

RELATIONSHIPS BETWEEN SPORT, WORK AND LEISURE-TIME PHYSICAL ACTIVITY AMONG LITHUANIAN UNIVERSITY STUDENTS

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ABSTRACT

Research background and hypothesis. Other than sport physical activity which occurs in occupational, leisure and domestic sectors is often overlooked, meanwhile it also affects health. Previous research revealed that energy expenditure in occupational, domestic and leisure-time domains may influence energy expenditure in sports or exercising domain. University students are understudied population in this area. We expected that lower work and leisure-time activity among university students would be associated with their higher sports related activity.

Research aim was to examine relationships between sport, work and leisure-time activities in a sample of university students.

Research methods. The final sample consisted of 867 students from four Lithuanian universities, 195 (22.5%) were males, their age ranged from 18 to 22 years. Baecke Questionnaire of Habitual Activity (Baecke et al., 1982) was used to assess work, leisure-time and sport physical activity.

Research results. Male students scored significantly higher than female in work and sport activity ($p < 0.0001$), but not in leisure-time activity ($p = 0.61$). Males and females who were more active in their occupational domain were also twice more active in sports-related activities (OR = 2.22 [95% CI 1.25–3.93] and OR = 2.14 [95% CI, 1.50–3.04] respectively). Females who were more active in leisure-time domain were almost twice more active in sports-related activities (OR = 1.65 [95% CI 1.22–2.21]) as well.

Discussion and conclusions. Analysis of the relationships between sports, work and leisure-time physical activities did not confirm our expectation. The results of the current study revealed that lower physical activity in occupational or leisure-time domains did not determine higher sports related physical activity. Sports-related activity and physical activity in other domains can coexist together in the population of students and possibly depends on variables which influence them all. In further research, the broader set of variables influencing university students' habitual physical activity should be taken into account.

Keywords: habitual physical activity, physical activity domains, occupation of university students.

INTRODUCTION

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure above the resting level (WHO, 2011). Regular physical activity is one of the most important factors in health promotion. It not only improves mood, but also is definitely beneficial to physical health

(WHO, 2011). Adequate physical activity reduces risk of cardiovascular disease, diabetes and even certain forms of cancer, helps control weight and improves mental health. Participation in physical activities helps to make friends and feel part of the community (Castillo, Garcia-Molina, 2009) as increased physical activity is associated with

higher levels of social support and self-efficacy (Maglione, Hayman, 2009; Shuval et al., 2009). On the contrary, physical inactivity is associated with many chronic diseases and obesity (Baba et al., 2006) and is among the 10 leading causes of mortality and morbidity around the world (WHO, 2002).

Assuming that years while studying make a great impact on the young people consciousness, this is an opportune time point for implementation and fixing ideas about healthy lifestyle. Besides, students are supposed to be an educated part of the society and are expected in the future to spread ideas and be an example for certain groups in society. Data about students' physical activity is important in assessing their health status, predicting the changes and trends of public health development, planning health promotion and disease prevention strategies.

Up to now, many studies revealed that physical inactivity is a serious health problem among university students. A cross-sectional survey in 23 countries identified that the prevalence of inactivity in leisure time varied, averaging 23 percent in North-Western Europe and the United States, 30 percent in Central and Eastern Europe, 39 percent in Mediterranean countries, 42 percent in Pacific Asian countries, and 44 percent in developing countries (Haase et al., 2004). Moreover, another study reported that, for example, in Canada 65 percent of students were insufficiently physically active (Irwin, 2007).

Understanding of physical activity is sometimes associated with sport and exercising, but physical activity and exercising actually, reflect different things. Physical activity is a broader concept than physical exercise; it is a complex and multidimensional exposure variable and includes several domains – occupational, domestic and leisure (Ono et al., 2007; Jankauskiene, 2008).

An international study, which reviewed and analyzed the prevalence of university students' participation in physical activity at the level necessary to acquire health benefits, revealed that female students were less active than male students (Irwin, 2004). Results of some other cross-cultural studies are in accordance with the previous research (Seo et al., 2009).

According to K. R. Evenson and colleagues (2003), physical activity that occurs in the occupational and domestic sectors is often overlooked (Evenson et al., 2003). While it has

an important effect on body weight (Monda et al., 2008), cardio-vascular disease in later life (Wang et al., 2010) and self-rated health (Parkes, 2006). A large number of research examining physical activity has largely focused on sports and physical exercise rather than other sources of energy expenditure, such as occupational or work activity and leisure-time activity. Thus the actual data about habitual physical activity could be incomplete.

Results of some previous research about relationships of sports, work and other than sports leisure-time activities are contradicting. Research in the USA shows, that the level of work and leisure-time activity may negatively influence energy expenditure in sports and exercising domain (Evenson et al., 2003). On the contrary, the study in Australia revealed that white-collar employees were less likely to engage in sufficient physical activity and more likely in occupational sitting than blue-collar employees (Duncan et al., 2010). Meantime, a study in the USA with racial or ethnic minorities and study in Brazil showed that occupational and housework physical activity were not related to participation in physical exercise in leisure (Marquez et al., 2010; Rombaldi et al., 2010). So, the research of the relationship of various types of physical activity is still important. Particularly university students are understudied population in this area. While their prime occupation, i. e. studying, is supposed to be associated with sitting and this fact is not positively related to their health (Duncan et al., 2010). The **aim** of the study was to examine relationships between sport, work and leisure-time activities in a sample of university students. We hypothesize that lower work and leisure-time activity of university students would be associated with their higher sports-related activity.

RESEARCH METHODS

Participants. The initial sample of participants included 1036 of university students. 169 students failed to complete questionnaires correctly. The final sample consisted of 867 students from four Lithuanian universities, 195 (22.5%) were males and 672 (77.7%) females, who ranged in age from 18 to 22 years. Lithuanian University of Health Sciences (LUHS) was represented by 421 student, studying medicine, odontology, pharmacy and public health. There were 235 students from

the Lithuanian Academy of Physical Education (LAPE), Faculties of Sports Biomedicine and Sports Education participated in this study, and 101 students were from the Lithuanian Music and Theatre Academy (LMTA). These students were studying music and music performance-related sciences. Finally, 110 students were from Mykolas Romeris University (MRU), studying social sciences.

Instruments. *Baecke Questionnaire of Habitual Activity* (Baecke et al., 1982) proved to have high reliability and accurate assessment of heavy intensity activity as well as light intensity activities. Additionally it fits for both men and women (Richardson et al., 1995). It was proved by research that the Baecke Questionnaire of Habitual Activity can provide valid data about physical activity (Philippaerts et al., 1999). The questionnaire consisted of 16 items, classified into three scales: work, sports, and leisure-time activity, which measure self-assessed activity referring the past 12 months. The first scale, *work activity*, consists of eight questions reflecting the occupation-related physical activity. All occupations in this questionnaire are classified into three groups based on physical activity levels and each group assigned a corresponding score (1-st item). The 2–8 items assess individual work-related physical activity. As the population in target was university students, work activity was considered as activity while studying. The second scale, *sport activity*, reflects the casual sports-related physical activity. Taking into account that different sports related to different amount of energy expenditure, two out of four items estimate that. The third scale, *leisure-time activity*, also consists of four items. Non sport-related activity, such as watching television, riding a bike, walking to and from work, which also utilized certain

amount of energy, is included into leisure-time activity scale.

Demographic information included age and gender.

Statistical analysis. Students' sample was divided into two groups depending on the means of the sport, work as well as leisure-time activity indexes. More and less physically active groups were obtained. Binary logistic regression analysis was used to assess the relationship between sport, work as well as leisure-time activity and university variable. Students from LUHS were considered as a reference group. Gender as a control variable was included into the equation. Descriptive statistics was used to calculate means and standard deviations (SD).

Gender differences of habitual physical activity were determined by a Mann-Whitney test for nonparametric data. Percentage distribution of exercising, occupational sitting, sitting at a computer or watching TV were calculated using χ^2 statistic.

Finally, binary logistic regression analysis was used to assess the relationships between sport, work and leisure-time physical activity. Predictive value of work and leisure-time activity variables for greater sport activity index were evaluated.

RESEARCH RESULTS

Differences of habitual physical activity between universities. First, prevalence of sport, work and leisure-time physical activity between universities was compared. Results of binary logistic regression analysis (Table 1), adjusted for gender, showed that students from LAPE and MRU were more likely to be classified as more physically active in sports (OR = 3.52

Table 1. Logistic regression models of habitual physical activity prevalence between universities showing adjustment for gender odds ratios (with 95% confidence intervals)

University	Sport activity		Work activity		Leisure-time activity	
	Mean SD	OR (CI 95%)	Mean SD	OR (CI 95%)	Mean SD	OR (CI 95%)
LUHS	2.62 ± 0.48	Ref.	2.12 ± 0.41	Ref.	3.17 ± 0.54	Ref.
LAPE	2.99 ± 0.66	3.52 (2.49–4.98) **	2.34 ± 0.54	1.61 (1.16–2.24) **	2.96 ± 0.58	0.60 (0.43–0.84) *
LMTA	2.75 ± 0.60	1.54 (0.96–2.44)	2.51 ± 0.52	2.97 (1.86–4.74) **	3.44 ± 0.58	2.13 (1.33–3.39) *
MRU	2.95 ± 0.44	3.37 (2.18–5.22) **	2.02 ± 0.46	1.32 (0.86–2.01)	3.07 ± 0.47	0.70 (0.46–1.07)

Note. * – $p < 0.05$; ** – $p < 0.0001$.

Variable	Male OR (CI 95%)	Female OR (CI 95%)
Work activity	2.22 (1.25–3.93) **	2.14 (1.50–3.04) **
Leisure-time activity	0.96 (0.58–1.59)	1.65 (1.22–2.21) **

Table 2. Logistic regression models showing relationships of sport, work and leisure-time physical activity in male and female university students (odds ratios with 95% confidence intervals)

Note. ** – $p < 0.0001$.

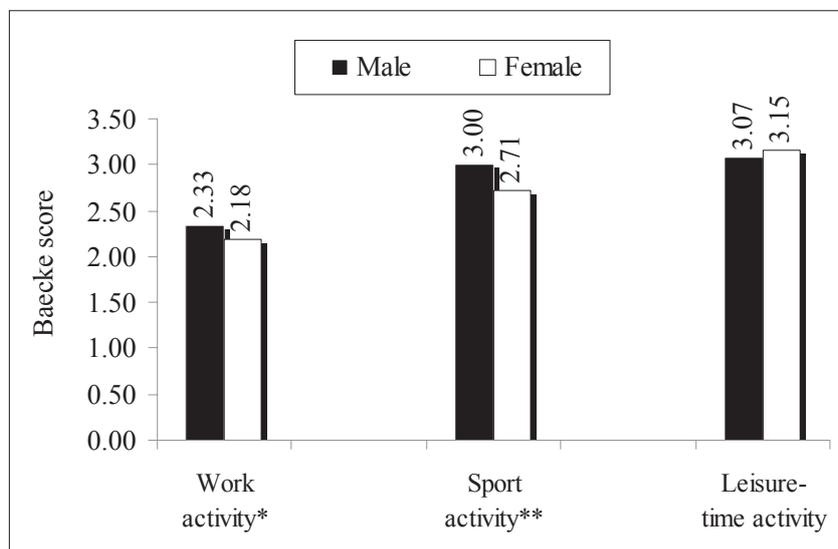


Figure. Habitual physical activity indexes in male and female students

Note. * – $p < 0.05$; ** – $p < 0.0001$.

[95% CI 2.49–4.98] and 3.37 [95% CI 2.18–5.22] respectively; $\chi^2 = 103.21$; $df = 4$; $p < 0.001$) as compared to LUHS students. Students from LAPE and LMTA were more active at work (OR = 1.61 [95% CI 1.16–2.24]; and 2.97 [95% CI 1.86–4.74] respectively; $\chi^2 = 35.22$; $df = 4$; $p < 0.001$); and also students from LMTA were more likely to be active in other than sports leisure-time activity (OR = 2.13 [95% CI 1.33–3.39]) as compared to LUHS students. But LAPE students had lower odds to be active in leisure than LUHS students (OR = 0.60 [95% CI 0.43–0.84]); model's $\chi^2 = 31.62$; $df = 4$; $p < 0.001$.

Gender differences of habitual physical activity. Further, we evaluated and compared occupational sitting between genders. Results showed that 79.5 percent ($n = 155$) of male and 85.4 percent ($n = 574$) of female students agreed that their occupation was always or very often related with sitting. Only 8.2 ($n = 16$) and 7.4 percent ($n = 50$) of male and female students reported that their sitting was not habitual or was just rarely related to their work. Reported occupational sitting between males and females did not differ ($\chi^2 = 6.53$; $df = 4$; $p = 0.16$).

Only one (0.5 percent) male student and 1 percent ($n = 7$) of female students reported that they sat at the computer or watched TV always, 20 ($n = 39$) and 23.1 percent ($n = 155$) respectively agreed that they did that often, 36.4

($n = 71$) and 36.5 percent ($n = 245$) respectively – sometimes, 38.5 ($n = 75$) and 33.3 ($n = 224$) respectively – rarely, and small percent – 4.6 ($n = 9$) and 6.1 ($n = 41$) respectively declared that they never sat at computer or watched TV in leisure time. Results distributed in a similar way between male and female students ($\chi^2 = 2.82$; $df = 4$; $p = 0.59$).

χ^2 statistic revealed that 92.3 percent ($n = 180$) of male and 61.3 percent ($n = 412$) of female students reported that they exercised or played sports in leisure time. Obviously, more male than female students exercised ($\chi^2 = 67.06$; $df = 1$; $p < 0.0001$).

The Mann-Whitney test was applied to assess the differences of work activity, sport activity and leisure-time activity indexes between male and female students. The test results revealed (Figure 1) that males scored significantly higher than female students on work and sport activity (Mann-Whitney $U = 55376$; $p = 0.001$ and Mann-Whitney $U = 46402$; $p < 0.0001$ respectively). Leisure-time activity index didn't differ between the groups (Mann-Whitney $U = 59811$; $p = 0.61$).

Relationships between sport, work and leisure-time physical activity. Results of binary logistic regression analysis in the male group of students (Table 2) indicated that only work activity was associated with sport activity. The greater

the work activity index, the higher the odds of being classified as more physically active in sports (OR = 2.22 [95% CI 1.25–3.93]; $\chi^2 = 8.11$; $df = 2$; $p = 0.02$).

Logistic regression analysis in female group of students revealed (Table 2) that both greater work and leisure-time activity indexes were associated with greater sport activity (OR = 2.14 [95% CI, 1.50–3.04] and 1.65 [95% CI 1.22–2.21] respectively; $\chi^2 = 32.27$; $df = 2$; $p < 0.001$).

DISCUSSION

By the current research we tried to identify the impact of occupational and leisure-time activities for students' participating in sports activities. It was proposed that lower work and leisure-time activity of university students would be associated with their higher sports related activity. Analysis of the predicting factors of higher sports-related activity did not confirm our expectations. The results of the current study revealed that lower physical activity in occupational or leisure-time domains did not determine higher sports related physical activity. On the contrary, male and female students who were more active in their occupational area, were also twice more active in sports-related activities. Higher leisure-time activity was associated with higher sports related activity in females, but it was associated in males. P. C. Rouse and S. J. H. Biddle (2010) revealed in their research that leisure-time activities related to sedentary technology, which includes TV watching and computer gaming, was associated with higher physical activity in male, but not female students, but this relation was slight. So, the authors concluded that these slight relationships suggest that technological sedentary behaviours and physical activity do not compete significantly for time and can coexist as part of a student's lifestyle (Rouse, Biddle, 2010). But research in older population produces different results. Our results contradict to the results obtained in the USA and Brasil, where authors did not find any relationship between work and sports activities in working age adults (Marquez et al., 2010; Rombaldi et al., 2010). But K. R. Evenson and colleagues (2003) revealed that those middle-aged adults with the highest occupational activity had lower participation in any sports than those with lower occupational activity across gender groups.

The results of the current study also provide important evidence that occupation of most students is predominantly related with sitting. Though, that is not surprising, because the main occupation of students is supposed to be studying, which is in turn associated with sitting. In the study in England, P. C. Rouse and S. J. H. Biddle (2010) also revealed that studying was the predominant sedentary activity among students followed by the sedentary technology (Rouse, Biddle, 2010). But in our study only one fifth of students, both males and females, sat at the computer or watched TV in their leisure-time. Furthermore, nine out of ten male students and more than a half of female students reported exercising or participating in sports regularly. Significantly more male than female students are physically active. The latter finding was expected and was already confirmed in Lithuania (Puišienė et al., 2008) as well as in many other countries (Irwin, 2004; Seo et al., 2009).

There is a lack of research about physical activity differences between universities in Lithuania. Our study add some evidence revealing that students form LAPE were more active at sports than other students who participated in this study. Also they were among the most active ones at work. The results obtained are not surprising because physical activity is an integrated part of studies at LAPE.

CONCLUSIONS AND PERSPECTIVES

So, on the basis of the current research we can conclude that students, especially females, if they were physically active, they were active in all domains of life, and vice versa. We suggest that sports-related activity and physical activity in other domains can coexist together in the population of students and possibly depend on variables which were not studied in this research and which influence all of them. In further research, the broader set of variables, possibly predicting university students' habitual physical activity, should be taken into account.

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LIETUVOS AUKŠTŲJŲ MOKYKLŲ STUDENTŲ FIZINIO AKTYVUMO SPORTUOJANT, DIRBANT IR LAISVALAIKIU SĄSAJOS

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SANTRAUKA

Tyrimo pagrindimas ir hipotezė. Su sportu nesusijęs fizinis aktyvumas dirbant, laisvalaikiu ir buityje dažnai yra nepakankamai įvertinamas kaip sveikatą veikiantis veiksnys. Kita vertus, ankstesni tyrimai atskleidė, kad energija, išseikvota dirbant ir laisvalaikiu, siejasi su energijos išseikvojimu sportuojant ir mankštinantis. Visgi studentai yra ypač mažai šiuo atžvilgiu analizuota grupė. Tikėjomės, kad mažesnis fizinis aktyvumas dirbant ir laisvalaikiu siesis su didesniu aktyvumu sportuojant.

Tikslas: nustatyti aukštųjų mokyklų studentų fizinio aktyvumo sportuojant, dirbant ir laisvalaikiu sąsajas.

Metodai. Galutinę tyrimo imtį sudarė 867 Lietuvos aukštųjų mokyklų studentai, 195 (22,5%) iš jų buvo vyrai. Amžiaus ribos – 18–22 metai. *Baecke* kasdienio fizinio aktyvumo klausimynas (*Baecke Questionnaire of Habitual Activity* – Baecke et al., 1982) buvo naudojamas įvertinant fizinį aktyvumą studentams sportuojant, dirbant ir laisvalaikiu.

Rezultatai. Vaikinų fizinis aktyvumas dirbant ir sportuojant buvo didesnis nei merginų ($p < 0,0001$), bet aktyvumas laisvalaikiu vaikinų ir merginų grupėse nesiskyrė ($p = 0,61$). Vaikinai, kaip ir merginos, kurių aktyvumas dirbant buvo didesnis, du kartus dažniau buvo aktyvūs sportuodami nei tie studentai, kurių aktyvumas dirbant buvo mažesnis (šansų santykis (ŠS) = 2,22 [95% PI 1,25–3,93] ir ŠS = 2,14 [95% PI, 1,50–3,04] atitinkamai). Merginų, kurių aktyvumas laisvalaikiu buvo didesnis, beveik du kartus dažniau buvo aktyvios ir sportuodamos nei tos merginos, kurių aktyvumas laisvalaikiu buvo mažesnis (ŠS = 1,65 [95% PI 1,22–2,21]).

Aptarimas ir išvados. Fizinio aktyvumo sportuojant, dirbant ir laisvalaikiu sąsajų analizė nepatvirtino mūsų prielaidų. Šio tyrimo rezultatai leidžia teigti, kad mažesnis fizinis aktyvumas dirbant ir laisvalaikiu nelemia didesnio fizinio aktyvumo sportuojant tikimybės. Taigi fizinis aktyvumas sportuojant ir aktyvumas kitose gyvenimo srityse dera tarpusavyje ir, tikėtina, priklauso nuo neįtrauktų į šį tyrimą veiksnių, kurie gali veikti visas šias sritis kartu. Tolesnių tyrimų metu norint iširti didesnę studentų kasdienį fizinį aktyvumą lemiančius veiksnius, reikėtų apimti platesnį šių veiksnių spektrą.

Raktažodžiai: kasdienis fizinis aktyvumas, fizinio aktyvumo sritys, universiteto studentų veikla.

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