and more people seeking for these types of outdoor activities. Young couples tend to establish family in a later age, typically in their thirties. They have more time for active leisure activities such as hiking and nature walking. In addition, they likely to spend a growing amount of money for any unique touristic experience. Nature walks sometimes combined with other nature-based activities such as discovering wildlife in a given area. Not only are the younger, but older generations also opened to outdoor recreational activities and sports too. There are several options for observing wildlife depending on the geographical location; some of them may offer significant physical challenges. Hungary's North Great Plain region is predominantly flat, while the Bihar region in Rumania is a real mountainous terrain. Hortobágy and the Tisza lake areas offer unique opportunities for birdwatching in Europe. Like any other recreational activity, bird watching is proved to be beneficial for both physical and mental health. Wildlife tourism and avitourism represents serious health-recreational and touristic potential. There is a constant need for quality nature-based services, especially associated with wildlife tourism.

**Keywords:** wildlife tourism, recreational activity, healthcare industry, Bihar-Bihar Euroregion

## Introduction

According to recent statistical data, outdoor adventure activities play a significant role in today's tourism market. The growing tendency is supported by several different factors. First, the number of people participating in any outdoor

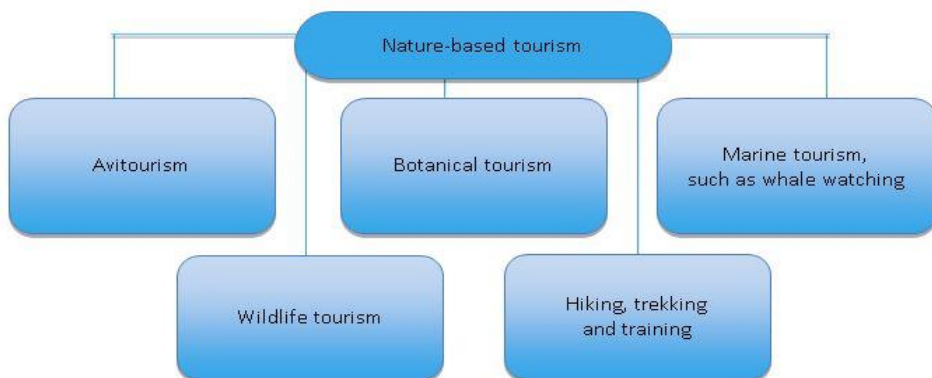


activities is continually growing. A wide range of people who are actively seeking outdoor activities. It is a tendency that young women give birth to a child at a later age. This is why these couples have more opportunities to spend money on their adventurous trips. Not only are the younger but senior generations also more likely to choose outdoor activities. These people have high expectations which are a driving force to develop higher quality outdoor services (Dunford, 2008). Since 1990 when the Adventure Travel Trade Association (ATTA) was established a thousand members from one-hundred countries have joined. Annual meetings called, Adventure Travel World Summits have gained increasing popularity over the years (ATTA).

### **Adventure tourism and activities**

Adventure Travel Trade Association (ATTA) defines adventure tourism as an activity, which is characterized by at least two out of three criteria: 1. physical activity; 2. performed in outdoors; 3. cultural interaction is present (Dunford, 2008). Adventurous, outdoor activities may help to get out of our daily routine, breaking out of our comfort zone. This way one may discover something new, through overcoming his/her barriers. There is a broad definition of such outdoor activities from whitewater rafting to traditional hiking. The North Great Plain Region is geographically flat, without any mountainous region, compared to other parts of Hungary, or especially Romania's Bihar region the available outdoor activities are somewhat limited. Just across the border, Bihar region is a paradise for nature-lovers, with abundant trails for hikers, those who like caving, rappelling, via ferrata or rafting, won't be disappointed either (Lăzuran and Ungureanu, 2014; Ilieș et al., 2017; Dehoorne et al., 2019; Olău et al., 2019; Herman et al., 2019).

The geographical characteristics of the North Great Plain region make it ideal for so-called „soft” activities such as Nordic walking, fishing, bird-watching, canoeing, horse-riding might be an option for more of thrill-seekers. „Avitourism, or avian tourism, is travel and tourism that focuses on and highlights local birding opportunities). Avitourism is one of the fastest growing types of environmental tourism or ecotourism” (Mayntz, 2017, p. 2). Avitourism, including bird-watching, is a fast-growing sector of the international tourism market (figure 1).



Source: Nature Conservancy

These activities except for horse-riding may be suitable for any generation regardless of age, and physical condition - the other advantage of these activities, that they do not require any significant prior experience.

### **Major attractions of the Hortobágy, Tisza lake areas**

Hortobágy and Tisza lake areas are one of Eastern Hungary's main touristic attractions, famous for its extraordinary flora and fauna. The Pusztaság, represented by the Hortobágy National Park, consists of a vast area of natural grasslands, alkaline pastures, meadows, and smaller and larger wetlands and marshes (UNESCO, 2018). Since 1999, Hortobágy National Park and Reserve have been selected as a UNESCO World Heritage site, a haven for migrating birds, birdwatching is a popular option, for nature-lovers. A perfect location for hiking trails, one may discover its treasure on a bike or riding a horse. Walking, cycling, horse-riding tours are widely available in this region.

Tisza lake is the second largest lake after Balaton in Hungary with extraordinary natural wonders. Several ecotouristic options are available including bird-watching, canoeing, fishing, cycling, horse-riding, and sailing as well. The eco-center located in Poroszló is the largest sweet water aquarium in Europe (Tisza-tó, 2018).

### **Flora and fauna of the Bihor region**

The area of Apuseni and Bihor mountains boasts rich flora and fauna, an ideal place for wildlife tourism. The Apuseni Nature Park situated in Rumania in the territory of Alba, Bihor and Cluj counties. This protected area is home to mammals such as the bear (*Ursus arctos*), the Carpathian elk and the black goat (*Rupicapra rupicapra*). Rare alpine birds, such as the ural owl (*Strix uralensis*), the nutcracker (*Nucifraga caryocatactes*) and the lesser spotted eagle (*Aquila pomarina*) may be observed in the park.<sup>1</sup>

### **Birdwatching and mental well-being**

Commonly, walking around in nature rich in vegetation, listening to the birds is a useful tool against stress. Nature walks, hiking, while observing species such as birds may even alleviate anxiety, depression too. More and more people seeking inner peace, for those visiting a natural reserve, observing wildlife may be a possible option. Now we have scientific evidence, that hiking and bird-watching may be beneficial for one's mental health.

Researchers from University of Exeter have recently published a study, involving over 270 participants of varied ages, incomes, and ethnicities. They confirmed that the feathery creatures are a fantastic natural remedy for your mental health. Research conducted by the University of Exeter, the British Trust for Ornithology, and the University of Queensland has demonstrated that people living in greener predominantly suburban areas are significantly less exposed to depression, anxiety, and stress (Cox et al., 2017). In 2016, two researchers also conducted a study

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<sup>1</sup> <http://romaniatourism.com/park-nature-apuseni.html>

suggesting bird-watching has a significant beneficial effect on mood, through feelings of relaxation, and interconnection to the natural world (Cox and Gaston, 2016).

According to Kaplan (1995), there is scientific evidence that interactions with nature promote psychological well-being, improved mood state (Barton and Pretty 2010), and reduced stress and anxiety (Grahn and Stigsdotter, 2003; Hartig et al., 2003; Maas et al., 2009). Natural environments, such as natural reserves may provide psychological benefits and also have the potential to be a practical approach to reduce stress and preserve mental health (Hartig et al., 2014; Shanahan et al., 2015).

Several researchers suggest that observing birds may be beneficial for people's mental health status (Curtin, 2009; Brock et al., 2017; Cox and Gaston, 2016, Cobar et al., 2017).

From 2018, medical doctors in the Island of Shetlands may officially prescribe nature walks and birdwatching as a natural treatment for chronic and debilitating illnesses. The physical activity associated with spotting local species such as lapwings, long-tailed ducks, and oystercatchers may help treating stress related illnesses, heart disease and diabetes etc. (Guardian, 2018).

### **The financial impact of anxiety and mood disorders**

Some scientific evidence, cross-sectional and longitudinal studies suggest, that mood disorders such as depression, may lead to disability or impaired work productivity (Simon, 2003). The overall costs of treating mood disorders may reach an estimated €187.4 billion per year in Europe (Gustavsson et al., 2012; Olesen et al., 2012). After stress, they are one of the most widespread work-related health issues (13.7% of all reported work-related cases; Eurostat, 2012). This phenomenon may be originated from the increasing gap between people and nature that is resulting from more urbanized, sedentary lifestyles (Soga and Gaston, 2016). Hiking in nature includes activities such as observing wildlife or bird-watching may be one of the solutions to relieve stress and anxiety.

### **Conclusions**

Wildlife tourism combined with other recreational activities such as hiking; canoeing may not only promote mental health but improve physical fitness too. It may be challenging to estimate the extent of these beneficial effects, researchers such as Brock et al., and Curtin investigated the interaction with nature and everyday wildlife, who emphasized the positive psychological effects. Cox et al., 2017 delivered one of the most comprehensive surveys, including 236 respondents on this topic. They collected data utilizing the short version of the Depression, Anxiety, and Stress Scale (DASS 21) study. Primarily mental, psychological status, socio-demographic, personal data, additionally the amount of physical activity was assessed. We may conclude that, hiking and observing wildlife have a beneficial effect on the individual's overall mental and physical health status, this way the healthcare industry is impacted too.

In the future, we advise to measure the magnitude of physical activity associated with every bird-watching (wildlife observing) trip, in North Great Plain Region, or Bihar region using a self-assessment survey method. Focusing not only the

mental rather the cardiovascular benefits of observing wildlife (hiking), this may further enhance the popularity of nature-based tourism.

**Acknowledgment:** This study was supported by the EFOP-3.6.2-16-2017-00003 project which is financed by the European Union and the European Social Fund.

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**GEOSPORT FOR SOCIETY**

Scientific Journal founded in 2014 under aegis of University of Oradea (Romania),  
University of Debrecen (Hungary), University of Gdansk (Poland)

ISSN 2393-1353

Edited by Oradea University Press  
1, University Street, 410087, Oradea, Romania

Journal homepage: <http://geosport.uoradea.ro>



## Mapping the Scottish university football system, a dual performance model based on sport and school

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**Citation:** Ilies, A., Caciora, T. (2020). Mapping the Scottish university football competitions. A dual performance model: organized sports and professional training. *Geosport for Society*, 12(1), 72–90. <https://doi.org/10.30892/gss.1208-061>

*Article history:* Received: 20.04.2020 ; Revised: 15.05.2020; Accepted: 29.05.2020, Available online: 02.06.2020

**Abstract:** For students at University studying towards an academic level professional qualification, practicing a sport in an organized manner provides a complementary activity to their studies. The Scottish model, which is administered through BUCS, is the case study and it is argued can be considered a successful model which can be applied to other academic environments. Through specific cartographic representation methods, through qualitative and quantitative spatial analysis tools, and a systemic approach, the geography of sports generates useful solutions in the territorial planning and organization policies and strategies.

**Keywords:** BUCS, Scotland, football team, university competitions, Sport geography

### Introduction

The increasing number of universities in the world and the rising percentage of people with higher education provide opportunities for the promotion of a dual form of academic life based on the practicing of a sport in an organized manner, together with the professional academic formation (Tight, 2002; Donnor, 2005; Christensen and Sørensen, 2009; Gayles and Hu, 2009; Böheim and Lackner, 2012). This combination of higher education and sport has been shown to have economic benefits (Humphreys, 2006; Kijewski and Wendt, 2019; Oros and Hantiu, 2018). The tradition of university sport has a long history in the UK as a whole (Moorhouse, 1995) and Scotland in particular (Anderson, 1987; Bradley, 1995). The

organizational body, the British University & College Sport (BUCS)<sup>1</sup> can be considered an example of a “professional organization” structure in an amateur sport environment. The objective in this article is to map the Scottish university football system and thereby generate a set of model maps which are representative of the geography of sports and of territorial planning. The study is informed by use of methods of spatial analysis (Bale, 2003; Buhaş et al., 2015; O'Brien and Cheshire, 2015) and tools of cartographic representation through which a suggestive image (Cartwright and Ruas, 2015; Ilieş et al., 2015) can be formed which shows the main qualitative and quantitative elements that form the territorial system of Scottish university football. It has been observed for example that the “University of St. Andrews football programme fosters a healthy relationship between athlete and student. Our players graduate with a world class education, an exceptional sporting experience and teammates for life”<sup>2</sup>. The results of this study can be useful in territorial planning policies and strategies.

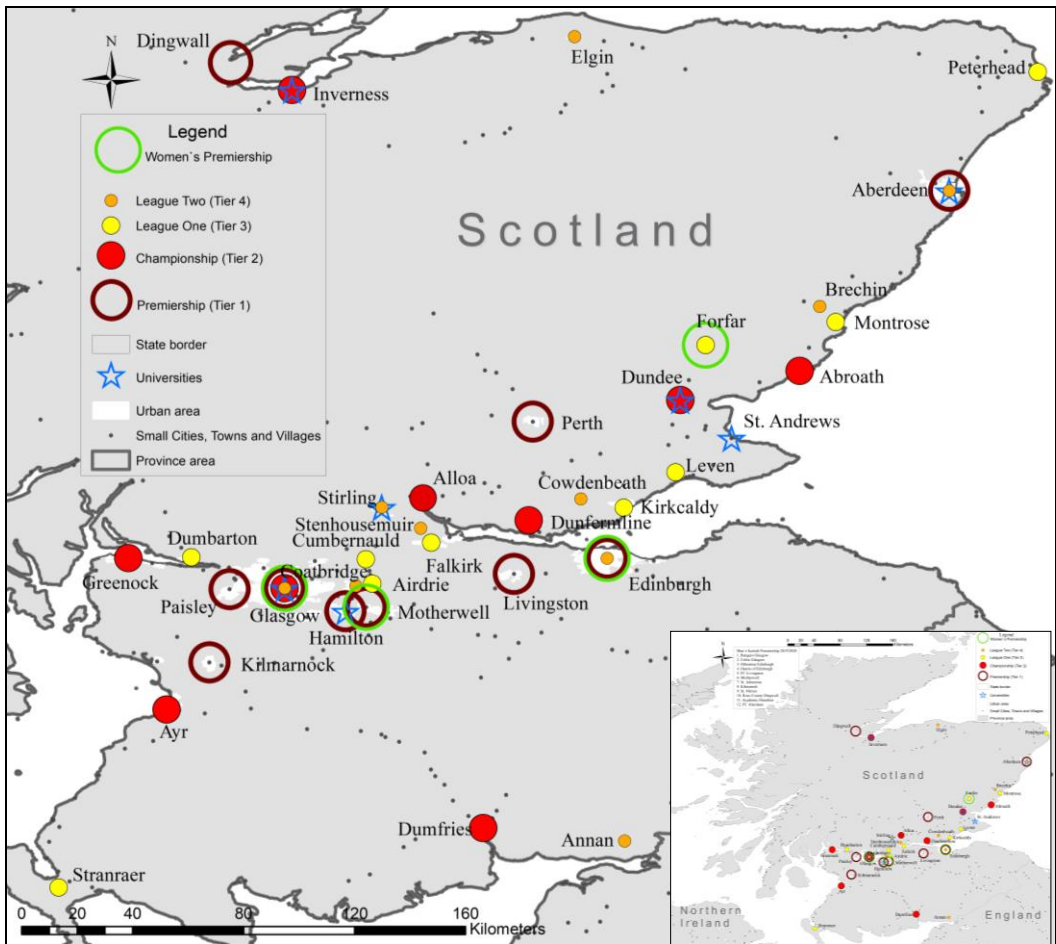
### **Methodology**

As is demonstrated in international literature, geographical analyses are important in understanding sport (Bale, 2003). Key geographical concepts can be applied to sport such as space and place; location and landscape; spatial diffusion and mapping. The creation of a database from online sources<sup>3;4;5</sup> managed through ArcGIS represents one way of analysing the spatial dimensions of a sporting phenomenon which is made up of static and dynamic inter-related elements (Reilly and Gilbourne, 2003; Buhas, 2015). The cartographic outputs produced through this process can contribute to territorial planning and organization policies from a local level to a regional level (Robinson et al., 2017; Murphy, 2019), as well as even at a national and continental level (Wendt and Scutti, 2016). Several studies have demonstrated the utility of applying methods of spatial analysis (Ilieş et al., 2015; Kozma et al., 2015; Gartner and Huang, 2016; Ilieş et al., 2016; Rotar and Ursu, 2019) to the geography of sports (Conner, 2014; Ilieş et al., 2014). Researchers use quantitative and qualitative elements (Griffin et al., 2017; Dehoorne et al., 2019) to generate a complex data base and cartographies series (Herman et al., 2016; Ilieş et al., 2016) with useful results and with high spatial visibility. A wide variety of factors are considered in such studies including those related to universities, their sports clubs, sports infrastructure, competitions, human resources, performances, spatial distribution, indicators ( $I_{fp}$ -index of football practicing), typologies and hierarchies, tools of analysis (Bulz and Ilieş, 2017) and impact in society (Bairner, 2011). All these factors are very useful in deciphering the mechanisms which make up and generate a functional specific territorial system.

### **Analysis**

Considering the complexity of the British sports system, Scotland was selected as a case study for this paper. The spatial analysis considers information generated by the competitions organized by BUCS for the 2019-2020 seasons, referring to Scottish professional<sup>6</sup> and amateur football<sup>7</sup>. Three key components are under investigation: the human resource (represented by players and teams), specific infrastructure, and competitions.

**The organization of Scottish professional football**<sup>6</sup>. Scotland has a total population of 5,454 million inhabitants with a density of 45 inhabitants/km<sup>2</sup>. As shown on Figure 1 Scottish football is organized across 5 levels<sup>5</sup>. Amateur football is included in the 5<sup>th</sup> level with two series and 7 levels of the university championship<sup>4</sup>. The overall map of Scottish football reveals that there are 36 localities with 42 teams (fig.1) with 31 localities having only one team. The exceptions are Glasgow 8 (4Men`s+4Women`s), Edinburgh 5 (3M+2W), Forfar 2 (1M+1W) and Motherwell 2 (1M+1W). Out of the total of 19 Scottish universities, only Stirling<sup>8</sup> and Glasgow<sup>9</sup>, along with BUCS, have teams also registered in the amateur Highland League (League 4)<sup>10</sup>.



**Figure 1.** Scottish centres and professional and universities football teams, season 2019/2020<sup>5</sup>

By overlapping the two male university categories of professionals and amateurs, it is observed that there are 8 localities with university football which are represented in Premiership 5, Championships 1 (Inverness), Stirling in League 2 and Highland League, while St. Andrews is represented only on amateur level. The fact that the 15 universities from BUCS are located in the main football-active localities of Scotland (figure 1), emphasizes the study’s core idea concerning the duality which is promoted through university football, sport and education. The existence of



important clubs in the locality means that there is an important resource of young sports individuals who can continue their activity in the university championships. On the professional female football level, only four localities are represented in the first Scottish League, half of the teams being in Glasgow (4).

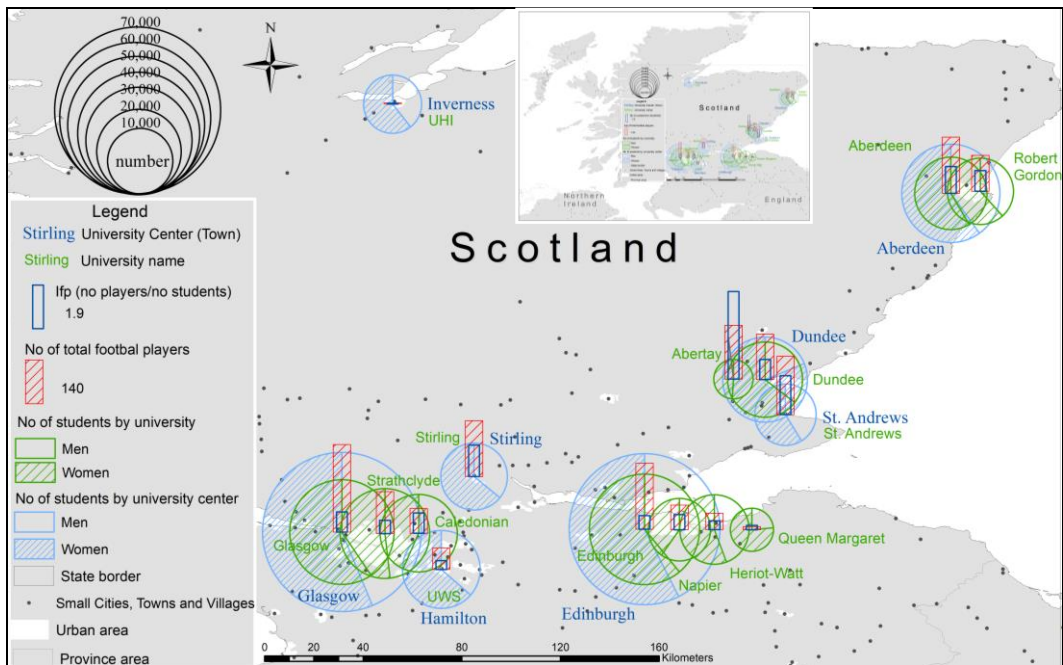
**Human resource: Number of sporting students.** In the 2019/2020 academic year, a total of 231,335 students<sup>11</sup> (5.1% from total population) attended one of the country's 19 universities and 15 of those universities have football teams. The largest universities in Scotland in terms of numbers of studies are Edinburgh (34,275), Glasgow (30,800) and Glasgow Strathclyde (22,640) (table 1). The universities without football teams in BUCS competitions (2019/2020) include: Scotland's Rural College Edinburgh, Royal Conservatoire of Scotland of Glasgow; The Open University in Scotland of Edinburgh; and Glasgow School of Arts.

**Table 1.** Scottish Universities and human resources in 2019<sup>1</sup>; 4; 11

no	Universities & Colleges	Number of students			Number of players			Number of teams			The Football Practicing Index (I <sub>fb</sub> )		No students/team	
		Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women		Total
1	Aberdeen Robert Gordon University	4735	7600	12335	83	29	112	3	1	4	1.75	0.38	0.91	28
2	Aberdeen University	6135	8640	14775	135	40	175	5	1	6	2.20	0.46	1.18	29
3	Dundee Abertay University	2215	2140	4355	145	23	168	3	1	4	6.55	1.07	3.86	42
4	Dundee University	5640	10275	15915	107	35	142	5	1	6	1.90	0.34	0.89	24
5	Edinburg Heriot-Watt University	6540	4395	10935	55	22	77	6	1	7	0.84	0.50	0.70	15
6	Edinburg Napier University	6025	7570	13595	39	12	51	3	1	4	0.65	0.16	0.38	17
7	Edinburgh Queen Margaret University	1230	3995	5225	10	0	10	1	0	1	0.81	0.00	0.19	10
8	Edinburgh University	13355	20920	34275	118	88	206	6	3	9	0.88	0.42	0.60	26
9	Glasgow Caledonian University	9185	7675	16860	52	25	77	2	1	3	0.57	0.33	0.46	26
10	Glasgow Strathclyde University	10885	11755	22640	100	31	131	4	1	5	0.92	0.26	0.58	26
11	Glasgow University	12265	18540	30805	184	89	273	3	2	5	1.50	0.48	0.89	55
12	Hamilton University of the West of Scotland	6180	10845	17025	67	0	67	3	0	3	1.08	0.00	0.39	22
13	Inverness University of the Highlands and Islands	3720	5775	9525	10	0	10	1	0	1	0.27	0.00	0.10	10
14	St. Andrews University	4355	6215	10570	121	61	182	6	3	9	2.78	0.98	1.72	20
15	Stirling University	4447	8053	12500	104	70	174	5	3	8	2.34	0.87	1.39	22
<b>Colleges</b>														
16	Cumbernauld New College Lanarkshire							1						
17	Edinburgh College							1						
18	Glasgow College City							2						
19	Glasgow Kelvin College							1						
20	Glasgow Clyde College							1						
21	Livingston West Lothian College							1						
	<b>TOTAL</b>	<b>96912</b>	<b>134393</b>	<b>231335</b>	<b>1330</b>	<b>525</b>	<b>1855</b>	<b>63</b>	<b>19</b>	<b>82</b>	<b>1.37</b>	<b>0.39</b>	<b>0.80</b>	<b>25</b>
	%	42%	58%	100%				69%	31%	100%				
	%				71.7%	28.3%	100							

The football practicing index (table 1; figure 2), illustrates the total number of male and female students engaged in football relative to the student body as a whole. It shows some key results. When compared with the average value of 0.8, the football practicing index is high in the following universities: Abertay (3.86), St. Andrews (1.72), Stirling (1.39) and Aberdeen (1.18); a very low practicing index is recorded in Queen Margaret (0.19). Table 1 also shows that there are consistent differences across genders with a higher football practicing index for males. For example, Dundee Abertay University has a male – female ratio with 6.55 for male students and 1.07 for female students. Regarding the number of sports students/team (table 1), there are also differences between universities, as well as between teams of the same institution. The formation of lots occurs according to the performance level and students' option. Compared to an average of 33 students/team, the most consistent lots are universities Abertay 84 and Dundee 71, while Napier 17 and Heriot-Watt only 13.

Figure 2 shows that the largest number of football playing students were in the following universities, most importantly Glasgow 273 (0.89) and Edinburgh 206 (0.6). Differences are observed in terms of gender: males in Glasgow 184/3 teams (1.5) and Abertay 145/3 teams (6.55), while females in Glasgow 89/2 teams (0.48), Edinburgh 88/3 teams (0.42) and Stirling 70/3 teams (0.87). In Scotland 58 % of students are women. Nevertheless, the football practicing index is not surprisingly much lower for women than for men. The gender differentiation is also reflected in terms of data concerning number of men’s as opposed to women’s teams in Scottish football (figure 2).



**Figure 2.** Scottish University centers and universities: number of students, football players and index of football practicing (Ifp) universities football teams, season 2019/2020<sup>4, 11</sup>

**Infrastructure.** The organization of a university championship supported by BUCS indicates the existence of formal infrastructure. The 21 institutions which have a total of 82 male and female teams benefit from an infrastructure which includes 94 football pitches (table 2; figure 2.1-16) at the universities’ own sports grounds. As is shown on table 2 other football pitches are added to this infrastructure. Some belong to local communities, others to partner football clubs and some which are rented.

University centers and university campuses have sports complexes which include numerous grass or synthetic pitches, indoor pitches, and sports halls, Table 2 and figures 2.1-16<sup>3, 4</sup> present a profile concerning the situation of the football pitches for the 21 institutions (8 university centers and 6 colleges) registered in competitions. The map of official playing pitches includes 25 locations<sup>3, 4</sup> (table 2). Eight universities have their own sports centers with an impressive number of pitches (94), an average of 8 pitches per institution. The largest complex (tables 1 and 2) is that of Dundee University<sup>12</sup> (12,335 students; figure 2.10).

**Table 2.** Scotland's universities sport complexes<sup>3, 4</sup>

No	Town	University	Teams		Stadiums		
			Men's	Women's	Name Owner: University / Others partners	No of pitches	Figure no.
1	Aberdeen	The University of Aberdeen	1		Hillhead Centre (Aberdeen University FC)	2	2.3
			2, 5	1	Balgownie Playing Fields	9	2.2
				1	Sport Village; Spain Park (Banks O'Dee Football Club)	3	2.4
2	Aberdeen	The Robert Gordon University	1		Balmoral Stadium (Cove Range FC)	3	2.1
			2, 3	1	Snowsports Centre	3	
3	Cumbernauld	New College Lanarkshire	1		Broadwood Stadium	2	2.16
4	Dundee	University of Abertay	1		Whitton Park	1	
			3		GA Arena	1	
				1	Craigie Community Sports Arena	8	2.9
5	Dundee	The University of Dundee	1, 4	1	Riverside Sports Ground (University)	18	2.10
6	Edinburgh	Napier University	1	1	Ainslie Park Stadium: Spartans CFA	2	
7	Edinburgh	The University of Edinburgh	1, 4	1, 2, 3	Sport & Exercise Peffermill (University)	10	2.5
8	Edinburgh	Heriot-Watt University	1, 2	1	Oriam Sport Complex Currie	8	2.6
9	Edinburgh	Queen Margaret University			Sport & Exercise Peffermill (University of Edinburgh)		2.5
					Firhill Complex;	1	
					Springburn Park;	1	
					Petershill Park (Petershill FC)	1	
10	Glasgow	Caledonian University	1	1	Green Football Center	9	2.15
11	Glasgow	The University of Glasgow	1, 3	1, 2	Garscube Sport Complex	8	2.14
12	Glasgow	The University of Strathclyde	1-4	1	Steeps Playing Fields (University)	10	2.13
13	Glasgow	City of Glasgow College	1		Green Football Center		
14	Glasgow	Clyde Langside College	1		Green Football Center		
15	Glasgow	Kelvin College	1		Petershill Park (Petershill FC)		
16	Hamilton	The University of the West of Scotland (UWS)	1, 3		Palace Sports Grounds (University)	8	2.11
17	Livingston	West Lothian College	1		FC Toni Macaroni Arena	2	
18	St Andrews	The University of St Andrews	1, 5	1, 2, 3	University Sports Centre	12	2.12
19	Stirling	The University of Stirling	1, 2, 3, 4	1, 3	University Airthrey Sport Centre	5	2.7
				2	Stirling Sport Village	3	2.8

**Institutions and teams.** The organization of competitive football for both men and women teams allows each institution to have a visibility through its registered male and female teams and players. In the 2019/2020 season, the Scottish university football map included 9 localities, 15 universities and 6 colleges with a total of 82 teams. Out of this total of 82 teams 63 are men's teams and 19 women's teams. In total 12 institutions are represented in both men's and women's competitions, while 9 institutions are represented only in men's competitions. On an institutional level, Edinburgh<sup>13</sup> with nine teams has the most. In the men's competitions, there are 63 teams registered, belonging to 21 institutions which differ in terms of the participation value level and the number of registered teams. As an order, Edinburgh<sup>13</sup>, St. Andrews<sup>2</sup> and Heriot Watt<sup>14</sup> have 6 teams each, followed by Stirling<sup>8</sup>, Dundee<sup>12</sup> and Aberdeen<sup>15</sup> which all have 5 teams each; Strathclyde<sup>16</sup> has 4 teams and then Abertay<sup>17</sup>, Glasgow<sup>18</sup>, Napier<sup>19</sup>, Robert Gordon<sup>20</sup> and UWS<sup>21</sup> all have 3 teams each. Further, two other institutions, namely Caledonian<sup>22</sup> and Glasgow College City<sup>23</sup>, have 2 teams and 7 institutions have one team each - Universities Queen Margaret<sup>24</sup> and Inverness UHI<sup>25</sup> and 5 colleges: New College Lanarkshire<sup>26</sup>, Glasgow Kelvin<sup>27</sup>, Clyde Langside<sup>28</sup>; West Lothian<sup>29</sup>, Edinburgh College<sup>30</sup> (table 1).



**Figure 2.1.** Aberdeen Robert Gordon University: *Balmoral Stadium* (source: [google.com/maps/place/Balmoral+Stadium/](https://www.google.com/maps/place/Balmoral+Stadium/); 2019)



**Figure 2.2.** University of Aberdeen: *Balgownie Playing Fields* (source: [google.com/maps/place/Balgownie+Playing+Field/](https://www.google.com/maps/place/Balgownie+Playing+Field/); 2019)



**Figure 2.3.** University of Aberdeen: *Hillhead Centre* (source: [google.com/maps/place/Hillhead+Centre/](https://www.google.com/maps/place/Hillhead+Centre/); 2019)



**Figure 2.4.** University of Aberdeen: *Sport Village* (source: <https://www.google.com/maps/place/Aberdeen+Sport+Village/>; 2019)



**Figure 2.5.** University of Edinburgh (and Queen Margaret University): *Sport & Exercise Peffermill* (source: [google.com/maps/place/peffermill+Playing+Fields,+The+University+of+Edinburgh/](https://www.google.com/maps/place/peffermill+Playing+Fields,+The+University+of+Edinburgh/); 2019)



**Figure 2.6.** Edinburgh. Heriot-Watt University: *Oriam Sport and Exercise Complex* (source: <https://www.google.com/maps/search/Heriot-Watt+University+Sport+and+Exercise/>; 2019)



**Figure 2.7.** Stirling University: *Airthrey Sport Centre* (source: <https://www.google.com/maps/search/Airthrey+Pitches/>; 2019)



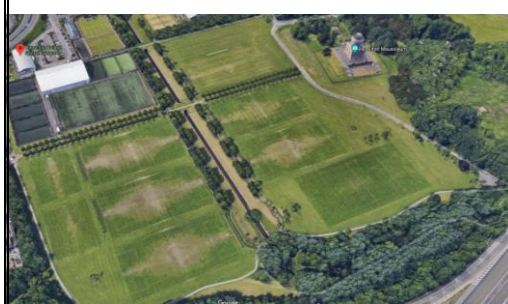
**Figure 2.8.** Stirling. *Sport Village: Forthbank Stadium* (source: <https://www.google.com/maps/place/Forthbank+Arena+Stirling/>; 2019)



**Figure 2.9.** Dundee University of Abertay: Craigie Community Sports Arena (3G) (source: [google.com/maps/place/Craigie+Community+Sports+Arena+\(3G\)/2019](https://google.com/maps/place/Craigie+Community+Sports+Arena+(3G)/2019))



**Figure 2.10.** University of Dundee: Riverside Sports Grounds, Institute of Sports & Exercise (ise), (source: [google.com/maps/place/Riverside+Sports+Grounds,+Institute+of+Sport+%26+Exercise+\(ise\),+Uni+of+Dundee/](https://google.com/maps/place/Riverside+Sports+Grounds,+Institute+of+Sport+%26+Exercise+(ise),+Uni+of+Dundee/))



**Figure 2.11.** Hamilton University of The West of Scotland (UWS): Palace Sports Grounds (source: [google.com/maps/place/Hamilton+Palace+Sports+Grounds/](https://google.com/maps/place/Hamilton+Palace+Sports+Grounds/); 2019)

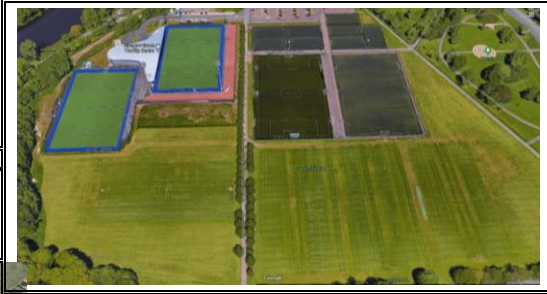


**Figure 2.12.** St. Andrews University: Sports Centre (source: [google.com/maps/place/University+Sports+Centre/](https://google.com/maps/place/University+Sports+Centre/))



**Figure 2.13.** Glasgow University of Strathclyde: Steeps Playing Fields (source: [google.com/maps/place/University+Of+Strathclyde/](https://google.com/maps/place/University+Of+Strathclyde/); 2019)

**Figure 2.14.** Glasgow. University of Glasgow: Garscube Sport Complex (source: [google.com/maps/place/Garscube+Sports+Complex/](https://google.com/maps/place/Garscube+Sports+Complex/), 2019)



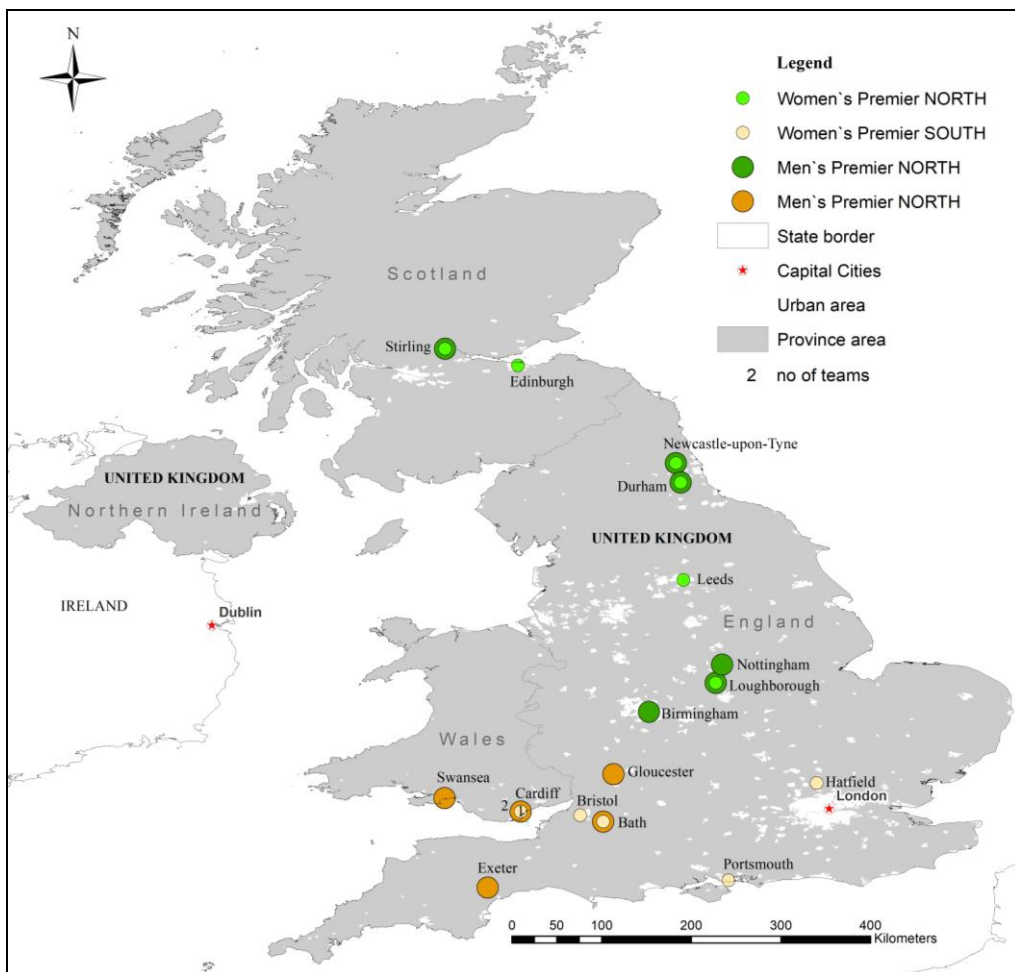
**Figure 2.15.** Glasgow (Caledonian University), Glasgow Green Football Centre (source: [google.com/maps/place/Glasgow+Green+Football+Centre/](https://google.com/maps/place/Glasgow+Green+Football+Centre/); 2019)



**Figure 2.16.** Cumbernauld: New College Lanarkshire: Broadwood Stadium, (source: [google.com/maps/place/Broadwood+Stadium/](https://google.com/maps/place/Broadwood+Stadium/); 2019)

In women’s competitions, Edinburgh, Stirling and St Andrews have the most teams with 3 teams each. In an order, Glasgow follows them with 2 teams and 8 other institutions have one team each. The focus shifts now from quantitative issues of numbers of teams to qualitative issues in regards to the competitive leagues. Figure 3 and 4 map the key spatial aspects of this competitive landscape. In the first 4 leagues, the 18 teams represent 11 institutions in men’s competitions and in women’s competitions, 6 institutions are represented in the first two tiers. The best performing institutions are: Stirling<sup>8</sup>, winner of Premier League North in men and 5<sup>th</sup> place in women and Edinburgh<sup>13</sup> which, out of the 8 teams, has 4 teams in the first 4 leagues (1 men’s tier 1 team and 3 women’s teams, one of them being in Premier League); the remaining 4 teams of Edinburgh are in the male leagues 4 and 5. Glasgow is the third ranked in terms of qualitative performance with 5 teams (men and women in T1-3).

**Competition systems.** In the competition system of BUCS, the participating teams are distributed in leagues and knockout competitions (figure 3-5; table 3).



**Figure 3.** United Kingdom. Premier League North and South<sup>4</sup>

**Table 3.** Scotland. Universities football teams and BUCS competitions<sup>1; 4; 5</sup>  
 (the colors from the table are in according with legends of the figures 6-10; M-men's team; W-women's team)

I	Championship Cup (M;W)		Trophy Scottish (M;W)	Scottish Conference Cup (M;W)				Conference Plate (M)		no	n o
	South	North		Tier One (L2)	Tier Two (L3)	Tier Three (L4)	Tier Four (L5)	Tier Five (L6)	Tier Six (L7)		
	Premier League										
1M	1.Hartpury1	1.Stirling 1	6.Stirling 2		1.Stirling 3	4.Stirling 4	4B.Stirling 5		1-5	5	
1W		4.Stirling 1	5.Stirling 2		3.Stirling 3				1-3	3	
1T										7	
	2.Cardiff1	2.Nottingham1									
	3.Swansea1	3.Loughborough1									
	4.USW1	4.Durham1									
	5.Bath1	5.Northumbria1									
	6.Exeter1	6.Birmingham1									
2M			1.Edinburgh 1			2.Edinburgh2 5.Edinburgh3	1B.Edinburgh (4)	1.Edinburgh 5 6.Edinburgh (IM)6	6-11	6	
2W		5.Edinburgh 1	3.Edinburgh 2		1.Edinburgh 3				4-6	3	
2T										8	
3M			2.Aberay 1			4B. Aberay 2	6C. Aberay 3		12-14	3	
3W			6.Aberay 1						7	1	
3T										2	
4M			3.Glasgow 1	6.Glasgow 2	3.Glasgow 3				15-17	3	
4W			2.Glasgow 1		2.Glasgow 2				8-9	2	
4T										5	
5M			4.Robert G. 1		6.Robert G. 2		1C.Robert G.3		18-20	3	
5W				3.Robert G. 1					10	1	
5T										4	
6M			5.Aberdeen 1		4.Aberdeen 3	2B Aberdeen 2 6B. Aberdeen 4	3C.Aberdeen 5		21-25	5	
6W			4.Aberdeen 1						11	1	
6T										3	
7M				1.Heriot Watt 1	5.Heriot Watt 2		3.BHW 3	3.Heriot Watt 4 2.Heriot Watt 5 7.Heriot Watt 6	26-31	6	
7W				6.Heriot Watt 1					12	1	
7T										6	
8M				2.Napier 1			2B.Napier 2	4.Napier 3	32-34	3	
8W				Napier 1					13	1	
8T										3	
9M				3.Strathclyd 1	2.Strathclyde 2	3.Strathclyde 3	2.Strathclyde 4		35-38	4	
9W				1. Strathclyd 1					14	1	
9T										5	
10M				4.Dundee 1		5B Dundee 2	2C Dundee4 5C Dundee 3 9C. Dundee5		39-43	5	
10W				4.Dundee 1					15	1	
10T										2	
11M				5.St Andrews 1		1B. St Andrews 2 3B. St Andrews 3	4C. St. Andrews 4 8C. ST Andrews 5 7C. St Andrews 6		44-49	6	
11M			1.St Andrews 1	5.St Andrews2	6.St Andrews3				16-18	3	
11T										4	
12M						1.G.Caledonian 1	4.G.Caledonian 2		50-51	2	
12W					4.Caledonian 1				19	1	
12T										3	
13M						6. UWS 1	7.UWS 3 8.UWS 2		52-54	3	
14M							1.New College Lanarkshire 1		55	1	
15M							3.Glasgow Kelvin 1		56	1	
16M							5.City of Glasgow College 2 6. City of Glasgow College 1		57-58	2	
17M							9.Glasgow Clyde Langside 1		59	1	
18M								5.West Lothian1	60	1	
19M							6BQueen Margaret1		61	1	
20M							5B.EdinburgCollege1		62	1	
21M							10C.Inverness UHI1		63	1	

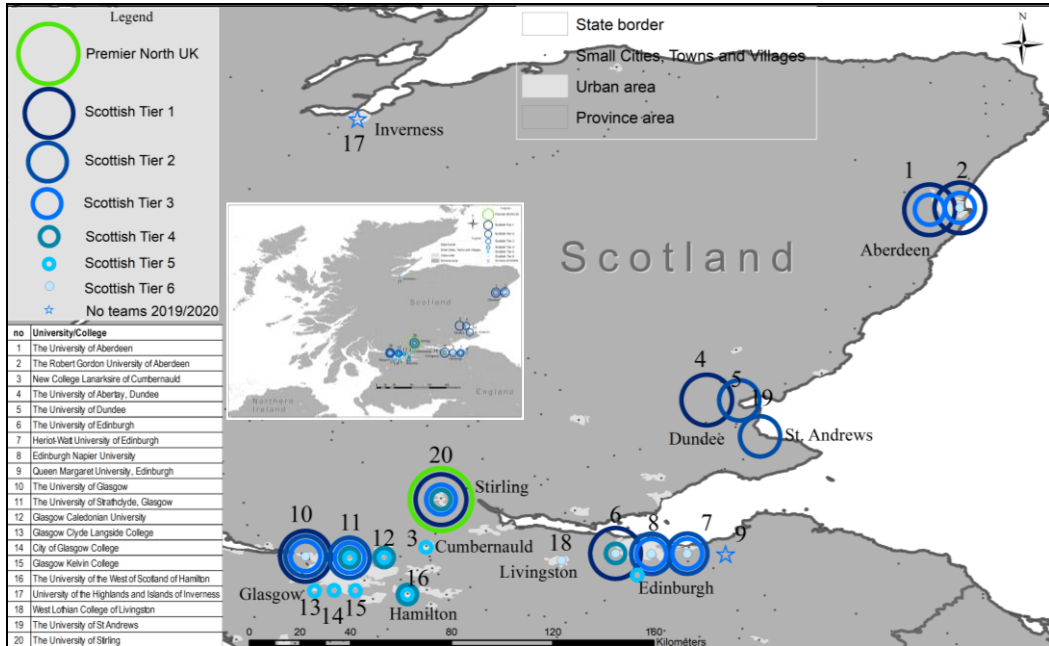


Figure 4. The Scottish Men’s teams from UK Premier North and Scottish Tiers 1-6<sup>1:4</sup>

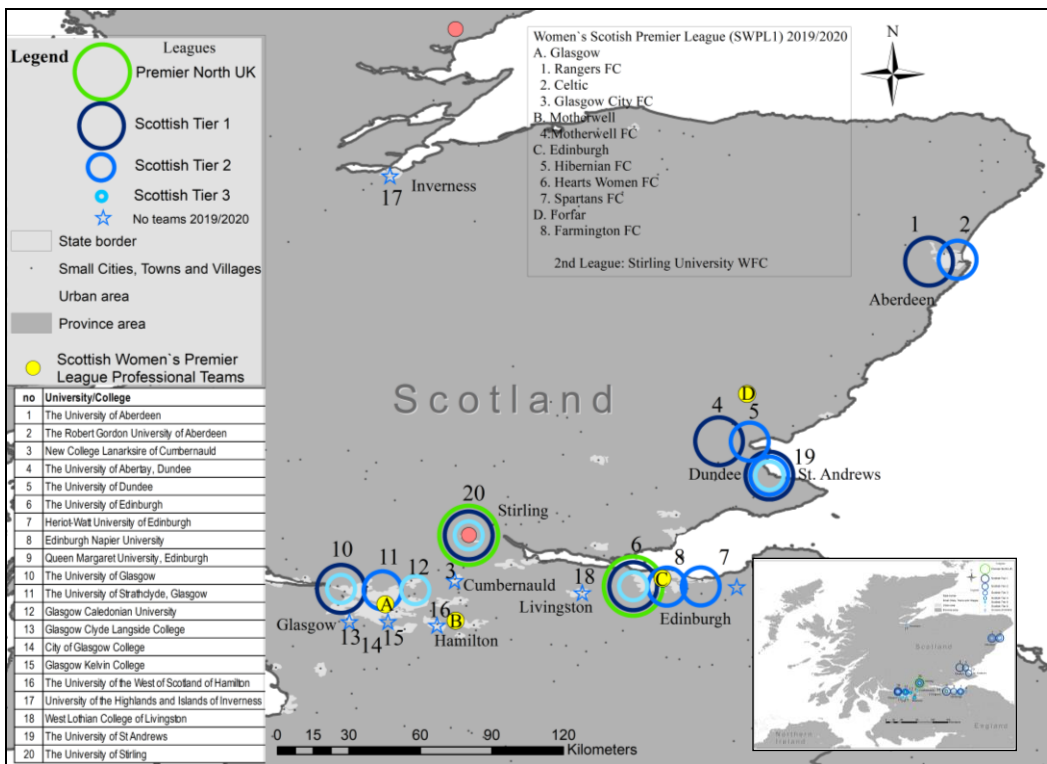


Figure 5. The Scottish Women’s teams from UK Premier North and Scottish Tiers 1-3<sup>1:4</sup>



**A) Leagues.** According to BUCS regulations (reg. 5)<sup>31</sup>, in the first three leagues (National League, Premier League and Championship), the institutions can register a maximum of 1 team (unless they are in different campuses). On a national Scottish level, together with United Kingdom Premier League North, there are (table 3; figure 3-5):

- 7 levels for men with 63 teams, representing 21 institutions (15 universities and 6 colleges) from 9 university centers;
- 4 levels for women with 19 teams, representing 12 universities from 6 university centers.

Starting with the 2<sup>nd</sup> level in the hierarchy, the other 6 men's leagues and 3 women's leagues (with a series of 6-9 teams) are formed exclusively by Scottish teams (figure 3-5). It should be noted also that many university teams participate regularly in other local amateur competitions.

**B) Knockout competitions** are organized for male and female teams. These are structured across 4 categories according to their level in the leagues. These knockout competitions usually take place in parallel with the regular championship (October-April). The highest level of competitions is organised on a UK level and the lower level knockout competitions are geographically confined to Scotland. This means that the knockout competitions can be grouped as follows (table 2; figure 1):

- 4 Competitions organized on UK level: Men's and Women's Championships (Premier League) and Men's and Women's Trophy (Leagues 1 and 2);
- 5 Competitions organized on Scotland's level: Women's and Men's Queen's Park Shield Cup Men's (First team of university), Women's Conference Cups (Leagues 3-5) and Men's Conference Plate (Leagues 6-7). It is observed also that many university teams participate regularly in Scottish Cup and other different local amateur competitions.

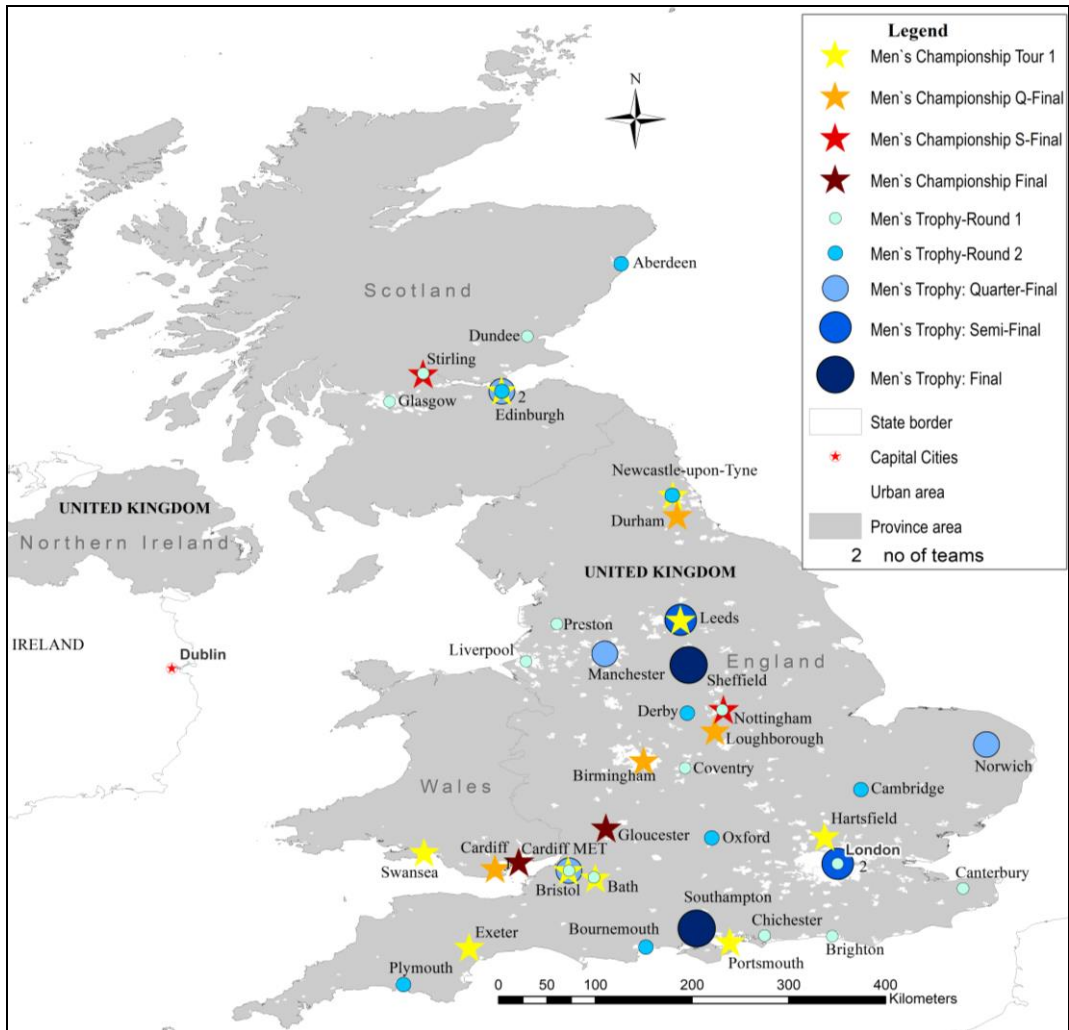
**Championship**<sup>4</sup> includes the first teams, male and female, of the universities participating in North and South Premier Leagues from the UK.

In the most recent football season (2019/2020), February-March, 12 teams from Men's Premier League were registered (figure 6). From the Scottish universities, only one team was registered in the Championship, Stirling 1 University. This team performed well, reaching the semifinal where it lost (0-2) against the Welsh team Cardiff Met1.

In the *women's competition*, out of the 12 participating teams, the first teams of Stirling1 and Edinburgh1 universities represented Scotland; both teams participated in Premier League North. Figure 7 shows that both of these teams were eliminated in the first round of the competition.

**Trophy Cup**<sup>4</sup> is the second tier knockout competition with teams registered in the 5 series of the first league and is extended across the UK territory (figure 6). The participants are usually, both for men and women, the 6 teams from Scotland's League 1 (Scottish Tier 1).

In the men's competition (figure 6, table 3), we find the second team of the University of Stirling and the first teams of the Aberdeen, Abertay, Edinburgh, Glasgow and Robert Gordon universities; 5 university centers being thus represented. Their relative performances are shown on Figure 6 and Table 3.



**Figure 6.** United Kingdom: Men`s Championship and Men`s Trophy Cups, 2019/2020 season<sup>4</sup>

In the parallel women's competition (figure 7; table 3), among the 30 registered teams, there were teams from Scottish League 1, representing 6 university centers and the same number of universities. Their relative performances are shown on Figure 7 and once again, on Table 3.

In addition to the two national competitions which are confined to Scotland, the Scottish university teams, registered in Scottish Leagues 2-7 (figure 1) also participate in the Men`s and Women`s Conference Cups (teams from leagues 2-4) and Men`s Conference Plate (teams from leagues 5-6).

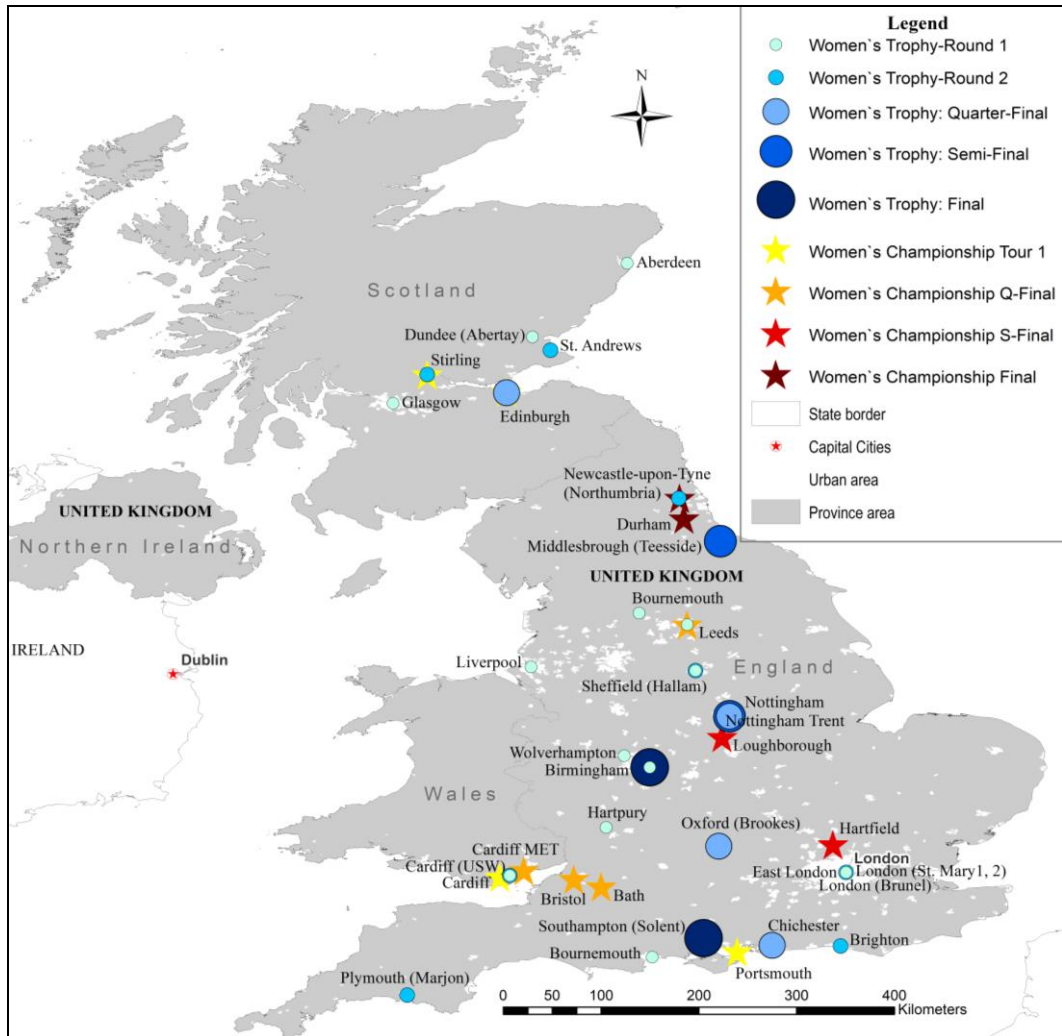


Figure 7. United Kingdom: Women's Championship and Men's Trophy Cups, 2019/2020 season<sup>4</sup>

**The Conference Cup** is organized for men's and women's teams and it is the third knockout competition. In the Conference Cup, 24 teams are registered from Scottish Leagues 2, 3 and 4 (tier 1-3) and this competition takes place from November till March.

In the *men's competition*, shown in figure 8, 13 universities, each with 1-3 teams (table 2) played which represented 8 university centers (Inverness is missing). With 3 teams each, Aberdeen (2-4), Strathclyde (1-3) and St. Andrews (1-3) had the most teams. St. Andrews mens1 and mens2 played a Semi-Final and the first team of this university also won the trophy, winning (2-0) in the final against the first team of Strathclyde1 University. According to the team's position in the institution's hierarchy (1-6), out of the 24 participating teams (figure 8), 7 institutions were represented by the first team (Men's1); by Men's2: 8 teams; Men's3: 7 teams and Men's4: 2 teams, namely, Aberdeen and Stirling. Table 3 and cartographic representation (figure 8)

show a qualitative spatial analysis (ranking the league and level in the Cups) and a quantitative one (number of teams, institutions etc.) on the level of 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> leagues from the Scottish football.

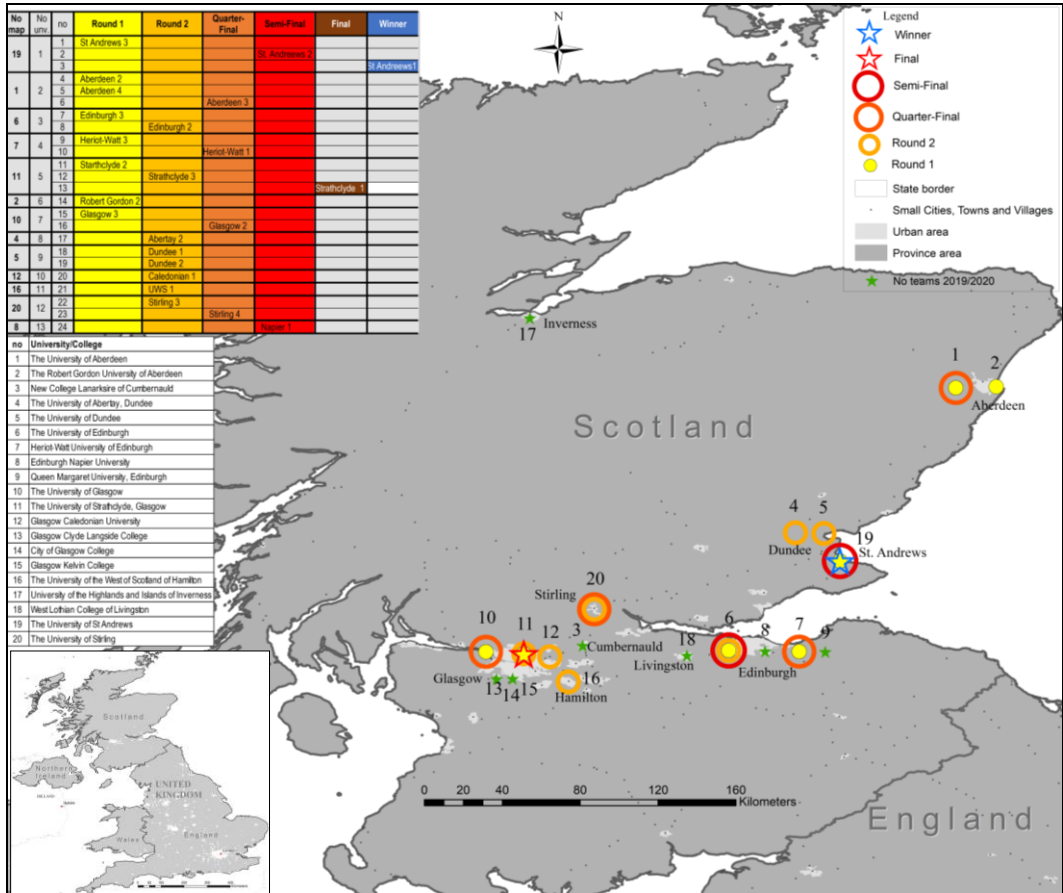


Figure 8. Men's Scottish Conference Cup (2-4 leagues), 2019/2020 season<sup>4</sup>

The Conference Cup for *women football* on Scottish territory included 11 teams from leagues 2 and 3 (levels 3 and 4), belonging to 10 universities (figure 9) which represented 6 university centers. St Andrews University participated with two teams and the 6 other institutions participated with one team: their first team. The Conference Cup is a knockout competition which takes place in parallel with the regular championship, starting in November and with the final in March. The winner of the Cup was the first team of Robert Gordon University from Aberdeen, which defeated the first team of the University of Dundee in the final (3-2).

**The Conference Plate** is the knockout competition which includes only the men's teams from the Scottish leagues 5 and 6. The cartographic representation of this competition is similar to figure 2 and is based on the representation of qualitative elements (performances) and quantitative elements (number of teams).

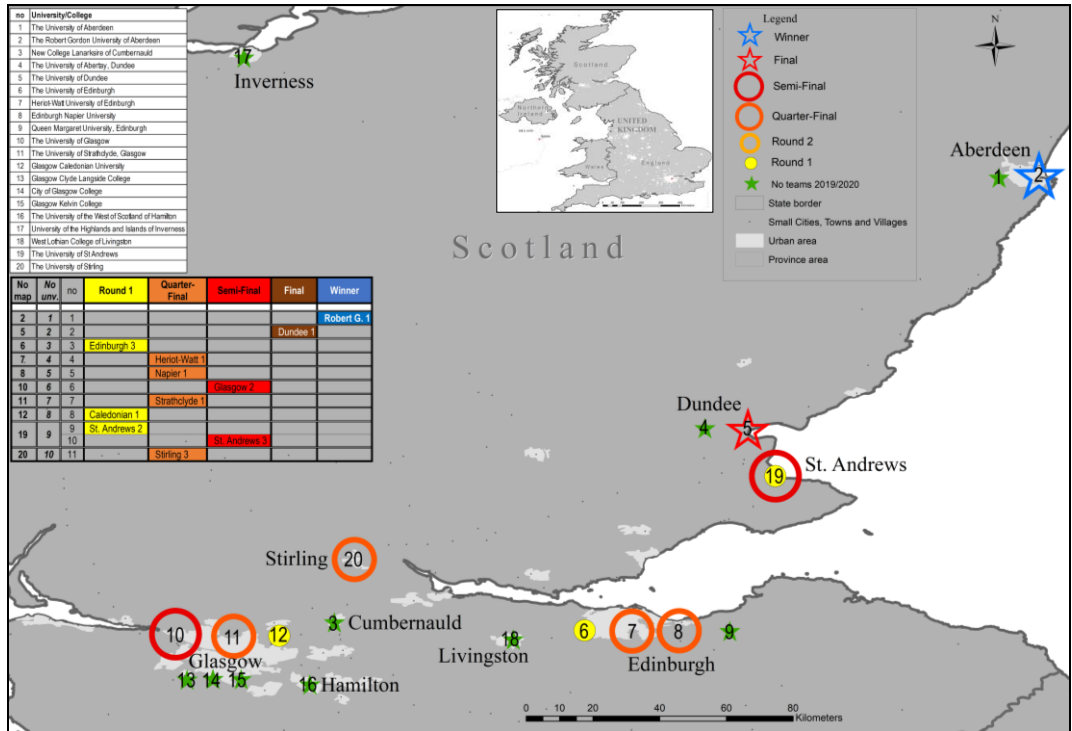


Figure 9. Women's Scottish Conference Cup (2-4 leagues), 2019/2020 season<sup>4</sup>

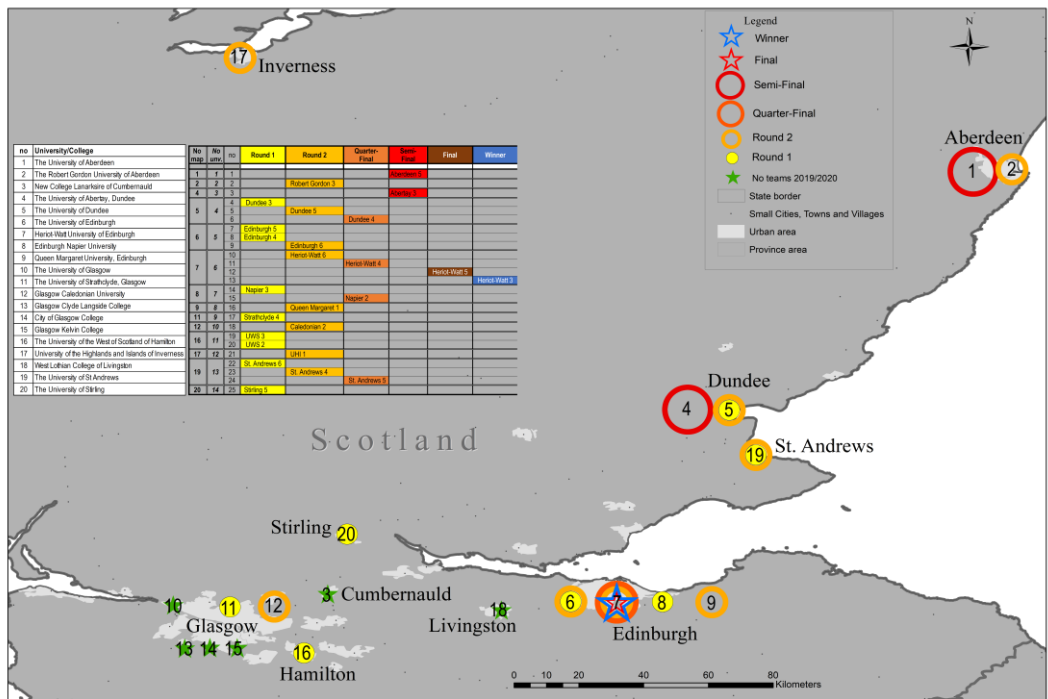


Figure 10. Men's Scottish Conference Plate (5-6 leagues), 2019/2020 season<sup>4</sup>

In the 2019/2020 season, all 8 university centers with 14 universities were represented by 25 teams (figure 4 and table 10). Dundee, Edinburgh and St. Andrews universities all had 3 teams each represented whilst Edinburgh Heriot-Watt University had the most teams represented (4). Two of these teams played in the final and the winner was the Men's 3 team (figure 10).

**Other competitions.** Some universities have a complex competitive programme with participation in different amateur leagues or cups, such as the Queen's Park Shield<sup>32</sup>. For example, Strathclyde University Football Club<sup>33</sup>, participates in different Saturday competitions including: Glasgow and District Saturday morning league<sup>34</sup>, Scottish Amateur Cup<sup>35</sup> and West Scotland Amateur Cup<sup>36</sup>.

### Conclusion

In conclusion, this research is a contribution to the geography of sport (Bale, 2003). It demonstrates the value of applying the methods of spatial analysis and, in particular, the richness of cartographic representation both for quantitative and qualitative aspects of the organization of sport. The case study was of the Scottish football university space which, includes both men's and women's teams and a total of 11 regular competitions structured on 7 levels for men and 4 for women with 7 knockout competitions. It is revealed in this study that across the 18 Scottish universities, football is very popular among students, with 15 of the universities supporting 82 football teams. The study has mapped out three structural aspects of the organization of the Scottish university football environment, namely the human resource (represented by players and teams), specific infrastructure, and competitions. The approach used in this article of specific cartographic representation methods, through qualitative and quantitative spatial analysis tools, and a systemic approach, generates potential useful information for territorial planning and organization policies and strategies in relation to sport. This organizational model could be applied beyond this analysis of Scotland.

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- <sup>3</sup> [www.google.com/maps](http://www.google.com/maps)
- <sup>4</sup> <https://bucs.playwaze.com/bucs-football/>
- <sup>5</sup> <http://www.scottishstudentsport.com/sports/football>
- <sup>6</sup> <https://spfl.co.uk/>
- <sup>7</sup> <http://slfl.co.uk/>
- <sup>8</sup> <https://www.stir.ac.uk/student-life/sport-at-stirling/performance-sport/football-men/>
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- <sup>11</sup> <https://www.hesa.ac.uk/data-and-analysis>
- <sup>12</sup> <https://sportsunion.dundee.ac.uk/clubs/football-men/>
- <sup>13</sup> <https://euafc.com/>
- <sup>14</sup> <https://www.hw.ac.uk/uk/edinburgh/sports/union/clubs/football.htm>
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- <sup>36</sup> [http://www.scottishamateurfa.co.uk/static\\_page/id/colville\\_park](http://www.scottishamateurfa.co.uk/static_page/id/colville_park)



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