

University of Pécs
Faculty of Health Sciences
Doctoral School of Health Sciences

Head of Doctoral School: Prof. József Bódis MD, Ph.D., D.Sc.

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Head of Programme: Prof. Gábor L. Kovács MD, Ph.D, D.Sc.

Research Topic E-13
*Social and gender disparities of the population based on follow-up studies in
Baranya County, Hungary*

CORRELATION BETWEEN ADULTS' PHYSICAL ACTIVITY
AND SOCIO-DEMOGRAPHIC FEATURES BASED ON
QUANTITATIVE ANALYSIS AND A COMMUNITY-BASED
HEALTH PROGRAM

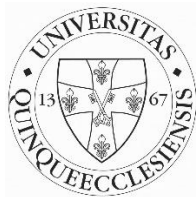
Theses of Doctoral Dissertation

Alexandra Makai

Supervisors:

Prof. Mária Figler MD, Ph.D.

habil. Kinga Lampek Ph.D.



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Introduction

Individual and public attention on regular physical activity is constantly growing nowadays. Regular physical activity positively impacts the individual's health while his number of years spent without illness increases. The societal and economic influence of this is indisputable.

According to the World Health Organization's (WHO) recommendation, at least 150 minutes of moderate physical activity per week is suggested for a healthy adult, which may consist of moderate intensity activities for 30 minutes 5 times per week, or at least 20 minutes of high intensity activities 3 times per week. Also, activities aimed to improve muscle strength and endurance is recommended to be carried out 2-3 days a week.

The Eurobarometer 2017 data showed that 53% of the Hungarian population do no physical activity at all. 14% of Hungarians rarely engage in physical activity, and only 33% do sports regularly. While this result showed an improvement compared to the 2009 data, values are still lower than the European average.

Several studies are being carried out in Hungary on physical activity and sport habits, but there is no independent longitudinal study monitoring physical activity based on representative data, focusing on the healthy adult population. The only studies containing questions on physical activity are the Eurobarometer, the European Social Survey (ESS), the European Health Interview Survey, and the National Nutrition Survey (OTÁP). Such surveys are suitable to analyze overall tendencies, while an independent study offers an opportunity for detailed analysis of various forms of sport and physical activity, including the parallel application of subjective surveys and objective analytical tools, which provide precise information on the habits and amount of physical activity carried out by the Hungarian adult population.

Analysis of the correlation between physical activity and demographic features parallel to monitoring trends provides an opportunity to identify high-risk groups and develop health programs which specifically target such groups.

Interventions and prevention programs aim to increase the health status of the target group. There are several tools to reach this goal, such as physical activity programs or health days, etc. Web-based prevention programs are gaining momentum as internet penetration and the use of social media platforms is growing. Several researches prove that web-based prevention programs are easy to organize and flexible, and also hold the advantage of being available 24/7.

Research Goals

The goal of our research was to introduce subjective analytical tools for measuring physical activity through the available physical activity monitoring databases and our own analysis, and to examine and compare the amount of habitual physical activity of the adult healthy Hungarian population (age 18-64) with the European data based on the analysis of ESS, Eurobarometer 2017 (online and free databases) and the E-Harmony quantitative survey.

The exploratory research in three phases describes 3 subjective measures and through them the extent of the activity of the target group. During the research we analyzed the influence of socio-demographic features, as these factors help identify the social groups most in need of interventions aiming to increase physical activity.

The last section of the dissertation introduces the physical activity motivation program called 'E-Harmony', discussing its effectiveness. The goal of 'E-Harmony' was to increase the popularity of physical activity among healthy adults in Baranya county, Hungary, through a web- and television-based program.

The goals of our research were:

- To introduce the frequently used subjective measurement tools (which are also available for scientific research) applicable to monitor physical activity.
- Examine the amount to which the Hungarian adult population meets the physical activity levels recommended by the ESS 2014, compared to European data, and examine the correlation to demographic features.
- Examine the physical activity, time spent sitting, and participation in sport and related motivation based on the Eurobarometer 2017 research focusing on European data and in connection with the sociodemographic factors.
- Using the IPAQ-HM, the most frequently used survey to analyze physical activity in international research, to summarize the physical activity of 18-64 year old population of Baranya county, Hungary, focusing on body composition data and demographic parameters.
- The key goal of our research was to analyze the effectiveness of the web- and television-based E-Harmony health program and examine whether it is suitable to increase the physical activity among the adult healthy population.

Materials and Methods

European Social Survey 2014 (ESS 2014)

ESS is a biennial international longitudinal study which was first conducted in 2001. In 2014 it took place in 17 European countries including Hungary (Europe: N=28088, Hungary: N=1250). The population was selected using the representative probability sampling method. To examine the level of physical activity, the survey built on the recommendation of the World Health Organisation (WHO) and asked the following questions: *In the past 7 days how many times did you walk, do a sport, or carried out physical activity for at least 30 minutes?* Based on the WHO's recommendation, we considered those respondents physically active, who carry out physical activities for a minimum of 30 minutes at least 5 times per week.

Eurobarometer study (2017)

The Eurobarometer study is based on a quantitative, longitudinal survey, an international research conducted by the order of the European Commission. The study has two modules: the 'Standard EB' including the same questions in each survey, and the 'Special EB' including physical activity and sitting. The empirical research carried out in 2017 included 28031 participants (761 participants from Hungary). The Eurobarometer 2017 survey on sport and physical activity includes 13 questions, focusing on participation in sport and the frequency in which the respondent engages in physical activities. Furthermore the study examines the active and inactive participants' motivation to do sport or refrain from it, respectively, while also asking what type of sport venues can be found near participants' homes.

E-Harmony health program (2014)

In our study we analyzed the level of physical activity among the adult healthy population of Baranya county, Hungary. The first part of the quantitative study consisted of questionnaire on demographic data, edited by the research team. To analyze physical activity, we used the *long version of the International Physical Activity Questionnaire (IPAQ-HM)*.

After the exploratory study we introduce the E-Harmony health program (the goal of which was to increase the physical activity levels of the population in Baranya county, Hungary), and we discuss its effectiveness through analyzing the IPAQ-HM and anthropometric data. The quantitative analysis was based on an exploratory, longitudinal questionnaire. The first round of data was collected in summer of 2014, the second round was collected in summer of 2015, among healthy adults of Baranya county, Hungary. We applied quota sampling, representative for age and gender. Participants were from the age group 18-64.

Altogether 633 respondents participated in the study. Data collection was carried out face-to-face, questionnaires were completed using tablets.

‘E-Harmony’ web-based health program aimed to increase physical activity

A key goal of the web- (using both a website and social media page) and local television-based health program was to increase the popularity of physical activity, with the participation of medical professionals and physiotherapists.

In the program we produced 10 educational videos to provide useful information for participants of the program and increase the health knowledge of the audience. Topics on physical activity included short videos for various age groups to increase the popularity of physical activity, physical activity of adults in various age groups (such as midlife, aging, 66-75 year old's and 75+), physical activity during pregnancy, physical activity with small kids or during the first year after giving birth, popular physical activities for teenagers, outdoor physical activities (especially for adolescents or middle aged people), physical activities in water.

Apart from the educational videos the programs website and social media sites disseminated useful information with the help of physiotherapists on sport and physical activity. Various educational articles drew attention on the importance of physical activity and show examples for tools to increase physical activity focusing on free and easily available tools and activities.

Applied Statistical Methods

Based on the results of testing normality (using Kolmogorov-Smirnov test) we applied parametric and non-parametric tests (t-test, ANOVA, Wilcoxon, Mann-Whitney U or Kruskal-Wallis test) to test our hypotheses. The comparative analysis was carried out applying Pearson's chi-squared test or correlation analysis (Spearman or Pearson correlation), regression with two or more dependent variables or CHAID analysis.

Confidence interval was set to 95%, and the level of significance was $p < 0.05$. SPSS version 22.0 was used to carry out analysis and Microsoft Excel was used to depict results.

Results

ESS 2014

Average age of European respondents was 42.26 (42.10-42.41) years and average age of Hungarian respondents was 42.74 (41.99-43.49) (the European and the Hungarian sample did not differ, $t=-1.03$; $p=0.300$). Average body mass index (BMI) of the European respondents was 25.3 kg/m^2 (25.3-25.4) and that of Hungarian respondents was 25.68 kg/m^2 (25.45-25.90) (average BMI level differed, $t=-3.34$; $p=0001$).

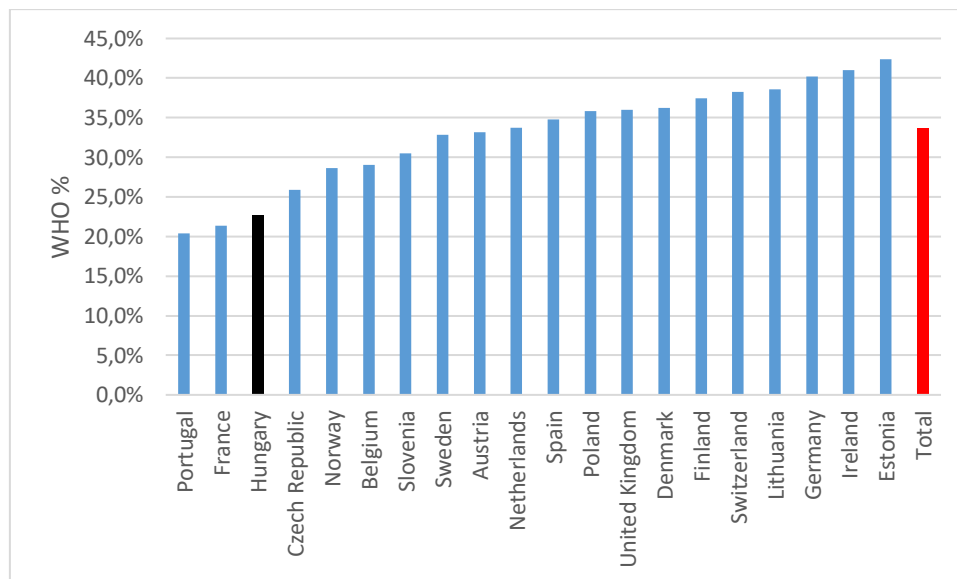


Chart 1: Ratio of the population complying with WHO recommendations for physical activity by country and across Europe (source: self-edited based on ESS data)

Significant difference was found among Hungarian respondents regarding their place of residence: respondents living in urban areas proved to be less active (19.75%) than those living in villages (25.95%) ($\chi^2=6.19$, $p=0.013$). Those living with a partner proved to be more active than those living alone ($\chi^2=6.29$, $p=0.012$). Respondents in the highest income group tend to comply less with WHO recommendations for physical activity (13.18%, $\chi^2=30.98$, $p<0.001$). Regarding occupation, students proved to be the most active, while the least physical activity was carried out by pensioners and housewives or housemakers ($\chi^2=14.66$, $p=0.005$). Other examined demographic factors showed no significant correlation with the dependent variable.

Eurobarometer – examination of sporting habits and physical activity

Further on we examined the frequency of carrying out sport or physical activity and sitting time, comparing the Hungarian sample with European data (Eurobarometer 2017) applying statistical analysis.

The European and the Hungarian sample did not differ significantly according to gender ($\chi^2=0.22$; $p=0.636$) or age ($\chi^2=7.63$; $p=0.054$). Regarding place of residence, people living in rural areas were less represented in the Hungarian sample ($\chi^2=70.76$; $p<0.001$). Based on self-classification, a higher proportion of respondents belonged to the middle and upper class in the European sample ($\chi^2=128.97$; $p<0.001$). Regarding occupation, the Hungarian sample included less C-level managers and entrepreneurs and more employees conducting physical work ($\chi^2=121.71$; $p<0.001$). In the Hungarian sample, we found significant difference between the two genders only in regard to occupation ($\chi^2=50.07$; $p<0.001$): more men carried out physical work and more women were engaged in housemaking and office work or were retired.

We analyzed the level of physical activity by examining sporting habits, frequency of physical activity and the time spent sitting. We found significant difference in the European and Hungarian data in all three aspects (sport: $\chi^2=27.71$; $p<0.001$, physical activity: $\chi^2=13.47$; $p=0.004$, time spent sitting: $\chi^2=41.64$; $p<0.001$). Regarding the frequency of sport, the European and Hungarian results differ only slightly, but a larger proportion of Hungarian respondents proved to never carry out any sport. The Eurobarometer study also examines the total amount of physical activity, and the Hungarian respondents proved to carry out more physical activity during their everyday lives (including activities during working hours, time spent home and transportation). Also, Hungarian respondents spend less time sitting than European citizens.

In the next phase of our study we examined motivations—which play an important role when designing programs for better health—to do sport and why people chose not to do any sport. Both the European and the Hungarian data showed that the most prevalent motivation to do sport was maintaining health, increasing fitness and appearance, and the leisure factor in sport. Similar results were found after analyzing European and Hungarian responses on the reasons behind not doing sport: the three most frequently mentioned reasons were the lack of time, motivation, and money. Finally, we discuss the places which European and Hungarian respondents choose to do physical activity most often. These are their homes, *en route*, outdoor places nearby, and parks. This highlights that the most popular places are those which are the easiest to access and cost the least money.

E-Harmony 2014 – Examining the level of physical activity

Approximately half of the respondents participating in the E-Harmony research were married, more than two-third of them were active in the labor market, and only a quarter of the respondents carried out easy physical work. Only one-tenth of the sample lives in villages. Approximately two-third of the respondents carry a middle-school diploma, the rest has a higher education degree. Almost half of the respondents categorized their income as less than average.

The study sample's total physical activity was 5129.89 (± 4488.05) MET min / week. Male participants scored higher in total activity (5314.04 (± 4674.07) MET min / week) while the average physical activity of female participants was 4949.77 (± 4298.01) MET min / week. Two-third of the average total physical activity consisted of activities connected to domestic work, while one-third of the average total physical activity was connected to leisure time and transportation (walking and cycling).

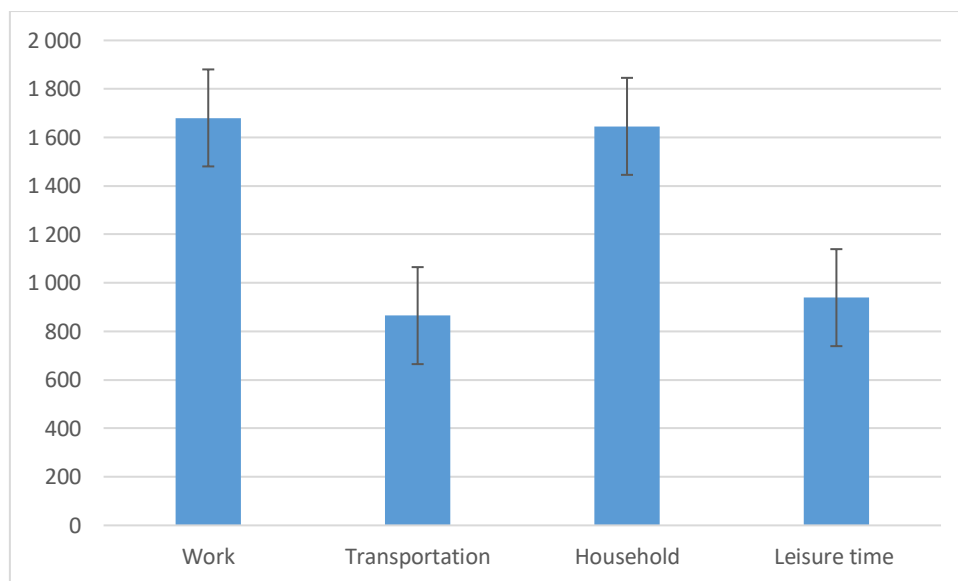


Chart 2. Average values of the four factors measured by IPAQ-HM on the total sample (average \pm SE)

Analysis of the correlation between anthropometric data and level of physical activity revealed that the total physical activity showed no significant correlation to BMI data, only in regards to skeletal muscle %. Yet physical activity did influence certain dimensions, two in particular: time spent sitting was negatively influencing results, while leisure activities and sport positively influenced the results.

In the last phase we summarized the correlation of sociodemographic factors and physical activity levels using multivariate linear regression models. In the first regression model the dependent variable was the total physical activity, and previously described sociodemographic factors were included as independent variables. Work including light physical activity ($p < 0.001$), young age ($p = 0.029$), and middle level of education ($p < 0.001$) significantly influenced total physical activity. Based on these results, those who carried out work including light physical activity were more active than those doing sedentary work. Respondents with middle level of education were more active than those with higher level of education. Sedentary work ($p < 0.001$) and higher education ($p < 0.001$) significantly influenced activity at the workplace. According to our third regression model, activity during transportation was significantly influenced by age (the 40-49 age group ($p = 0.009$) proved to be significantly more active during transportation) and education (respondent with higher education degree ($p = 0.028$) were less likely to choose active forms of transportation such as walking or cycling). Activity in housework was significantly lower of those of younger age and with higher education degree ($p < 0.001$), while women spend significantly more time with housework ($p = 0.011$). The final regression model included the leisure time activities (MET min / week) as dependent variable, where the 40-49 age group ($p = 0.011$), work including light physical activity ($p = 0.020$), and average income level ($p = 0.031$) of the sociodemographic factors induced significantly lower level of physical activity.

E-Harmony health program

Table 1. Differences in the level of physical activity during the health program

MET min / week	N	2014 average	SD	2015 average	SD	Z	p
Work	497	1866.03	3484.95	2282.55	3423.35	-14.219	<i><0.001</i>
Transport	497	862.23	1050.66	1192.10	1369.70	-17.595	<i><0.001</i>
Household	497	1613.10	2083.53	1872.16	2265.28	-17.993	<i><0.001</i>
Leisure time	497	954.84	1471.06	1137.83	1583.26	-15.538	<i><0.001</i>
Moderate physical activity	497	2750.15	2952.44	2822.75	2903.20	-18.585	<i><0.001</i>
Intensive physical activity	497	1500.51	2695.93	1436.44	2358.38	-13.523	<i><0.001</i>
Walking	497	1045.54	1018.25	1647.66	1560.82	-18.566	<i><0.001</i>
Total physical activity	497	5296.20	4554.02	5906.85	4791.17	-19.529	<i><0.001</i>
Sitting (per week)	497	2591.52	2066.00	2099.86	1351.14	-19.543	<i><0.001</i>
Average time spent sitting per day	497	370.22	295.14	315.94	227.55	-19.540	<i><0.001</i>

Table 2. Changes (%) in the indicators of physical activity between 2014-2015

	N	Change %
Work	497	18.25%
Transport	497	27.67%
Household	497	13.84%
Leisure time	497	16.08%
Moderate physical activity	497	2.57%
Intensive physical activity	497	-4.46%
Walking	497	36.54%
Total physical activity	497	10.34%
Sitting (per week)	497	-23.41%
Average time spent sitting per day	497	-17.18%

In the final phase of our research we examined the effectiveness of the E-Harmony health program using the IPAQ-HM questionnaire. The second round of data collection took place 1 year after the first round, following the events of the health program. Table 1. shows average results (and SD) from 2014 and 2015 regarding respondents' level of physical activity and time spent sitting. All factors changed significantly from 2014 to 2015. Table 2. shows the direction and size of change in in terms of each examined indicator. Total physical activity increased by 10.34%, while intensive physical activity decreased, only a 2.57% change was detected in terms of moderate physical activity. As the data shows a much larger increase took place in terms of walking. Analyzing the change in light of various domains of physical activity, it is apparent that the biggest increase took place in terms of activities related to transport, work, and leisure time, and not in regard to intensive or moderate activity but in regard to walking. Respondents spent 17.18% less time sitting in 2015.

The health program had a significant influence on respondents' physical activity. Apart from the IPAQ-HM survey results we detected a small, non-significant change in respondents' BMI after the health program.

Discussion

Detailed analysis of physical activity is essential in order to gain sufficient information about the extent of the healthy population's physical activity. In case expensive objective tools are unavailable, subjective survey methods offer a solution to measure the level of physical activity (relevant scientific literature claims that the combination of the two techniques offer the most precise insight).

The Hungarian population is less physically active than the European average, and only 22.69% of Hungarians comply with the WHO's relevant recommendation, compared to 33.70% of Europeans (ESS, 2014). Although the European average can not be considered a lot more favorable, a goal for the Hungarian population may be to catch up with the European average.

The Hungarian results did not differ from the European data significantly in terms of doing sport or physical activity, but there is a larger proportion of the population in Hungary which does not do any sport whatsoever. However, Hungary does not lag behind Europe in terms of total physical activity. Hungarians spend less time sitting than the European average, which is highlighted by the Eurobarometer 2017 database and also confirmed by the E-Harmony research.

Eurobarometer 2017 data showed lower activity levels in the upper classes. It appears to be even more crucial to emphasize the protective role of sport on health towards people living in urban areas, women, and people with sedentary work.

Analyzing the sociodemographic factors, we recognized that level of education, income, occupation, and marital status all play an important role in the level of one's physical activity. In Hungary the physical activity levels of women, young age groups, pensioners, office workers, people living in urban areas, and those in upper classes proved to be lower compared to respondents in other demographic groups.

In the E-Harmony 2014 research we applied the IPAQ-HM survey to measure the level of physical activity. Results showed that almost two-third of respondents activity comes from home- and work duties, while respondents also spend time on active transport (walking and cycling) and leisure time sport activities.

The E-Harmony research confirms that life in an urban area induces a lower level of physical activity, and people living in rural areas spend a lot more time with (both moderate and intensive) activities around their homes. The research in Baranya county confirmed the results of ESS and Eurobarometer, as in the total physical activity is lower of younger age

groups, single respondents, office workers, and those in upper classes, compared to other demographic groups.

Time spent on sport during leisure time increased by 16.08%, and time spent on active transport increased by 36.54% among respondents. Our results confirm that health programs aiming to motivate participants are a successful tool in health promotion.

Experiences of the E-Harmony research has greatly contributed to the design and implementation of our further studies.

Novel Findings

1. This study is the first one in Hungary to apply the ESS database for analyzing physical activity. Our results are based on WHO's recommendations for physical activity, and define specific high-risk target groups by sociodemographic factors, where activity is lower and health programs may be more justified.
2. Several studies in sport science apply the Eurobarometer data, but this is the first analysis with Hungarian primary data focusing on the physical activity and sporting habits of the healthy 18-64 age group.
3. There are several studies both in Hungary and in Europe evaluating the physical activity of a specific target group (patient group, intervention group, labor market group), but there has not yet been an independent study with a large, representative sample size on the healthy (18-64 year old) Hungarian population's physical activity using the IPAQ-HM and analyzing results in light of sociodemographic indicators.
4. The E-Harmony study analyzed the physical activity of the 18-64 age group living in Baranya county, and drew public attention to the importance of physical activity through a health program which lasted for 1 year.
5. A web- and television-based health program was developed during the E-Harmony research, which used a widely available web-based technology to disseminate knowledge on and increase the level of physical activity, and increased the effectiveness of the program with the support of dietitians and physiotherapists who offered personal help to increase participants' health status and the level of physical activity.

Suggestions

- Analysis and summary of quantitative data implies the need for a unified physical activity monitoring system for the healthy population in Hungary.
- We suggest researches to be carried out not only on a county- but also on a national level.
- It would be an important and significant development, if similar researches would not only collect data through surveys but also through objective measurement tools and would in addition analyze clinical parameters. Studies using objective measurement tools would provide more precise suggestions on which subjective tools are appropriate to examine the level of physical activity.
- To encourage international comparisons, it is recommended to comply with data collection processes of other European countries, especially those, which champion physical activity monitoring for years.
- New opportunities arose during the examination of the effectiveness of our research group's health program, which indicate new directions for future programs aiming to increase the health status of people living in Baranya county.
- We consider it important to increase the health literacy of the population, which may provide information on the importance of physical activity and its role in maintaining and protecting health.

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List of Publications

Publications discussing the topic of this thesis

Journal Articles:

Makai, A; Prémusz, V; Lampek, K; Ács, P; Simon-Ugron, Á; Figler M. Sitting time and sport participation of the employed population in Hungary and Europe. **STUDIA UBB EDUCATIO ARTIS GYMN.**, LXIII. 2. (2018)

Makai, A; Prémusz, V; Ács, P; Figler, M. Fizikai aktivitás mértékének vizsgálata a magyarországi munkavállalók körében egy európai keresztmetszeti vizsgálat alapján. **SPORT- ÉS EGÉSZSÉGTUDOMÁNYI FÜZETEK 2** 1 pp. 61-76., 16 p. (2018)

Makai, A; Füge, K; Breitenbach, Z; Lampek, K; Figler, M. "E-Harmónia" Prevenációs program, fókuszban az egészséges táplálkozás és a rendszeres testmozgás. **ÚJ DIÉTA: A MAGYAR DIETETIKUSOK LAPJA.** (2001) 27: 1 pp. 19-23. 5 p. (2018)

Makai, A; Füge, K; Breitenbach, Z; Figler, M. Physical activity levels of adults in two counties of Hungary in view of sociodemographic inequalities. **HEALTH PROBLEMS OF CIVILIZATION** 10: 3 pp. 38-46. 9 p. (2016)

Ács, P; Prémusz, V; Melczer, Cs; Bergier, J; Salonna, F; Junger, J; Makai, A. Nemek közötti különbségek vizsgálata a fizikai aktivitás vonatkozásában a V4 országok egyetemista populációjának körében. **MAGYAR SPORTTUDOMÁNYI SZEMLE** 19: 74 pp. 3-9. 7 p. (2018)

Ács, P; Prémusz, V; Morvay-Sey, K; Kovács, A; Makai, A; Elbert, G. A sporttal, testmozgással összefüggésben lévő mutatók változása Magyarországon és az Európai Unióban az elmúlt évek eredményeinek nyomán. **SPORT- ÉS EGÉSZSÉGTUDOMÁNYI FÜZETEK 2:** 1 pp. 61-76., 16 p. (2018)

Ács, P; Bergier, J; Salonna, F; Junger, J; Gyuro, M; Simon-Ugron, Á; Welker, Zs; Makai, A. Gender differences in physical activity among the university students in the Visegrad (V4) countries. **STUDIA**

UNIVERSITATIS BABES-BOLYAI EDUCATIO ARTIS GYMNASTICAE 62: 1 pp. 5-17. , 13 p.
(2017)

Ács, P; Bergier, J; Salonna, F; Junger, J; Melczer, Cs; Makai, A. Gender differences in physical activity among secondary school students in the Visegrad countries. **HEALTH PROBLEMS OF CIVILIZATION** 10: 3 pp. 21-29. , 9 p. (2016)

Presentations:

Makai, A; Cseh, AM; Breitenbach, Z; Füge, K; Járomi, M; Prémusz, V; Ács, P; Lampek, K; Oláh, A; Betlehem, J. A web-based intervention to promote and increase physical activity level of Hungarian healthy adults. In: F, Salonna (szerk.) **ABSTRACT BOOK FOR THE ISBNPA 2019 ANNUAL MEETING IN PRAGUE** Prága, Csehország: International Society of Behavioral Nutrition and Physical Activity, pp. 1163-1163, 1 p. (2019)

Makai, A; Premusz, V; Betlehem, J; Olah, A; Melczer, Cs; Filo, Cs; Lampek, K; Figler, M; Acs, P. Special Eurobarometer on sport and physical activity versus International Physical Activity Questionnaire, comparison of two different survey methods. **BMC SPORTS SCIENCE MEDICINE AND REHABILITATION** 11: Suppl 1 Paper: P61 (2019)

Makai, A; Prémusz, V; Ács, P; Figler, M. Ülő életmódot élők aránya az aktív korú munkavállalók körében Magyarországon és Európában, egy keresztmetszeti kutatás eredményei. **MAGYAR SPORTTUDOMÁNYI SZEMLE** 19: 75 pp. 62-63. 2 p. (2018)

Makai, A; Breitenbach, Z; Füge, K; Járomi, M; Ács, P; Figler, M. Physical activity level and sport participation of Hungarian employed adults, a cross - sectional study. Pp. 45-45. , 1 p. In: Potočniková, J; Bakalár, P (szerk.) **REKREAČNÝ ŠPORT, ZDRAVIE, KVALITA ŽIVOTA IV.: ZBORNÍK ABSTRAKTOV Z MED ZINÁRODNEJ VEDECKEJ KONFERENCIE** Kassa, Szlovákia: Univerzita Pavla Jozefa Safárika v Kosiciach, p. 99 11. (2018)

Makai, A; Prémusz, V; Lampek, K; Ács, P; Figler, M. Sport participation and physical activity of different occupational groups in Hungary and Europe. **VII. INTERDISZCIPLINÁRIS DOKTORANDUSZ KONFERENCIÁT (IDK2018)**, Pécs (2018)

Makai, A; Füge, K; Breitenbach, Z; Prémusz, V; Járomi, M; Lampek, K; Figler, M. Physical activity and self-reported health of Hungarian adults: observation survey and elaboration of an educational intervention. **INTERNATIONAL SOCIETY FOR BEHAVIORAL NUTRITION; PHYSICAL ACTIVITY (ISBNPA)** (2015)

Makai, A; Füge, K; Breitenbach, Z; Járomi, M; Boncz, I; Lampek, K; Figler, M. Gender differences in physical activity of Hungarian adults: an observatory survey. **VALUE IN HEALTH** 18: 7 pp. A555-A555. 44. (2015)

Prémusz, V; Melczer, Cs; Makai, A; Bergier, J; Ács, P. A fizikai aktivitás mértéke a középiskolások körében a V4 országokban, egy keresztmetszeti kutatás eredményei. **MAGYAR SPORTTUDOMÁNYI SZEMLE** 19: 75 pp. 77-77. , 1 p. 12. (2018)

Ács, P; Prémusz, V; Makai, A; Junger, J; Bergier, J. Physical activity of university students according to IPAQ long questionnaires results pp. 22-22. , 1 p. In: Potočnicková, J; Bakalár, P (szerk.) **REKREAČNÝ ŠPORT, ZDRAVIE, KVALITA ŽIVOTA IV.: ZBORNÍK ABSTRAKTOV Z MED ZINÁRODNEJ VEDECKEJ KONFERENCIE** Kassa, Szlovákia: Univerzita Pavla Jozefa Safárika v Kosiciach, p. 99 3. (2018)

Prémusz, V; Makai, A; Várnagy, Á; Ács, P. Associations between Hrql And Pa In Hungarian university students. pp. 49-49. , 1 p. In: Potočnicková, J; Bakalár, P (szerk.) **REKREAČNÝ ŠPORT, ZDRAVIE, KVALITA ŽIVOTA IV.: ZBORNÍK ABSTRAKTOV Z MED ZINÁRODNEJ VEDECKEJ KONFERENCIE** Kassa, Szlovákia: Univerzita Pavla Jozefa Safárika v Kosiciach, p. 99 13. (2018)

Other Publications

Journal articles, book chapters:

Makai, A. Derékfájás társadalmi és egyéni meghatározó tényezői pp. 9-18. , 10 p. In: Tóthné, Steinhausz Viktória; Tóth, Klára (szerk.) **TUDATOS ÜLÉS GERINCISKOLÁJA ÁLTALÁNOS ISKOLÁSOKNAK: AZ ISKOLAI TESTNEVELÉSBEN VÉGZENDŐ TARTÁSKORREKCIÓT KIEGÉSZÍTŐ GERINCISKOLA** Pécs, Magyarország: Pécsi Tudományegyetem Egészségtudományi Kar (PTE ETK), p. 154 45. (2015)

Makai, A; Prémusz, V; Füge, K; Figler, M; Lampek, K. Social participation and health among ageing people in East-Central Europe. **PRACTICE AND THEORY IN SYSTEMS OF EDUCATION** 10: 2 pp. 177-185. 9 p. (2015)

Makai, A; Prémusz, V; Figler, M; Lampek, K. Az idősödő népesség szubjektív életminősége és társas aktivitása. In: Ács, Pongrác (szerk.) **TUDOMÁNYOS SZEMELVÉNYEK A PÉCSI TUDOMÁNYEGYETEM EGÉSZSÉGTUDOMÁNYI KAR FIZIOTERÁPIÁS ÉS SPORTTUDOMÁNYI INTÉZETÉNEK JELENÉBŐL: JUBILEUMI TANULMÁNYKÖTET KRÁNICZ JÁNOS 70. SZÜLETÉSNAJJA ALKALMÁBÓL** Pécs, Magyarország: Pécsi Tudományegyetem Egészségtudományi Kar (PTE ETK), pp. 78-86. 9 p. 50. (2014)

Moghaddam Hosseini, V; Makai, A; Varga, K; Ács, P; Prémusz, V; Várnagy, Á: Assessing fear of childbirth and its predictors among Hungarian pregnant women using Wijma Delivery Expectancy/Experience Questionnaire subscales **PSYCHOLOGY HEALTH & MEDICINE** 24: 7 pp. 879-889., 11 p. (2019)

Kovács-Babócsay, B; Makai, A; Szilágyi, B; Tardi, P; Ács, P; Velényi, A; Rébék-Nagy, G; Járomi, M. Egy deréktáji fájdalommal kapcsolatos betegségspecifikus tudást felmérő külföldi kérdőív hazai, magyar nyelvű validálása **ORVOSI HETILAP** 160: 42 pp. 1663-1672. , 10 p. (2019)

Kiss, G; Faludi, B; Szilágyi, B; Makai, A; Velényi, A; Ács, P; Tardi, P; Pallag, A; Bors, V; Sekk, P.; Járomi M. Effect of Active and Passive Mechanical Thromboprophylaxis and Consensual Effect on the Venous Blood Flow Velocity Among Hemiparetic Patients. **CLINICAL AND APPLIED THROMBOSIS-HEMOSTASIS** (25), 11 p. (2019)

Moghaddam, Hosseini V; Makai, A; Dweik, D; Várnagy, Á. Factor analysis study of the Hungarian translation of Wijma Delivery Expectancy/Experience Questionnaire (version A). **CURRENT PSYCHOLOGY** (2018)

Szilágyi, B; Kukla, A; Makai, A; Ács, P; Járomi, M. Sports therapy and recreation exercise program in type 2 diabetes: randomized controlled trial, 3-month follow-up. **JOURNAL OF SPORTS MEDICINE AND PHYSICAL FITNESS** 5. (2018)

Kiss, G; Kovácsné B, V; Tóth L, Á; Jeges, S; Makai, A; Szilágyi, B; Ács, P; Járomi, M. Efficiency examination of a 6-month trunk prevention program among recruitment kayak-canoe athletes: randomized control trial. **JOURNAL OF BACK AND MUSCULOSKELETAL REHABILITATION** 32: § pp. §-§. 7. (2018)

Járomi, M; Kukla, A; Szilágyi, B; Ugron, Á; Kovácsné, Bobály V; Makai, A; Linek, P; Ács, P; Leidecker, E. Back School programme for nurses has reduced low back pain levels: a randomized controlled trial. **JOURNAL OF CLINICAL NURSING** 27: 5-6 pp. e895-e902. , 8 p. 8. (2018)

Prémusz, V; Makai, A; Melczér, Cs; Perjés, B; Ács, P; Bódis, J; Lampek, K; Várnagy, Á. Habitualis fizikai aktivitás és életminőség összefüggése várandósság alatt a WHO Global Physical Activity Questionnaire alapján. **MAGYAR NŐORVOSOK LAPJA** 81: 6 pp. 343-350. , 8 p. 14. (2018)

Kovácsné, Bobály V; Szilágyi, B; Makai, A; Koller, Á; Járomi, M. Új low back pain prevenció mozgóprogram, amely javítja a törzsizmok állapotát és a lumbalis motoros kontrollt. **ORVOSI HETILAP** 158: 2 pp. 58-66. , 9 p. 19. (2017)

Szalai, M; Szirmai, A; Fuge, K; Makai, A; Erdelyi, G; Premusz, V; Bodis, J. Special aspects of social support: Qualitative analysis of oncologic rehabilitation through a belly dancing peer support group. **EUROPEAN JOURNAL OF CANCER CARE** 26: 6 Paper: e12656, 14 p. (2017)

Brainard, J; Loke, Y; Salter, C; Koos, T; Csizmadia, P; Makai, A; Gacs, B; Szepes, M; Irohla, Consortium healthy ageing in Europe: prioritizing interventions to improve health literacy. **BMC RESEARCH NOTES** 9: 1 Paper: 270, 11 p. 24. (2016)

Kovácsné, Bobály V; Makai, A; Kiss, G; Szilágyi, B; Ács, P; Járomi, M. The examination of muscle balance in dancers. **UNIVERSAL JOURNAL OF PUBLIC HEALTH** 4: 4 pp. 171-178. , 8 p. 29. (2016)

Kovácsné, Bobály V; Makai, A; Kiss, G; Markus, M; Ekliesné, Lepenye K; Simon, Ugron Á; Járomi, M. Core muscle assessment of dancers. **STUDIA UNIVERSITATIS BABES-BOLYAI EDUCATIO ARTIS GYMNASITICAE** 60: 2 pp. 31-47. , 17 p. 30. 30. (2016)

Breitenbach, Z; Dreiszker, R; Szekeresné, Szabó Sz; Polyák, É; Gubicskóné, Kisbenedek A; Makai, A; Füge, K; Figler, M. Középiskolások folyadékfogyasztásának vizsgálata. **ÚJ DIÉTA: A MAGYAR DIETETIKUSOK LAPJA** (2001-) 24: 2-3 pp. 26-28. , 3 p. (2015)

Szilágyi, B; Járomi, M; Makai, A: Sportterápia alkalmazása és hatékonyságának felmérése II. típusú diabetes mellitusban szenvedő pácienseknél. **EGÉSZSÉG-AKADÉMIA** 6: 4 pp. 250-257. 48. (2015)

Harnóczy, E; Makai, A; Simon, G; Wágner, N. Fogyatékos életesélyek – életútinterjúk tükrében. **ACTA SOCIOLOGICA: PÉCSI SZOCIOLÓGIAI SZEMLE** III.: 1. pp. 140-150. (2010)

Presentations:

Makai, A; Prémusz, V; Füge, K; Figler, M; Lampek, K. Social participation and health among ageing people in East-Central Europe. p. 30, 1 p. In: Karlovitz, János Tibor (szerk.) **2ND IRI HEALTH CONFERENCE: STÚROVO**, 2014. December 8-9. Slovakia. Program abstrakty Komárno, Szlovákia : International Research Institute, p. 44 49. (2014)

Makai, A; Prémusz, V; Füge, K; Figler, M; Lampek, K. Social activity and health among older adults. **NÉPEGÉSZSÉGÜGY** 92: 2 pp. 122-123. 51. (2014)

Csernak, G; Makai, A; Olah, A; Boncz, I; Molics, B; Jaromi, M. The effect of physical activity during pregnancy on quality of life. **VALUE IN HEALTH** 21: 1 pp. S200-S200. , 1 p. 6. (2018)

Szilágyi, B; Makai, A; Betlehem, J; Ács, P; Járomi, M. Evaluation and development of trunk muscle strength, lower limb muscle flexibility and lumbar motor control ability with back school program among 6 - 7 year old children. pp. 54-54. , 1 p. In: Potočniková, J; Bakalár, P (szerk.) **REKREAČNÝ ŠPORT, ZDRAVIE, KVALITA ŽIVOTA IV.: ZBORNÍK ABSTRAKTOV Z MED ZINÁRODNEJ VEDECKEJ KONFERENCIE** Kassa, Szlovákia: Univerzita Pavla Jozefa Safárika v Kosiciach, p. 99 15. (2018)

Breitenbach, Z; Szekeresné, Szabó Sz; Gubicskóné, Kisbenedek A; Füge, K; Makai, A; Figler, M. A minőségi folyadékbevitel vizsgálata a felnőtt lakosság körében. pp. 23-23. , 1 p. In: Biró, Lajos; Gelencsér, Éva; Lugasi, Andrea; Rurik, Imre (szerk.) **MAGYAR TÁPLÁLKOZÁSTUDOMÁNYI TÁRSASÁG XLII. VÁNDORGYŰLÉS** programkönyve: MTT 1966 Siófok, Magyarország : Magyar Táplálkozástudományi Társaság, 72 p. 16. (2017)

Breitenbach, Z; Szekeresné, Szabó Sz; Gubicskóné, Kisbenedek A; Füge, K, Makai, A, Figler, M. A szív- és érrendszeri kockázat vizsgálata a táplálkozás és az antropometriai adatok alapján pp. 8-8. In: Gelencsér, É; Horváth, Zné; Rurik, I; Tömösközi, S (szerk.) **TÁPLÁLKOZÁSTUDOMÁNYI KUTATÁSOK VII. PHD KONFERENCIA:** program és előadás összefoglalók Budapest, Magyarország: Magyar Táplálkozástudományi Társaság, p. 23 17. (2017)

Járomi, M; Makai, A; Szilágyi, B; Ács, P. Gerinciskola: Gerincprevenációs tudás fejlesztése általános iskolás gyermekek körében. **MAGYAR SPORTTUDOMÁNYI SZEMLE** 18: 2 pp. 47-47. (2017)

Szilágyi, B; Makai, A; Acs, P; Boncz, I; Jaromi, M. Evaluation and development of habitual posture and posture deemed correct with back school program among primary school children. **VALUE IN HEALTH** 20: 9 pp. A542-A543. (2017)

MoghamHosseini, V; Makai A; Dweik, D; Várnagy. Á. A factor analysis study of Wijma Delivery Expectancy/Experience Questionnaire (version A) in Hungarian pregnant women p. 107, 1 p. In: Ács, K; Bódog, F; Mechler, M; Mészáros, O (szerk.) **BOOK OF ABSTRACTS: INTERDISCIPLINARY DOCTORAL CONFERENCE 2017** = Absztraktkötet. Interdiszciplináris Doktorandusz Konferencia 2017 Pécs, Magyarország: Pécsi Tudományegyetem Doktorandusz Önkormányzat, p. 187 23. (2017)