



**IN COMMON SPORTS - INTERGENERATIONAL COMPETITION AS MOTIVATION FOR
SPORT AND HEALTHY LIFESTYLE OF SENIOR CITIZENS**

FIRST INTERMEDIATE REPORT

(Ref.: 590543-EPP-1-2017-1-PT-SPO-SCP)

March 2019



Co-funded by the
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**IN COMMON SPORTS - INTERGENERATIONAL COMPETITION AS MOTIVATION FOR
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(Ref.: 590543-EPP-1-2017-1-PT-SPO-SCP)

Start Date: Jan 1, 2018

End Date: Dec 31, 2020

Partners: Municipio de Vila Nova de Cerveira (PT), University of Vigo (ES), Zolpont Egyesulet es Szerkesztoseg (HU), Polytechnic Institute of Viana do Castelo (PT), Obshtina Aksakovo (BG), Comune di Cesena (IT)

WP4 STUDY “Physical fitness and cognitive performance of the aged population – planned competition as additional motivation for active lifestyle”

WP Leader – Polytechnic Institute of Viana do Castelo (IPVC)



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First Intermediate Report

1. Introduction

Few researches have investigated the relation to sports competitions as key factor to motivation of a healthy lifestyle, among the elderly. The main aim of the project was to evaluate the health-related changes of physical fitness, self-perception of health, and cognitive status, in the aged population across the involved countries and the specific determinants of each one. In fact, the running investigation embrace a wide range of socio-economic contexts, looking for increasing wellbeing conditions under similar motivation – sports games.

The investigation group include people with background on public health, longitudinal data statistical analysis and physical fitness testing on aged population.

Tasks such as planning and controlling the specific management steps that will lead to the project's objectives are under Polytechnic Institute of Viana do Castelo (IPVC) supervision. The partners are responsible for training sports technicians in developing interventions sessions, to manage both the questionnaires and physical fitness data, under supervision of IPVC researchers.

The aims of WK4 are:

To assess the impact of a sport competition in the participants, and analyze the association between physical activity level, physical fitness and cognitive performance of the elderly in, at least, 5 countries;

To investigate the impact of additional events such as “In Common Sports” on physical fitness status and healthy life style, on aged population;

To understand the motivation for systematic physical activity on aged population;

To examine the exercise-related changes on cardio-metabolic markers for health;

To create intergenerational links for social inclusion;

To drive and to contribute to the development of more effective health promotion policies and strategies.



2. Methods

2.1. Participants

The sample was selected from adults over 60 years of age, representatives of each country. The aim was to recruit 75 participants per country, at least. From recruitment process, it was defined three groups - Experimental group (EG) – participants who enrolled the intervention program; Control group 1 (CG1) - participants who are sedentary, not involved on intervention process and maintained the regular daily routines; Control group 2 (CG2) – participants who exercise, systematically, at least twice a week, but are not involved on intervention program.

The recruitment is an open process. This means that new participants are welcome, anytime. At the end of the first year, the sample is defined as presented on Table 1.

Table 1: Participants distribution by country and sex.

Country	Men	Women	Total
Bulgary	12	64	76
Hungary	16	42	58
Italy	27	94	121
Portugal	33	52	85
Spain	a)	a)	a)
Total	88	252	341

a) In recruitment process

2.2. Testing protocol

Literature review show us a wide range of testing protocols including both physical and cognitive assessment. Considering the countries' differences in terms of tests validity and available equipment, the tests battery was defined as anthropometric measures



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(ISAK, 2010)¹ and the Rikli & Jones protocol (2013)² , on physical fitness status, and the Mini-Mental State Examination³, Participation Motivation Questionnaire (Gill et al., 1983)⁴ , and EQ-5D-5L test ⁵, as cognitive status and quality of life.

Two short term courses (Portugal, February 2018) were developed aiming 1) to present and explain the main goals of the study (4 hours), and 2) to standardize procedures in assessment and to define appropriate equipment (4 hours).

Two meeting were organized in Italy (May) and Bulgari (September) aiming 1) to identify potential difficulties on inserting data, 2) to show the most common errors on inserting data and to present simple processes to control such errors, 3) to present a draft of the database output intra and inter countries, and 4) to define the individual report, extract from database, to deliver to participants (see table 2).

¹ ISAK. International Standards for Anthropometric Assessment . Ed. The international Society for the Advancement of Kinanthropometry. 2010

² Rikli, R. and J. Jones, Development and validation of a functional fitness test for Community-residing older adults. *Journal of Aging and Physical Activity*, 1999. 7: p. 129161.

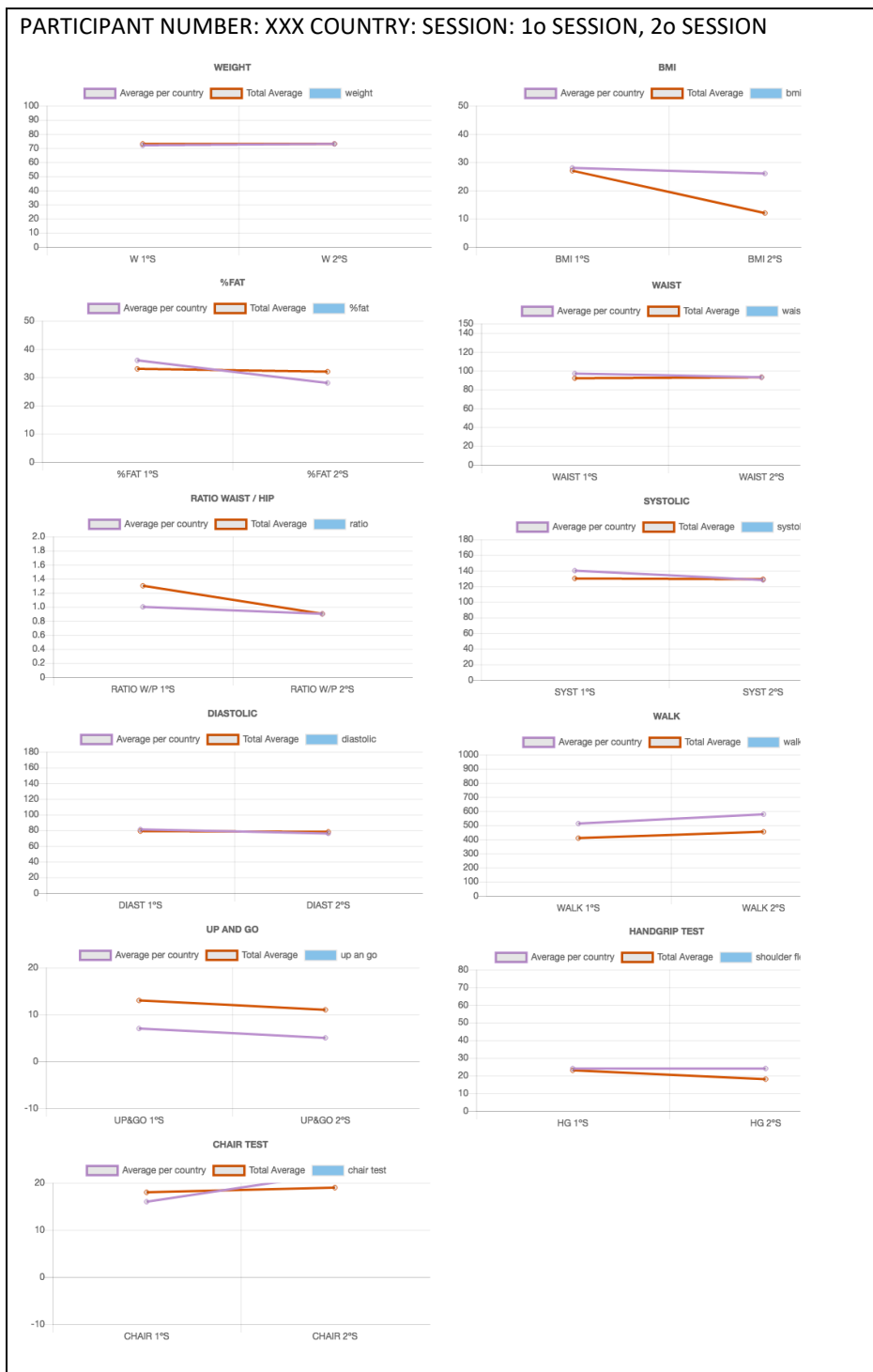
³ Almeida, O.P., Mini exame dos estado mental e o diagnóstico de demência no Brasil. *Arquivos de NeuroPsiquiatria*, 1998. 56: p. 605612

⁴ Gill, D. L., Gross, J.B. and Huddleston, S. (1983). Participation motivation in youth sports. *International Journal of Sport Psychology* 14, 1-14

⁵ <https://euroqol.org/eq-5d-instruments/eq-5d-5l-about/>



Table 2: Demo of the individual report obtained from database.



Tests were performed (March and November 2018) on appropriate place available by local organization and carried out by the technicians who attendant the two short courses.



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Raw data were insert on platform (<http://www.olympics4all.eu/backoffice/user/>) by Country partners for further analysis.

3.Results

3.1. Data Analysis & Intermediate Results

To ensure the quality of database and to detected possible errors, research team performed exploratory statistics and data normality.

It was find two errors type – introduction errors , for example 165 Kg instead of 65 Kg, in weight; units errors, for example 173 cm instead of 1.73 m, in height.

On moment one, the data analysis was performed as 1) participants' cognitive status, life quality and motivation for physical activity practice, and 2) physical fitness status, as whole, by country and by sex.

The cognitive status, life quality and motivation for physical activity practice are presented as Table 3.

Table 3: Participants' cognitive status, life quality and motivation for physical activity practice, moment 1.

	N	Mean	Std. Error	
MNSE total	319	27,5392	,15160	
EQ-5D-5L index	327	,8215	,01072	
Motivation to practice physical activity	Social issue	325	3,2769	,05691
	Fitness	325	4,4246	,04544
	Emotion	325	3,9815	,05174
	Competition	325	3,4277	,06678
	Skills Develop	325	3,7415	,05232
	Affiliation	325	3,8277	,05446
	Fun	325	4,2369	,04702

The participants present a good score on Mini-mental test (27,5 of 30 points) and EQ-5D-5L test (0,82 of 1 point). Such results report no big issues on cognitive and Quality of



Life of the enrolled participants. In relation to motivation, participant report *Fun* and *Fitness* as main factors to practice physical activity.

Considering the information by country (Table 4), Bulgaria seems to have lower scores on Mini-mental test and EQ-5D-5L test than the other countries. Nevertheless, the scores are still on good standard (25,8 and 0,67, respectively).

Table 4: Participants' cognitive status, life quality and motivation for physical activity practice, by country, moment 1.

	Bulgaria			Hungary			Italy			Portugal		
	N	Mean	Std. Er	N	Mean	Std. Er	N	Mean	Std. Er	N	Mean	Std. Er
MNSE total	75	25,8133	,37857	45	28,4889	,28714	114	27,9825	,22771	85	27,9647	,23755
EQ5D5L index	74	,6710	,02823	48	,9011	,02346	120	,8439	,01334	85	,8761	,01620
Social issue	76	3,4211	,10305	48	3,3750	,14472	116	2,9224	,08927	85	3,5765	,11996
Fitness	76	4,1184	,11077	48	4,3750	,12140	116	4,3362	,07641	85	4,8471	,04269
Emotion	76	3,9605	,09448	48	3,4583	,14574	116	3,9914	,09122	85	4,2824	,08470
Competition	76	3,6974	,12568	48	3,3125	,15516	116	2,9310	,10513	85	3,9294	,13049
Skills Develop	76	3,7105	,11053	48	3,8125	,15081	116	3,4655	,08069	85	4,1059	,09171
Affiliation	76	3,7763	,10530	48	3,6250	,14472	116	3,5603	,09586	85	4,3529	,07975
Fun	76	4,0263	,10756	48	4,3958	,12182	116	4,1466	,07474	85	4,4588	,08293

Regarding to motivation, all countries have reported *Fun* and *Fitness* as main factors that move participants for physical activity practice. Interesting findings are reported by Italy as *Competition* is the last motivation for physical activity practice, while in Portugal several factors are mentioned - *Fitness*, *Emotion*, *Skills Develop*, *Affiliation* and *Fun* - as the most important for motivation. The Portuguese scores may due to the five years' project where competition, fair-play and social interaction among communities has been used as stimulus for regular physical activity practice.

In relation to sex, the data are reported on table 5.

Both male and female get similar and high score on Mini-mental test. However, male report higher quality of life than female (0,8959 vs ,7966).



The motivation for physical activity also change with sex. In fact, female follow the general tendency and reports *Fun* and *Fitness* as main factors to move her for physical activity practice. Male add as factors motivation the *Emotion*.

Table 5: Participants' cognitive status, life quality and motivation for physical activity practice, by sex, moment 1.

	Female			Male		
	N	Mean	Std. Er	N	Mean	Std. Er
MNSE total	240	27,3958	,17474	79	27,9747	,30145
EQ5D5L index	245	,7966	,01311	82	,8959	,01440
Social issue	243	3,2099	,06576	82	3,4756	,11142
Fitness	243	4,3992	,05444	82	4,5000	,07999
Emotion	243	3,9547	,06179	82	4,0610	,09239
Competition	243	3,2634	,07815	82	3,9146	,11273
Skills Develop	243	3,7243	,06096	82	3,7927	,10227
Affiliation	243	3,8148	,06344	82	3,8659	,10663
Fun	243	4,1934	,05469	82	4,3659	,09102

The Anthropometrics measures are presented as Table 6.

Table 6: Participants' Anthropometrics measures, moment 1.

	N	Mean	Std. Error
BMI (Kg/m ²)	331	28,41	,28
Fat percent (%)	330	34,02	,48
Waist to Hip Ratio	323	,88	,005

According to World Health Organization, the BMI cut-off point is 30 Kg/m², The Fat Percent is 30%, and the Waist to Hip ratio cut-off point is > 0.95 (male) and >0.85 (female). Changes in BMI and Waist to Hip ratio are strongly related to changes in fat-free mass and may have strong repercussions on health, namely on Type 2 Diabetes and Cardiovascular Disease.



The present results do not show concerns about health status. However, the Fat Percent scores (34%) overpass the cut-off point and may be surveilled in the near future.

Table 7: Participants' Anthropometrics measures by country, moment 1.

	Bulgaria			Hungary			Italy			Portugal		
	N	Mean	Std. Er	N	Mean	Std. Er	N	Mean	Std. Er	N	Mean	Std. Er
BMI (Kg/m ²)	75	30,0	,49	56	28,08	,57	115	27,69	,58	85	28,19	,46
Fat percent (%)	75	38,2	,77	56	35,72	1,01	114	29,27	,74	85	35,58	,98
Waist to Hip Ratio	75	,86	,006	56	,89	,0127	107	,85	,008	85	,94	,009

Looking for anthropometric scores by country, Bulgaria presents the BMI reaching the obesity level and the fat percent variable with 8% more than it cut-off point. Portugal presents the Waist to Hip ratio border to it cut-off point indicating some precautions are needed.

Table 8: Participants' Anthropometrics measures, by sex, moment 1.

	Female			Male		
	N	Mean	Std. Er	N	Mean	Std. Er
BMI (Kg/m ²)	246	28,61	,35	85	27,83	,36
Fat percent (%)	246	36,59	,49	84	26,50	,74
Waist to Hip Ratio	239	,85	,004	84	,96	,009

Considering the scores by sex, females got good scores on BMI and Waist to Hip ratio. However Fat Percent variable may indicate added risks on health as the value is 36, 59. Male presents score in line with recommendations on BMI and Fat Percent and barely overpass the Waist to Hip ratio cut-off point.

The Physical Fitness Status is presented as Table 9.



Table 9: Participants' Physical Fitness Status, moment 1.

	N	Mean	Std. Error
HandGrip Left (Kg)	321	25,46	,67
HandGrip Dir (kg)	308	23,70	,76
Sit to Stand (nº)	329	15,97	,27
Walking 6m (m)	322	429,72	11,32
Sit & Reach (cm)	326	1,46	,61
TUG (sec)	331	7,96	,25

The physical fitness status as a whole presents good scores level. It is interesting to highlight the balance between left ($25,46 \pm 0,76$ Kg) and right ($23,70 \pm 0,76$ Kg) upper limb muscle strength and the averaged covered distance on 6 minutes walking ($426,72 \pm 11,32$ m).

Table 10: Participants' Physical Fitness Status by country, moment 1.

	Bulgaria			Hungary			Italy			Portugal		
	N	Mean	Std. Er	N	Mean	Std. Er	N	Mean	Std. Er	N	Mean	Std. Er
HandGrip Left (Kg)	75	10,94	,34	50	29,62	1,19	111	30,04	1,00	85	29,83	1,12
HandGrip Dir (kg)	75	8,62	,41	50	28,48	1,36	98	28,64	1,41	85	28,50	1,11
Sit to Stand (nº)	75	14,09	,45	55	14,74	,52	114	18,11	,57	85	15,56	,41
Walking 6m (m)	75	124,82	3,41	56	651,37	18,04	106	463,44	8,65	85	510,67	11,51
Sit & Reach (cm)	74	-1,60	,66	54	7,67	1,20	113	1,81	1,38	85	-,27	,91
TUG (sec)	75	10,57	,22	56	7,03	1,29	115	7,35	,19	85	7,10	,27

Looking for Physical Fitness Status scores by country, Bulgaria presents Left and right handgrip and walking 6 m test strangely low. It will be consider to review data and, eventually to repeat test as scores as researchers are not to comfortable with the results. Hungary get important scores on walking 6 m test ($651,37 \pm 18,04$ m) comparatively to Portugal ($510, 57 \pm 11,51$ m) and Italy ($463,44 \pm 8,65$ m). Bulgaria (-



1,60 ± 0,66 cm and Portugal (-0, 27 ± 0,91 cm) register low and negative scores on flexibility, assessed as Sit and Reach test.

Table 11: Participants' Physical Fitness Status, by sex, moment 1.

	Female			Male		
	N	Mean	Std. Er	N	Mean	Std. Er
HandGrip Left (Kg)	239	21,61	,56	82	36,68	1,45
HandGrip Dir (kg)	228	19,85	,72	80	34,66	1,57
Sit to Stand (nº)	246	15,66	,32	83	16,89	,51
Walking 6m (m)	240	408,76	13,26	82	491,06	20,31
Sit & Reach (cm)	243	2,68	,54	83	-2,12	1,74
TUG (sec)	246	8,06	,23	85	7,69	,74

Considering the scores by sex, male get considerable higher scores upper limbs muscle strength tests and Walking 6 min test than female. However, on flexibility, assessed as Sit & Reach test, males show evident lower scores than females.

In September/October the assessment moment 2 was running. T-Paired test, moment 1 to moment 2, was performed. The Table 12 shows the differences/comparison between the two moments.



Table 12: Mean differences of participants' Anthropometrics measures and fitness status, from moment 1 to moment 2.

Paired Samples Test						
		Paired Differences				
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
					Lower	Upper
Pair 1	HandGrip1Left HandGrip2Esq	2,42	8,26	,89	,64	4,20
Pair 2	HandGrip1Dir HandGrip2Dir	2,75	7,39	,82	1,10	4,39
Pair 3	BMI1 - BMI2	,037	1,410	,150	-,261	,335
Pair 4	Fatpercent1 FatPercent2	,55	4,49	,47	-,39	1,50
Pair 5	WaistHipRatio1 WaistHipRatio2	-,03	,22	,02	-,08	,01
Pair 6	SitStand1 SitStand2	-2,79	5,11	,55	-3,88	-1,69
Pair 7	Walking6m1 Walking6m2	-108,16	108,36	12,26	-132,59	-83,73
Pair 8	TUG1 - TUG2	,22	1,51	,16	-,09	,54
Pair 9	Weight1 - Weight2	-,04	4,21	,44	-,93	,85

Handgrip test (left and right) presents better results in moment 1 than moment 2. Sit to Stand test, Walking 6m test and TUG show better results in moment 2 than moment 1. BMI, Fat Percent, weight and Waist o Hip ratio barely change between moments.

Despite de differences and changes, T-paired test show inconsistent significant changes (Table 13).



Table 13: Significance of the changes of participants' Anthropometrics measures and Fitness Status, from moment 1 to moment 2.

Paired Samples Test				
		t	df	Sig. (2-tailed)
Pair 1	HandGrip1Left - HandGrip2Esq	2,705	84	,008
Pair 2	HandGrip1Dir - HandGrip2Dir	3,324	79	,001
Pair 3	BMI1 - BMI2	,246	87	,806
Pair 4	Fatpercent1 - FatPercent2	1,163	87	,248
Pair 5	WaistHipRatio1 - WaistHipRatio2	-1,519	86	,132
Pair 6	SitStand1 - SitStand2	-5,061	85	,000
Pair 7	Walking6m1 - Walking6m2	-8,816	77	,000
Pair 8	TUG1 - TUG2	1,387	86	,169
Pair 9	Weight1 - Weight2	-,096	87	,924

It seems that significant decreases were verified no upper limb muscle strength left ($p=0.008$) and right ($p=0.001$). Apparently, the training program was not effective in developing upper limb muscle strength. However, significant increases were found Sit to Stand test ($p < 0.001$) and Walking 6m test ($p < 0.001$). Such evidence indicate that training program was effective in developing lower limb muscle strength, assessed as Sit to Stand test, and aerobic capacity, assessed as Walking 6 min test.

The present findings require a deep insight on training process in order to better understand the lack of effectiveness on anthropometric variables, agility (TUG) and upper limb muscle strength.

3.2. Scientific work submission

Based on first moment of data collection, research team developed a scientific work (see Table 14) submitted and accepted to present on the 19th American College Sport






Medicine (ACSM) congress, May 28 – 1 June of 2019. In addition, the acceptance of the present work in this scientific context, give us the external validation of the objectives and methods of the present project.

The baseline data allow us to design the following **abstract**:

The age-related life quality in aged population has been widely reported in literature including muscular functioning and self-reported health state. The EQ-5D-5L questionnaire is widely used at population level and comprises five dimensions including mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Grip strength and walking ability are known to be associated with muscular functioning and activities of daily living. Little research has examined the differences throughout European countries. **Purpose:** this study aimed to investigate the relationship between the health state and health predictors, among elderly from 4 different European countries [Portugal (PT), Italy (IT), Bulgaria (BL) and Hungary (HU)]. **Methods:** 324 (81 PT, 119 IT, 76 BL and 48 HU) older adults ($68,9 \pm 6,3$ yrs, $73,6 \pm 12,7$ Kg, $1,61 \pm 0,08$ m), male (24%) and female (76%), were recruited from local population. The subjects completed the EQ-5D-5L and were assessed as handgrip test (HandT), 6 minutes walking test (6MW). EQ-5D-5L index (EQ_index) was calculated to assess the quality-adjusted life years (QALYs). ANOVA was performed to detect country group differences. Pairwise comparisons was executed with Tukey post hoc test and Cohen D. Pearson coefficient of correlation was used to assess relationship between determinants. Significance was set at $p < 0.05$. **Results:** Pairwise comparisons showed that BL has lower scores than HU, IT and PT in EQ_index (differences ranged between -17% to -28%, $p < 0.05$, $d = 0.80$ to 1.30), HandT (differences ranged between -29% to -69%, $p = 0.000$; $d = 2.60$ to 3.98); and 6MW (differences ranged between -72.33% to -82%, $p = 0.000$; $d = 4.58$ to 12.03), for both sexes. In all counties the EQ_index was moderately and positively correlated with HandT ($r = 0.453$; $p = 0.000$) and 6MW ($r = 0.533$; $p = 0.000$). However the pattern was not cross-country homogeneous, as HU showed lowest correlations ($r = 0.124$; $p = 0.400$; 6MW, $r = -0.016$; $p = 0.913$). **Conclusions:** Different environments promote different life quality in aged population. BL evidences poorer quality of life and fitness status than other European countries. HU seems to well promote healthy life style. Further investigation is need to better understand the present findings.



As consequence of the abstract submission, we received the scientific acceptance of the work: Presentation Notification, from ACSM.

May 28-June 1, 2019
Orlando, Florida USA
#ACSM19

February 7, 2019

Poster Presentation Notification

Please read all details carefully.

We are pleased to inform you that your abstract entitled "Age-related Health State Over European Countries: The Context May Be The Difference" has been accepted for presentation in a Free Communication/Poster session at the 2019 Annual Meeting, World Congress on Exercise is Medicine®, and World Congress on the Basic Science of Exercise, Circadian Rhythms and Sleep of the American College of Sports Medicine being held at the Orange County Convention Center and Rosen Centre Hotel in Orlando, Florida, May 28-June 1, 2019. Your abstract will be published in *Medicine and Science in Sports and Exercise*, Volume 51:5 Supplement. Your presentation date and time are as follows:

Author Block: Pedro Bezerra¹, Filipe Manuel Clemente¹, Marton Dvorak², João Camões¹. ¹*Polytechnical Institute of Viana do Castelo, Viana do Castelo, Portugal.* ²*University of Physical Education, Budapest, Hungary.*

Session Title: Physical Activity and Health II
Session Number: D-61
Session Viewing Date/Time: Thursday May 30, 2019 1:00 PM – 6:00 PM
Presentation Time: 3:30pm – 5:00pm

You will receive an additional email notification in April that will include your assigned poster board number and additional reminders.

Melgaço, 8 February 2019

Research team

(PhD, Pedro Bezerra)

(PhD, João Camões)



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