

## INTRODUCTION

Modern lifestyles are characterized by lack of physical activity, poor nutrition, smoking and excessive consumption of alcohol. Accordingly, sedentariness has been linked to morbidity and mortality. As a result, the increase of physical activity has been identified as one of the most important factors in health promotion. Physical activity is defined as any physical movement produced by the muscles that require energy consumption. Physical activity may include sporting, occupational and domestic activities, leisure, etc. Regular activity can improve quality of life. Remarkably, a normal weight person with poor physical fitness is more likely to die from cardiovascular disease than an obese person with moderate or good physical fitness.

It has been widely recognized that physical activity can have important immediate and long-term health benefits, including physical and psychological.

Physical benefits: The benefits of regular physical activity include reduced risk of heart attack, better weight management, lower blood cholesterol levels, reduced risk of type 2 diabetes and certain cancers, lower blood pressure, more resilient bones, muscles and joints, lower risk of osteoporosis, reduced risk of falls, faster recovery and rehabilitation, while, finally, it improves the quality of sleep and sexual life.

Social/emotional benefits: More specifically, include increased self-confidence, acceptance, adaptation to new environments, leadership skills, reduced feelings of depression and anxiety, increased energy levels, improved mood and overall emotional well-being.

Mental benefits: Physical activity is not only beneficial to the body, but also to the mind. In particular, delays the decline in cognitive function that occurs as we age and has a beneficial effect on brain health. Furthermore, it contributes to reducing mental fatigue, a sense of accomplishment, enhancing concentration and motivation, reducing anger or frustration, healthy appetite and fun.

Despite the apparent benefits of physical activity people remain largely inactive and identify a number of barriers: Lack of time, poor

health, fear of falling or injury, unfavorable environment and generally reduced interest in exercise are most often cited as the main barriers (Moschny et al., 2011; Newson & Kemps, 2007).

The most common barrier to regular physical activity is lack of time. Daily routine, work, family obligations often hinder a person's intentions to be more active. Moreover, one of the reasons people justify the lack of physical activity is poor physical health (Baert et al 2011). Reduced mobility, pain and other symptoms of a medical nature (e.g. depression) can affect a person's ability and/or motivation to engage in physical activity.

Fear of injury (traumatophobia) is classified as an additional barrier and it is important to note that older people are at increased risk of falling due to physiological changes that have occurred during their lifetime.

Social influence also plays an important role in the activation or not of the individual. Support from family and friends can increase physical activity levels and develop community spirit. Participation in group activities (such as a hiking or dance group) can encourage making friends with similar activity interests.

The physical environment is often cited as a barrier to physical activity levels. Accessibility to walking and cycling paths, distance to recreation facilities and availability of public transport to such places are additional barriers. Other environmental factors such as busy roads, poor pavement infrastructure, unsafe neighborhoods (crime) and pollution can also have a negative impact. Additional reasons commonly cited for not participating in physical activity are cost and climate (excessive heat, cold or rainfall).

Along with the above, there are many additional barriers that vary depending on the individual and life circumstances. Personal barriers include low self-confidence, boredom (not enjoying) exercise, low self-efficacy, lack of ability to set personal goals, monitor and reward progress towards achieving those goals.

The modern phenomenon of lack of physical activity has been described as a "pandemic". Recently, the WHO reported that around 3.2 million deaths each year are due to physical inactivity. Promoting a more active lifestyle is therefore an important public health priority. The

solution is simple, inexpensive and does not require a lot of time. However, a change in mindset and behaviour is necessary to achieve a gradual increase in physical activity and its beneficial effects through simple changes in our daily habits.

It is crucial to start by setting simple, short-term, achievable and realistic goals. In many cases, long-term and very ambitious goals bring frustration. For example, in adults who do exercise 20 minutes of walking 3 times a week may be an initial short-term goal. This can become an intermediate goal with a gradual increase in duration and frequency (e.g. 40 minutes/5 times a week) and a long-term goal (5 km walking on a daily basis). Moreover, recording our daily effort helps us both to stay motivated and to monitor our progress towards the goals we have set. Furthermore, rewarding ourselves at the end of each activity gives us positive emotions such as satisfaction, enjoyment, etc. Both the internal and external rewards we receive when achieving a short-term goal are an extra motivation for new long-term goals. In addition, the choice of activity is equally important. An activity that suits us, entertains us, keeps our interest undiminished, and is close to our home or work, proven to enhance our motivation to exercise.

To find opportunities for physical activity in our everyday routine! For example, we can practice at home watching TV or listening to music, using the stairs instead of the elevator, walking or cycling to work for shopping. At the same time, acceptance and encouragement from "our" people keeps us motivated. We can plan family activities that involve physical activity, invite friends to exercise with us, join a walking group.

Last but not least, we need to be flexible. We should not worry if unplanned commitments get in the way of our physical activity routine. Sometimes a break is necessary. We can look for ways to deal with such unforeseen situations and adjust our schedule.

In recent years a significant proportion of the European population has turned to physical activity (especially in large urban centers). Running, walking, cycling are part of the daily routine of the Greek. At the same time, there are adult centers that implement dance and fitness classes and organize outdoor excursions, helping them to maintain a good physical condition. However, there is still a long way to go to reach the WHO recommendations

Physical activity, because of its beneficial effect on our quality of life, can be seen as a kind of medicine. In fact, it is more important than drugs, since its aim is to prevent illness and not to cure it afterwards.

Considering the goals of this project in relation to the promotion of physical activity and the creation of physically active communities, the purpose of the research phase was to identify factors that are associated with physical activity or the lack of it across the partner countries. In particular, the aim was the collection of data that would help the development of an algorithm that would be used to weight the value of individuals' physical activity, considering factors that enhance or limit physical activity, such as gender, age, lifestyle, and more. For that purpose, a survey was developed and addressed to the general population of the partner countries.

## **SURVEY**

### **Methods**

Participants were 1174 people (493 males and 675 females, 6 not identified by gender) with a mean age of 37.8 years and a mean BMI 24.35. Among them, 232 came from Bulgaria, 251 from Croatia, 139 from Italy, 259 from Greece, and 293 from other countries. Twenty-six percent of participants reported that had never been athletes, 45% reported that they had been athletes in the past, and 29% that they are still currently athletes.

Participants completed a survey (Appendix 1) exploring patterns of physical activity through the International Physical Activity Questionnaire (IPAQ - short form, Lee et al., 2011), demographic characteristics, and other variables likely to influence participation in physical activity.

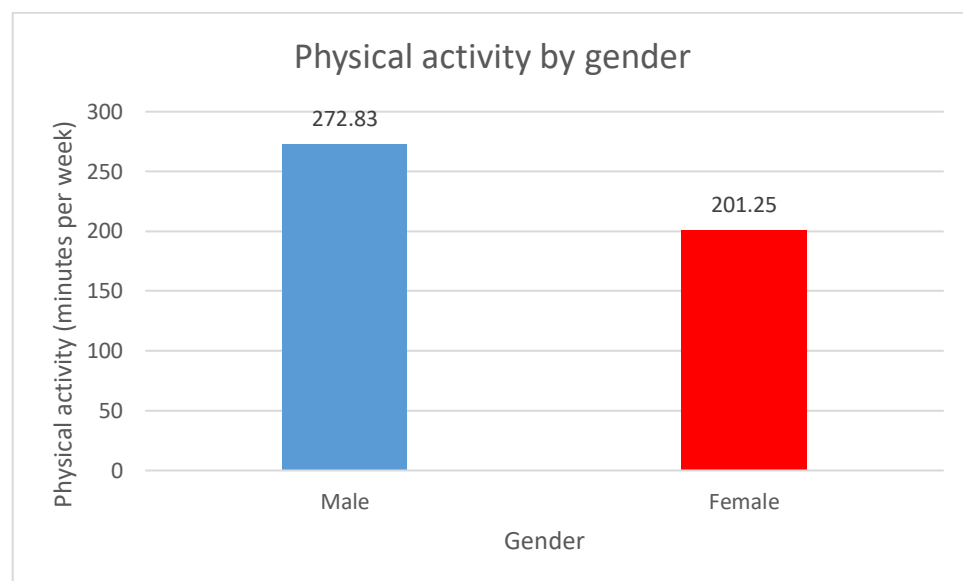
A series of Analysis of Variance was conducted to explore differences in moderate to vigorous physical activity as a function of the demographic variables. For the variables that proved statistically significant, between-group differences were further explored, to provide suggestions regarding the weight each group could receive for the calculation of exercise credits for the MCE index. The results from the analyses and the weights for the different variables are presented below. The means for all subgroups are presented in Table 1.

## Results

Considering the recommendation of the WHO, suggesting the adults should do at least 150–300 minutes of moderate-intensity aerobic physical activity per week, the analysis showed that participants in this survey were well above the minimum recommendations, reporting on average 230min of moderate to vigorous physical activity. This result should be interpreted cautiously, as it is likely that people participating in physical activity were more likely to take the survey (in fact, 71% of participants have been or still are athletes). Nevertheless, the data provide valuable directions regarding the factors that influence participation in physical activity. The following results were obtained when comparing the different subgroups based on personal and demographic characteristics.

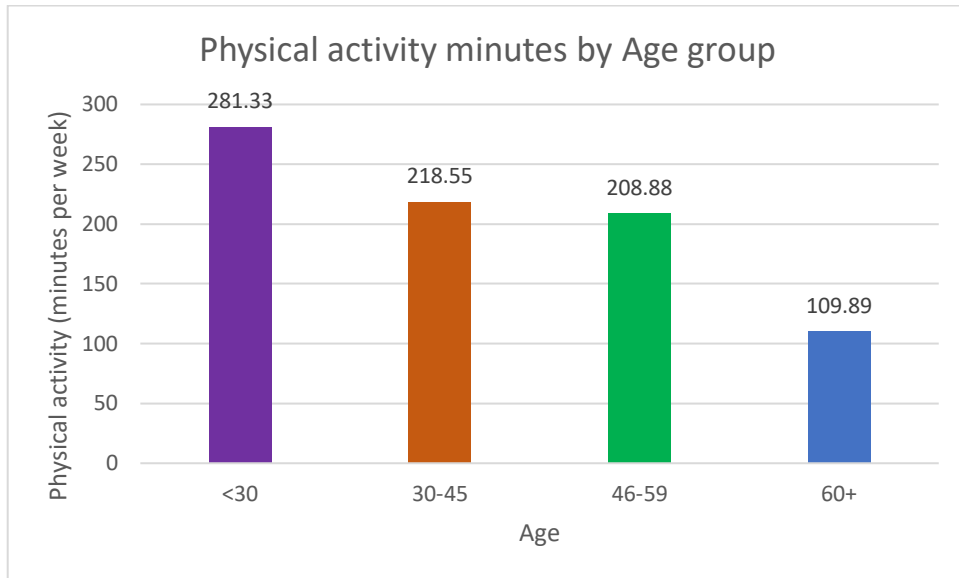
Regarding gender, the analysis showed significant differences between males and females,  $F(1, 985) = 7.03, p < .01$  with males reporting more moderate to vigorous physical activity.

**Figure 1. Physical activity minutes per week by gender.**



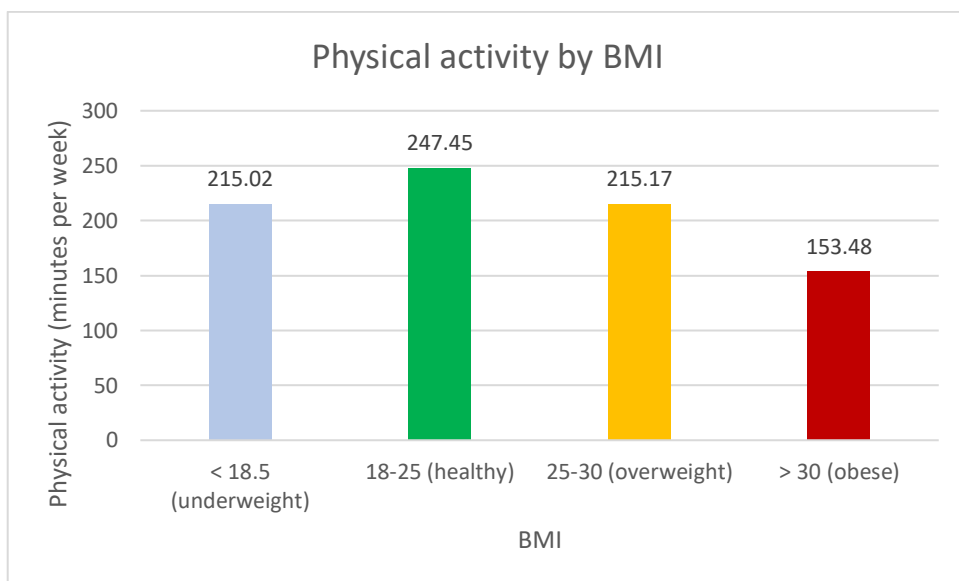
Regarding age, the analysis showed significant differences between the groups,  $F(5, 972) = 3.65, p < .01$ , with under 30 scoring higher than 31-45 and 46-59, who scored higher than 60 and above.

**Figure 2. Physical activity minutes per week by age group.**



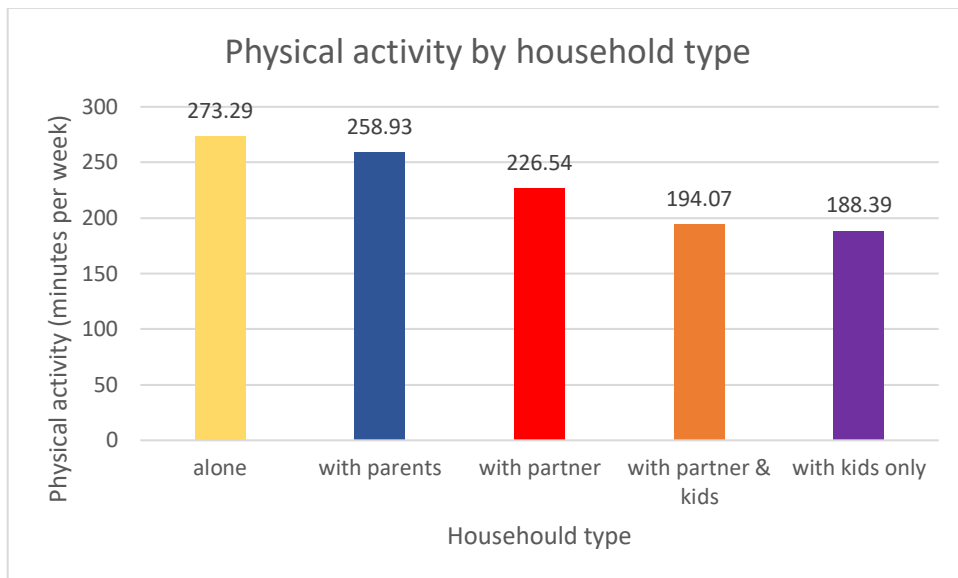
Regarding BMI, the analysis showed significant differences between the groups,  $F(3, 961) = 3.06, p < .05$ , with those with healthy BMI scoring higher than underweight and overweight, who scored higher than obese individuals.

**Figure 3. Physical activity minutes per week by BMI group.**



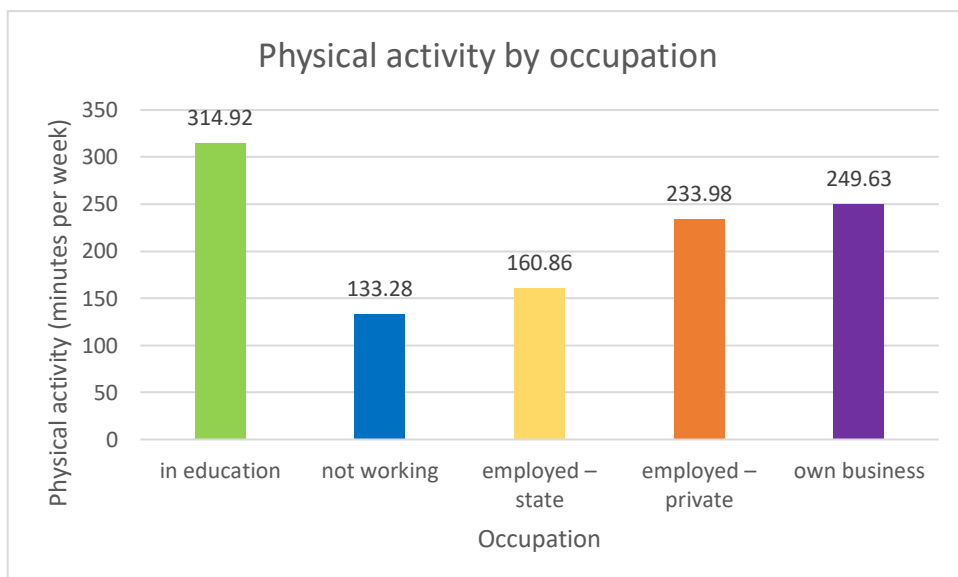
Regarding household inhabitants, the analysis showed significant differences between the groups,  $F(4, 985) = 2.99, p < .05$ , with those living alone or with parents scoring higher than those living with partner, who scored higher than those living with partner and kids, who scored higher than those who live with kids only.

**Figure 4. Physical activity minutes per week by household type.**



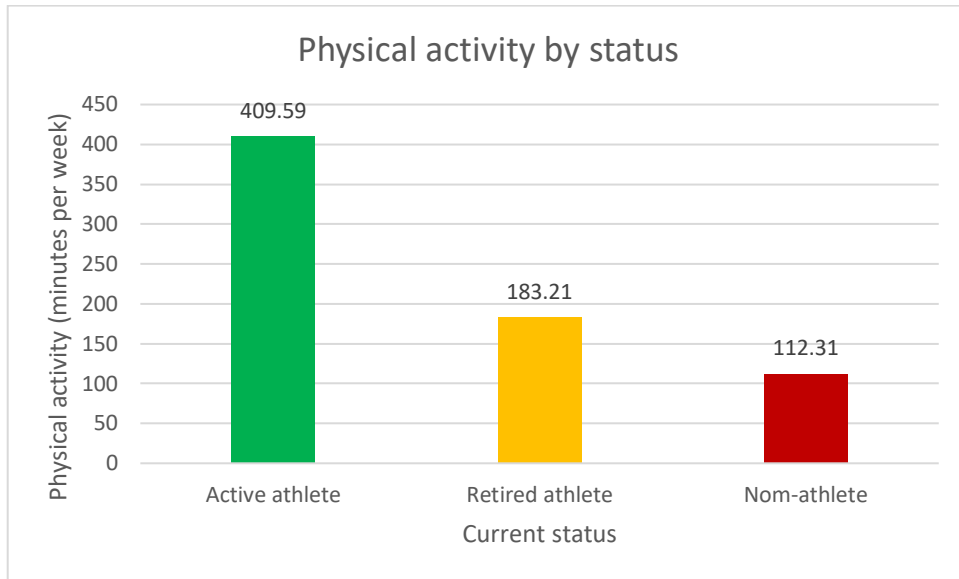
Regarding occupation, the analysis showed significant differences between the groups,  $F(4, 985) = 8.19, p < .01$ , with those in education scoring higher than those employed in the private sector and having own business, who scored higher than unemployed and those employed in the public sector.

**Figure 5. Physical activity minutes per week by occupation.**



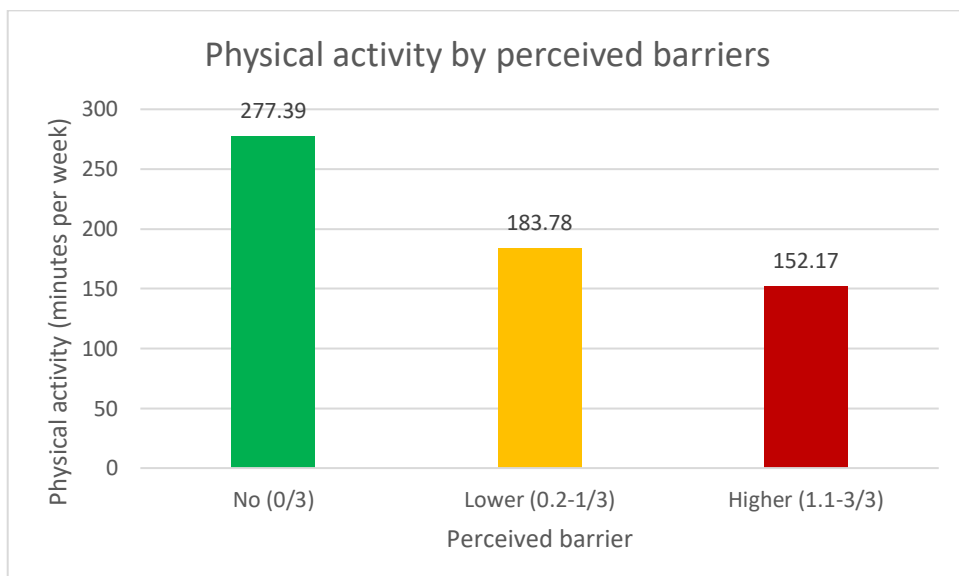
Regarding athletic status, the analysis showed significant differences between the groups,  $F(2, 985) = 91.53, p < .01$ , with athletes scoring higher than former athletes, who scored higher than non-athletes.

**Figure 6. Physical activity minutes per week by sport background.**



Regarding barriers to physical activity, the analysis showed significant differences between the groups,  $F(2, 985) = 15.51, p < .01$ , with those having no barriers reporting more physical activity than those having medium and higher barriers.

**Figure 7. Physical activity minutes per week by perceived barriers.**





No between-group significant differences were identified for education, marital status, type of residence, class, income, type of sport.

Considering the results of the aforementioned analyses, the suggested weight for each level of the demographic variables is presented in Table 1.

**Table 1. Means scores (minutes) on moderate to vigorous physical activity per subgroup and proposed coefficients for the MCE Index formula.**

<b>Variable</b>	<b>levels</b>	<b>Mean</b>	<b>Weight</b>
<b>Gender</b>	male	272,83	1
	female	201,25	1.35
<b>AGE</b>			
	<30	281,33	1
	30-45	218,55	1.3
	46-59	208,88	1.3
	60+	109,89	2.5
<b>BMI</b>			
	< 18.5 (underweight)	215,02	1.2
	18-25 (healthy)	247,45	1
	25-30 (overweight)	215,17	1.2
	> 30 (obese)	153,48	1.6
<b>you live</b>			
	alone	273,29	1
	with parents	258,93	1
	with partner/wife/husband	226,54	1.2
	with partner/wife/husband & kids	194,07	1.4
	with kids only	188,39	1.7
<b>occupation</b>			
	in education	314,92	1
	not working	133,28	2.2
	employed – state	160,86	2.2
	employed – private	233,98	1.3
	own business	249,63	1.3
<b>Athlete</b>			
	Yes, I am	409,59	1
	Yes, I was in the past	183,21	2.2
	No	112,31	3.5
<b>Barriers (mean score)</b>			
	No (0/3)	277,3923	1
	Lower (0.2-1/3)	183,7806	1.6
	Higher (1.1-3/3)	152,1729	1.6

## APPENDIX - SURVEY

### Multisport Community Experience WP2. Research

#### SURVEY

The purpose of this project is the development of a physical activity community game, the **Multisport Community Experience!**  
Please complete the survey and decide whether you want to become member of our Community.

#### Demographics

Gender	male female
age	
height (in cm, e.g., 172)	
weight (kg)	
completed education	primary secondary university
marital/family status	single married divorced/widowed
number of kids	
age of youngest kid	
country of residence	
you live	alone with parents with partner/wife/husband with partner/wife/husband & kids with kids only
you would describe the area you live as	Rural area or village Small or middle sized town Large town
you live in	apartment house
does your residence has a yard/play-exercise area	no yes
you would describe yourself/household belonging to	lower/working class middle class higher class
you would describe your income as	have no income rather low average

	rather high
occupation	in education not working employed – state employed – private own business
what percentage of your occupation involves	sitting __% standing __% moving __%
how would you describe your health at present	excellent good average rather poor very poor
Do you have any certified disability	No Developmental disability Learning disability Mental health or emotional disability Physical disability Sensory disability

### Sport

have you ever been involved in organized sport (i.e., be member of a sport team)	Yes, I am Yes, I was in the past No
if yes (either now or in the past) ...	
sport type	team individual
sport	
for how many years	
at what level	local/regional national international

### Sport & Exercise access

are there sport/exercise facilities (e.g., exercise fields, parks, sport grounds, sport courts, gyms, fitness centers) close to your residence	yes, within walking/biking distance yes, but I need a car no
if yes, what type	outdoors indoors
if yes, what type	public – open access

	public – with day/weekly/monthly/yearly fee private with day/weekly/monthly/yearly fee
are there sport/exercise/fitness programmes organized by the community	no yes, free yes, with a fee
what is an average monthly fee for exercising/playing sport in public/private facilities/programmes in your area	

### Exercising

By "exercising" we mean any form of physical activity that you may be doing in a sport context (individual or team), or exercise/fitness related setting (such as swimming, training in a fitness center, running in the park, etc.), or even walking in the streets for purposes of exercising.

During the last 7 days, on how many days did you walk for at least 10 minutes at a time?	1 2 ... 7
How much time did you usually spend walking on one of those days?	10 20 ... 120
During the last 7 days, on how many days did you do moderate intensity physical activities (e.g., exercise that made you breath harder than usual, such as, light jogging, biking, swimming, playing tennis)? Do not include walking.	1 2 ... 7
How much time did you usually spend on moderate intensity on one of those days?	10 20 ... 120
During the last 7 days, on how many days did you do vigorous physical activities (e.g., exercise that made you breath much harder than usual, such as, running, biking at a fast pace, doing aerobics)?	1 2 ... 7
How much time did you usually spend on vigorous on one of those days?	10 20 ... 120

During the last 7 days, how many hours did you spend sitting on average per day (relaxing, reading, studying, attending classes on-line, watching tv, playing games, talking on the phone)?	1 2 ... 16
If you exercise, where do you usually exercise	At a fitness center At a sport center/club At school or university At work At home At a park At the street
If you exercise, who do you exercise with	alone with partner with friends/colleagues with family

### Barriers to exercise

According to the recommendation of the World Health Organization, adults aged 18–64 years should do at least 150–300 minutes of moderate-intensity aerobic physical activity;  
or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week. Similarly, young people aged 13–17 years need at least one hour of moderate to vigorous physical activity each day.

**If you don't not exercise at all, or you do not exercise enough, what are the reasons for that?**

**Please reply based on the following scale.**

**1= not true for me, 2 = somewhat true for me, 3= rather true for me, 4 = mostly true for me, 5= absolutely true for me**

<b>Access</b>					
I don't have exercise facilities close to my residence	1	2	3	4	5
What I want to do is not offered anywhere close to my residence	1	2	3	4	5
I don't always have the transport means to get to the exercise facilities	1	2	3	4	5
<b>Time</b>					
I don't have enough time for that	1	2	3	4	5
I am too busy with my work/studies	1	2	3	4	5

I am too busy with the family at present	1	2	3	4	5
<b>Personal</b>					
I'm not the 'exercise' type	1	2	3	4	5
I don't know how/where to exercise	1	2	3	4	5
I don't find exercising interesting	1	2	3	4	5
<b>Social</b>					
My friends/partner don't exercise, so I don't either	1	2	3	4	5
My family does not encourage me to exercise	1	2	3	4	5
Exercising is not popular in my social environment	1	2	3	4	5

<b>Internet</b>	
do you use the internet	no yes
How many days per week do you use the internet	1 2 3 4 5 6 7
How many hours per days do you use the internet	1 2 3 4 5 6 7 8 9 10 11 12
For what reasons do you use the internet	entertainment (e.g., music, movies, games) communication (chat, social media) following the news work
How do you connect to the internet	PC Tablet Phone
how familiar/expert would you say you are with the internet	the basics only what I need normally familiar expert

do you use e-mail	no occasionally every day many times per day all the time
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<b>Social Media</b>	
do you use the social media	yes – no
if yes ...	
which applications	Facebook Twitter Instagram Linkedin TikTok Other, specify .....
How many days per week do you use the social media	1 2 3 4 5 6 7
How many hours per days do you spend in the social media	1 2 3 4 5 6 7 8 9 10 11 12
For what reasons do you use the social media	entertainment (e.g., music, movies, games) communication (messaging, chat) following the news work self-promotion sport and physical activity
How do you connect to the social media	PC Tablet



	Phone
how familiar/expert would you say you are with the social media	the basics only what I need normally familiar expert

<b>Activity trackers</b> (devices that capture/measure/time physical activity and sport)	
do you know what an activity tracker is	no yes
do you use the activity trackers	no yes
if yes, what type of activity tracker you use	watch phone wrist band
if yes, what brand/application do you use	Amazfit Apple watch Fitbit Garmin Honor Huawei Polar Samsung Withings Xiaomi Other ... specify
if yes, what functions of activity tracking do you use	type of activity duration of activity intensity of activity distance steps counter heart rate calories expenditure standing time Other, specify .....

**Intention to participate in our physical activity community**

The purpose of this project is the development of a physical activity community game, the Multisport Community Experience!

The Multisport Community Experience project will make use of the Multisport Community Experience Application (MCEapp) which will be a perfect platform

to (a) create physical activity and social events of your preference and promote participation, (b) measure and evaluate the individual and collective performance (both for physical and social activities). The MCEapp could be integrated into already existing apps in the market; it will represent a hub where the participants will interact with the Multisport Community Experience to store physical activity and credits, to keep track of calorie consumption or social interaction by using modern cell phone motion sensors.

<p>would you be interested becoming a part of this community?</p>	<p>no yes not sure; contact me for more information</p>
<p>if yes, or you would like more information, please write your e-mail and/or telephone number*</p> <p>* Your personal data will be exclusively used to contact you with regard to your participation in the Multisport Community Experience and for no other reason, and will not be shared with third parties.</p>	<p>tel: e-mail:</p>