

Thematic Article

Physical Activity and Workplace Stress: Influences on Health Perception Among Academics in Central and Eastern Europe

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Abstract

Several studies have drawn attention to the unhealthy lifestyles of academic staff (lack of physical activity, unhealthy diet, high levels of stress, etc.). However, few studies have addressed the physical activity (PA) of academics, the problem of inactivity as compared to the average population or university students. Our study aims to determine the role of PA and participation in university sports, as well as other health behaviours and sources and resources of stress at work, on the self-assessed health (SAH) status of academics in five Central and Eastern European countries (Hungary, Ukraine, Slovakia, Serbia and Romania). To answer our research question, we used the database of our international survey (CEETHE 2023, N=821). According to our results, SAH is mainly and positively influenced by PA and health-conscious eating, as well as work engagement, and negatively correlated with age, burnout, work-life conflicts and workplace bullying as work stressors. Based on our findings, workplace interventions including sports and time management programmes are recommended for universities, and a safe working environment is essential to improve academics' subjective health status.

Keywords: self-assessed health; physical activity; workplace stress sources and resources; academics

Introduction

Universities as workplaces are dynamic and intellectually stimulating environments. They are characterized by research and teaching autonomy, but often accompanied by high demands for productivity, including publishing, securing funding, and administrative duties. The environment fosters collaboration and innovation, but can also involve job insecurity, heavy workloads, and significant pressure to balance competing responsibilities. Academics may have unhealthy lifestyles due to high workloads, prolonged sedentary behavior, and stress (Hammoudi Halat et al., 2023; Naidoo-Chetty & du Plessis, 2021). Irregular schedules, pressure to publish, and limited time for self-care can also lead to poor eating habits, lack of exercise, and sleep deprivation, impacting their overall health (Iyaji et al., 2020; Omolawon et al., 2011).

Several studies draw attention to the unhealthy lifestyle of teachers, employees (inactivity, unhealthy diet, high stress, burn outetc.) (Alves et al., 2019; Iyaji et al., 2020; Wettstein et al., 2021). Still, only few studies (Dreyer et al., 2012; Ngalagou et al., 2019) deal with physical activity (PA) of academics. While they are more likely to be familiar with PA's importance and its beneficial effects on various dimensions of health, especially those who work and do research in this field, this knowledge is not always followed by practice (Kwiecień-Jaguś et al., 2021).

Our study aims to reveal the role of PA and participation in university sport opportunities, as well as other health behaviours, and workplace stress sources and resources on the self-assessed health (SAH) status of

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academics in five Central and Eastern European (CEE) countries (Hungary, Ukraine, Slovakia, Serbia and Romania). Our main questions are: How can PA and university sport activities affect the health status of academics? What associations can be found with other health behaviours (smoking, alcohol consumption and health-conscious eating)? What relationships can be found between workplace stress sources and resources on the health status? One of the novelties of our research is that we also focus on institutional sport activities as an influencing factor of health status to find out how sport opportunities provided by higher education institutions can contribute to better health for their staff. The role of PA at the individual level is also examined, as well as stress factors and job resources, which also have a strong impact on the health status of academic staff.

In our paper the academics' self-assessed (as well as self-perceived and self-rated) health status is examined, which is nothing more than a single-item health measure in which individuals rate the current status of their own health from poor to excellent, which is consistent with objective health status and can serve as a global measure of health status in the general population (Wu et al., 2013). According to World Health Organization (WHO, 2023) stress is a state of worry or mental tension caused by a difficult situation. Stress is a natural human response that helps us to address challenges and threats in our lives. A small amount of stress is good and can help us perform daily activities. Too much stress can cause physical and mental health problems. Two popular maladaptive mechanisms for coping with stress are smoking and alcohol abuse. Smoking, in particular, is one of the leading contributors to early mortality, causing approximately 8 million deaths worldwide in 2019. While smoking may temporarily reduce stress levels, the cyclical nature of nicotine addiction ultimately leads to higher overall stress levels in smokers compared to non-smokers. Furthermore, smoking cessation has been associated with significant reductions in stress, anxiety, and depression (Huddleston et al., 2022; Perski et al., 2022). Alcohol abuse is also a negative coping mechanism when increased stress, anxiety or sadness felt, like during the COVID-19 pandemic (Kosendiak et al., 2022). For sustainable stress management, integrating healthy habits like physical activity/exercise, structured stress-reduction programs (e.g. mindfulness), and counseling has been recommended as alternatives to smoking and drinking (Huddleston et al., 2022).

The definition of Physical Activity by Caspersen et al. (1985, p. 126) is: 'any bodily movement produced by skeletal muscles'. Previous research result also show that physical activity is effective for reducing mild-to-moderate symptoms of depression, anxiety and psychological distress, while inactivity is an ever-present global risk factor in mortality and morbidity (Kettle et al., 2022; Singh et al., 2023). According to the results of Marconcin et al.'s (2022) systematic review on the role of PA on mental health during the pandemic higher PA is associated with higher well-being, quality of life as well as lower depressive symptoms, anxiety, and stress, independently of age. Despite this, being physically active during the pandemic has been challenging, and the spillover from that health crisis is still influencing PA behaviours to some extent (Micheline et al., 2021; 2024). Based on the above research findings, our study examines the role of individual and institutional forms of PA, alcohol consumption, smoking, and health-conscious nutrition in SAH, as well as in-workplace stress and resources.

Health-Behavior, Physical Activity Among the Academics

Regular PA is a classic recommendation of preventive health strategies (Micheline 2015, 2017, 2021) and it influences positively amongst other anxiety-related disorders and stress. Because of the broad applicability thereof, it can be considered a transdiagnostic approach to be effectively employed in the treatment of the aforementioned various anxiety disorders and is largely used in health strategies. In addition to health status, PA has a significant positive impact on an individual's overall wellbeing and function (Devita & Müller, 2020; Kinczel & Müller, 2023; Lengyel et al., 2019). In this context, it reduces the risk of cardiovascular disease and premature death and contributes to the development and maintenance of a healthy lifestyle (Kandola et al., 2018).

At the same time, numerous studies have highlighted the unhealthy conduct of academics, in particular inactivity, obesity and overweight, as well as unhealthy eating habits. Research conducted at a South African university came up with results about the health status of the academics: the majority of the respondents are overweight or obese, generally unhealthy, a great portion of them feel that they are under a lot of pressure, being exposed to a lot of stress at work, despite seeking opportunities that would support their health and well-being. 63% of women and 48% of men did less than the recommended 150 minutes of moderate-intensity exercise, so they can be characterized as being sedentary. Negative behavioral patterns can also be observed among them when it comes to nutrition: low fruit and vegetable intake and high consumption of sugary soft drinks. Overall,

the respondents hold that they are undervalued by their colleagues, they are undermotivated at work and dissatisfied with the management, the opportunities, and the wellness initiatives at their faculty (Koen et al., 2018).

In a comparative study, one fifth of Australian and only 18% of British academics participated in at least 150 minutes of moderate-intensity PA, and a similar proportion did at least 90 minutes of more vigorous exercise. The vast majority of them (77.4% of the Australians, 88.2% of the British) did not participate in the health-oriented programs and events organized by their university. In both countries, approximately 10% indicated that their institution does not even provide such opportunities (Fetherston et al., 2021). At the same time, we are well aware that an organization has to provide its employees with access to wellness programs that encourage them to participate. Behavioral changes brought about as a result of these programs can be useful for the development of institutional culture, reduce absenteeism, medical expenses, and contribute to the well-being of the employees (Koen et al., 2018).

In a Nigerian study, it was found that though physical activities and recreation are positively correlated with quality of life, academics do not take advantage of the sports facilities and infrastructure provided by their institution, the majority of respondents rather spending their free time with passive activities, mostly due to work requirements (Omolawon et al., 2011). However, the study does not reveal what is meant by work requirements and how this was measured.

The effects of stress sources and PA on the health of academics

A heavy workload, lack of clarity of institutional roles, lack of managerial support, interpersonal and work-family conflicts, conflicts of roles, and low student motivation are all sources of job stress that negatively affect employees' well-being, job satisfaction and performance (Anastasiou & Papakonstantinou, 2014; Bell et al., 2012; Fetherston et al., 2021; Iyaji et al., 2020; Kinman et al., 2006), and may have high follow-up health costs as well (Wettstein et al., 2021). Though physiological and psychological stress are important predictors of job performance (Ismail et al., 2015), it should be noted that some forms of stress - if managed and prevented - increase performance. Ultimately, the type of stress is more a determinant than the level of stress (Usoro & Etuk, 2016).

Our previous results show emotional exhaustion at work, work-life conflicts and high workload are considered negative predictors, while engagement in work and the management support as positive predictors of wellbeing. The stress pertaining to performance evaluation and diversity in teacher role also affect wellbeing indirectly (Kovács et al., 2024a). Along with the aforementioned factors, job insecurity and bullying at work reduce the well-being of the examined university teachers as well (Kovács et al., 2024b).

Among Cameroonian academics, a positive correlation was found between inactive lifestyles and burnout, while the opposite, i.e. a physically active lifestyle, especially participation in sports, functions as a protective factor against numerous diseases (cardiovascular diseases, diabetes, obesity, cancer, metabolic syndrome, stress, depression, aging, dementia, etc.) (Ngalagou et al., 2019). According to Dreyer et al. (2012), teachers participating in a 10-week, high-intensity exercise intervention improved their physiological, psychological, morphological and blood biochemistry profiles. In addition, participation in the program also decreased their emotional exhaustion.

According to our previous research results moderate and high PA directly play a preventive role not in burnout itself, but in overcoming the stress sources that lead to burnout. Moderate PA reduces stress caused by diversity of teacher roles, as well as high PA, on top of that lowering work-private life conflicts and high workload stresses, which are strongly tied to exhaustion, work engagement and wellbeing (Kovács et al., 2024a). The use of institutional sports infrastructure added to performance, while none of the factors had a direct relationship with well-being. However, institutional recreation, especially community-building activities, helps curtail stress at work and discover (untapped) resources. They cut down on stress caused by multitude of teacher responsibilities, protect against stress from harassment at work, from emotional exhaustion, while strengthening social relationships (Kovács et al., 2024b).

Based on the above researches we formulated the following hypotheses on what can increase SAH:

- H1: Being younger men, working in higher, non-managerial positions and having a doctorate contribute to SAH.
- H2: Regular physical activity, use of institutional sports infrastructure and participation in sports events increase SAH.
- H3: A healthy diet, being engaged at work and having resources available at work increase SAH, while smoking, consuming alcohol, experiencing burnout and workplace stress sources decrease SAH.

Methodology

Data collection and sample

We examined the higher education establishments of two disadvantaged regions in Hungary: the Northern Great Plains Region (the University of Debrecen, the Debrecen Reformed Theological University, and the University of Nyíregyháza), and the Southern Transdanubia Region (the University of Pécs). When examining cross-border institutions, we targeted minority Hungarian institutions. The examined universities were: the University of Novi Sad in Serbia, the J. Selye University and the University of Presov and the University of Trnava in Slovakia, the Partium Christian University, the Oradea State University, the Emanuel University, the Sapientia Hungarian University of Transylvania, and the Babeş-Bolyai University and their satellite branches in Romania, the Ferenc Rákóczi II Transcarpathian Hungarian College and Uzhhorod National University in Ukraine. Though we examined Hungarian minority institutions, we still sent out the survey in the language of the majority population. Teachers from these regions filled out the survey, even those working in institutions from inner Ukraine ($n=62$). Regarding the latter, most of the respondents in the Ukrainian subsample live and work in the Transcarpathian region, though several teachers from the other regions of Ukraine moved because of the war. If they were excluded from the sample, the Ukrainian sub-sample would be reduced by half. Based on their answers, we could collect a lot of valuable information about the special situation of university teachers' work during the war. It has a significant impact on their working conditions and wellbeing, which is the most important question in our research. We therefore decided to keep the respondents from inside Ukraine in the survey for further analysis.

To reach representativity we strove for a 10% sample for each institution devoid of faculties, and for each faculty in larger universities. We reached much larger samples with the smaller universities and colleges, where fewer than 100 were employed. In the interest of reaching representative sample, where we had opportunity and permission, we sent the survey on two or three occasions through the institutions' registrar or correspondence offices. If the number of teachers per department and the total teacher number on campus was known, we compared the data to the ratio of respondents from the given institutions and faculties. Following this, we sent the letter of request only to the places where the level of teachers was less than 10%. Exempt from this are the non-Transcarpathian Ukrainian institutions, which are more difficult to reach due to the current conflict, their operation being in many cases challenging and unsure. Likewise, the number of teachers and the nature of their work are hard to ascertain, since there are some who have fled their homes to save their lives (mainly to Transcarpathia), some even leaving the country to do so. Thus, the Hungarian sample is representative per faculty, while the sub-samples from other countries are mainly representative of Hungarian minorities and the majority teachers working with them, mostly in the same institution. In total, 853 filled out the survey and following data cleansing, that number dwindled to 821. We coined the database, Central and Eastern European Teachers in Higher Education (CEETHE 2023).

The average age of the respondents was 46 ($SD=10.71$), and the average amount of years worked in higher education was 17 ($SD=11$) years. The questionnaire listed various teaching tasks, asking respondents to rate their perceived responsibility for each on a 4-point Likert scale. The tasks included managerial and administrative duties, supporting talented students, professional teaching, course development, academic research, collaboration with colleagues, publication, and senior positions. Factor and cluster analyses of the responses identified four academic types: classical teachers, organiser teachers, researcher teachers, and leader teachers. All the important demographic background and work-related characteristics of the sample are summarized in Table1.

Table 1. Demographic background and work-related characteristics of the sample.

Variable	Value	Percentage	N
Country	Hungary	62.8	514
	Ukraine	14.1	115
	Romania	13.8	113
	Serbia	4.9	40
	Slovakia	4.4	30
Gender	male	43.7	351
	female	56.3	452
Age	<29	5.4	43
	30-39	24.2	193
	40-49	35.2	280
	50-59	23.2	185
	60-69	10.3	82
	>70	1.6	13
Academic degree	I do not have	21.1	173
	PhD/DLA	44.6	365
	Candidate of Science (CSc)	5.7	47
	habilitated doctor	17.1	140
	Doctor of Science (DSc)	11.4	93
Discipline	humanities and arts	32.4	264
	STEM and agriculture	23.1	188
	medicine, health and sport	27.9	227
	society and economy	16.7	136
Job title	Senior lecturer or lower	58.8	483
	Associate professor or higher	41.2	338
Leader position	no	69.3	569
	yes	30.7	252
Types of teachers	Organiser teachers	19.7	162
	Classical teachers	33.4	274
	Leader teachers	26.6	218
	Researcher teachers	20.3	167

Source: CEETHE 2023

Measurements and variables

Self-assessment health status was measured by asking respondents to rate how healthy they felt on a scale of 1 to 5 (1 very bad, 5 very good). In our study, to calculate physical activity, the IPAQ scale was employed, which measures in a multifaceted fashion the intensive and moderate physical activities done weekly and measure daily to the minute, while also taking into account time sitting (for rest). In comparing these, the amount of daily physical activity during an average week can be predicted, and the respondents are able to be divided up into low (less than 150 minutes of moderate or 75 minutes of intensive physical activity weekly), moderate, and high physical activity groups (Craig et al., 2003).

Based on Kinman et al.'s work (2006), we checked the workplace stress- and resources, as well as its perceptions (16 items, Chronbach $\alpha=.869$ Maximum likelihood method, Varimax rotation, KMO=.856, $p=000$, explained variance=53.045%). Using factor analysis, three stress sources and one resource were identified³: workload, performance evaluation, and the diversity of teacher roles as stress sources, as well as management support as a resource. These factors were complemented by the following resources (Malik et al., 2017): good working conditions (5-item, Chronbach $\alpha=.739$, KMO=.753, $p=000$, explained variance 50.510%), peer support (4-item, Chronbach $\alpha=.867$, KMO=.827, $p=000$, explained variance 71.610%), and development opportunities (5-item, Chronbach $\alpha=.832$, KMO=.808, $p=000$, explained variance 60.101%). Beside this, further factors influencing work performance and wellbeing were inspected, which also could serve as stress- and resources. We also examined the dimensions of work and private life conflicts according to Hayman (2005), when work disturbs private life (6 items Chronbach $\alpha=.948$, KMO=.905, $p=000$, explained variance 79.545%). Workplace bullying was measured using the Malik et al. (2017) completed scale (7 items, Chronbach $\alpha=.873$, KMO=.890, $p=000$, explained variance 59.590%).

From among the factors influencing health, we peered into the realm of emotional exhaustion at work (5 items Chronbach $\alpha=.911$, KMO=.852, $p=000$, explained variance 73.894%), and into the engagement toward

³ The factors were created by the authors, the original scale was not divided into factors or subscales.

work with Utrecht work engagement-9 scales (9 items, Chronbach α =.931, KMO=.900, $p=0.000$, explained variance 65.441%) (Han et al., 2020).

The demographic background variables we viewed are age, gender, and country of origin; among the work characteristics those variables are academic degree, workplace position, leader position, academic field of expertise. Our analyses were done through the SPSS22 program, we used the crosstab analysis, Kruskal-Wallis test, and linear regression, and checked the normality with the Kolgomorov-Smirnov test.

Results

The background of health-behaviour among academics

Considering this, 30.6% of respondents belong to the high activity group, 32.6% to the moderate, and 36.8% to the low activity group. The survey also measured how often academics used the university sports infrastructure and participated in sports and leisure programmes organised by their institution. 75% of respondents never use the university sports infrastructure, 12.1% use it once or twice a year, almost 7% utilize it at least monthly, 6% access it at least weekly. 69.6% never participated in a sports programme organised by their institution, 25.7% participated one or two times a year, 36.3% participated in a physical, mental and spiritual recreational programme organised by their institution once or twice a year, 6.3% did so at least once a month and 56.3% never. 78.9% do not smoke, 8.9% smoke occasionally and 11.3% smoke daily. 62.7% had never drunk large amounts of alcohol in the past year, 22.3% had drunk occasionally and 13.8% had drunk at least every one to two months. 30.6% of teachers said they sometimes eat healthily, 3.1% said they never eat healthily, 8.2% said they sometimes do not eat healthily and 58.2% said they tend to eat healthily.

We checked what differences exist in daily physical activity and in the groups formed according to physical activity – age, gender, teacher position, field of expertise, degree of education, and types. The results of the Kruskal-Wallis test revealed that habilitated doctors are the most active regarding daily physical activity (Mean rank= 464.42), followed by those without a degree (Mean rank=439.47), those with PhD/DLA and CSc degrees being equally active (Mean rank=387.45 and 388.55), and those with a DSc degree (Mean rank=368.16, Chi-square=16.798, $p=0.002$, $N=818$) being least active. Serbian and Slovakian teachers were the most active (Mean rank= 473.53 and 469.69), followed by Hungarians (Mean rank=423.51), who were trailed by the Ukrainians and Romanians taking the title of „the least active” (Mean rank= 358.85 and 355.47, Chi-square=18.340, $p=0.001$, $N=818$). We received weak connections in the physical activity groups by sex and country of origin (Cramer's $V=0.112$ and 0.155). The overrepresentation of men was high, while in the women's intermediately active group (36.2 and 36.5%), the ratio of men was much lower (37.9%). The 36.9% of men and 38.1% of women belonged to the inactive group (Chi-square=12.254, $p=0.002$, $N=803$). Among Serbian teachers, teachers with high rates of physical activity were overrepresented (47.5%), while those with moderate activity have a smaller ratio (17.5%). In the Ukrainian teacher group, the high activity persons are far fewer (22.6%), while in Slovakia the low activity teachers are more scarce (16.7%). These ratios characterized the majority of Romanians (44.2%) and the largest ratio of Hungarians (36%). Beyond these, we found no other significant connections with other variables.

Significant associations were found with four background variables on the use of sports infrastructure. In the youngest age groups (<29: 41.9%, 30-39: 30.1%) and in the 50-59 age group, the proportion of those who had used institutional sports infrastructure in the past year was overrepresented (30.8%) (Chi-square=30.840, $p<0.001$, $N=796$). 30.2% of men and only 20.4% of women used the facilities (Chi-square=10.309, $p<0.001$, $N=803$). Ukrainians are the most frequent users (30.4%), while Romanians are the least frequent users (12.4%) (Chi-square=12.184, $p=0.016$, $N=818$). Academics in managerial positions are significantly more likely to use the institutional sports infrastructure and to participate in sports and leisure programmes and events organised by their university (Table 2). Correspondingly, academics belonging to the leader teachers were most likely to use institutional infrastructure (33%), classical teachers were least likely (18.6%), and those belonging to the other two clusters were about $\frac{1}{4}$ as likely (23.5 and 25.1%) (Chi-square=13.729, $p=0.003$, $N=821$). No significant correlation with other variables was found in any of the activities.

Table 2. Proportion of leader and non-leader academics among participants in institutional sport and recreation activities (%; N=821)

		Not leader	Leader	Chi-square	p
Using university sports infrastructure	Never	<u>78.4</u>	68.3	9.628	0.002
	Used	21.6	<u>31.7</u>		
	Total	100	100		
Participation in university sports program	Never	<u>73.6</u>	61.5	12.217	<0,001
	was	26.4	<u>38.5</u>		
	Total	100	100		
Participation in university recreation program	Never	<u>61</u>	49.2	9.906	0.002
	was	39	<u>50.8</u>		
	Total	100	100		

Source: CEETHE 2023

*The underlined values indicate that the number of people in that cell of the table is much higher than would have been expected in the case of random ordering.

The proportion of regular smokers is highest among academics without a doctorate (15.7%), and occasional smokers (14%) are also over-represented among them. The proportion of non-smokers is highest among DSc graduates (91.9%) (Chi-square=19.990, $p=0.010$, $N=811$). The proportion of daily smokers is over-represented among those with a rank of Assistant Professor or lower (13.5%), of whom 10.2% smoke occasionally, while the proportion of never-smokers is over-represented among those with a rank of Associate Professor or higher (84.4%), of whom 11.4% smoke regularly (Chi-square=8.250, $p=0.016$, $N=814$). 26.7% of men consume large amounts of alcohol occasionally and 19.3% at least every 1-2 months, while 70.6% of women never do so and 19.6% occasionally (Chi-square=25.102, $p<0.001$, $N=793$). The proportion of occasional smokers and heavy drinkers is highest in the youngest age group, with an overrepresentation of heavy drinkers 30 to 39 years of age who smoke and drink heavily at least every 1 to 2 months. With increasing age, fewer people smoke and drink less heavily (Table 3).

No association was found for smoking with stress sources and resources at work. However, there were associations with heavy drinking: perceptions of institutional management support and job satisfaction were highest among those who had never binge drunk in the past year (mean=59.51±18.58 and 71.31±20.26) and lowest among those who had binge drunk at least every 1 to 2 months (54.91±19.77 and 66.86±18.85) (Kruskal Wallis $H=6.666$, $p=0.036$, $N=768$; Kruskal Wallis $H=7.577$, $p=0.023$, $N=783$). 26±23.9) and never drank the least (mean=44.36±25.92) (Kruskal Wallis $H=6.016$, $p=0.049$, $N=793$).

Table 3. Frequency of smoking and heavy drinking by age groups (%).

		<29	30-39	40-49	50-59	60-69	>70	Chi-square	p	N
Smoking	never	60.5	76.4	81.7	82.5	82.7	84.6	22.747	0.012	789
	occasionally	<u>25.6</u>	9.9	8.3	8.2	3.7	0			
	daily	14	13.6	10.1	9.3	13.6	15.4			
	Total	100	100	100	100	100	100			
Heavy alcohol consumption	never	34.9	57.1	65.2	69.4	70	84.6	35.566	<0.001	786
	occasionally	<u>44.2</u>	20.9	21.4	21.9	50	15.4			
	at least every 1-2 months	20.9	<u>22</u>	13.4	8.7	10	0			
	Total	100	100	100	100	100	100			

Sources: CEETHE 2023.

*The underlined values indicate that the number of people in that cell of the table is much higher than would have been expected in the case of random ordering.

Background of academics' self-assessed health status

11.4% of respondents do not feel healthy, 25.8% could not say, 45% feel rather healthy, 17.7% feel completely healthy. 41% have some chronic illness or health problem, and 31% find it difficult to work.

Slovak and Serbian teachers feel the healthiest, while Ukrainian teachers feel the least healthy. Those working in medical and health sciences and those with habilitated doctorates, PhD/DLA degrees rated their health the highest, while those with humanities, arts and CSc. degrees rated it the lowest. Health-conscious behaviour clearly contributes to higher health ratings: those who were most physically active, used the institutional sports infrastructure, participated in university sports events and paid attention to their diet rated

themselves significantly healthier. Work stressors and burnout decrease, while resources and job satisfaction increase subjective health ratings. Those who rate their health lowest are those who are emotionally exhausted at work, have experienced harassment at work and have below average work engagement, while those who have below average burnout, work-life conflict and above average institutional peer support rate their health highest (Table 4).

Table 4. Mean scores for SAH along work-related factors, health behaviours and workplace stress sources and resources (Means, SD).

		Mean	SD	Kruskal-Wallis/Mann-Whitney U	p	N
Country	HU	3.71	0.94	21.304	<0.001	799
	UA	3.26	1.01			
	RO	3.75	0.9			
	SB	3.78	1.03			
	SK	3.77	0.89			
field of science	humanities and arts	3.05	0.93	20.946	<0.001	796
	STEM and agriculture	3.62	0.9			
	medicine, health and sport	3.85	1.03			
	social and economic	3.68	0.89			
academic degree	None	3.69	0.88	10.444	0.034	799
	PhD/DLA	3.69	0.98			
	CSc	3.19	1.07			
	habilitated doctor	3.74	0.84			
	DS	3.56	1.05			
PA	High	3.92	0.93	37.491	<0.001	802
	Middle	3.66	0.93			
	Low	3.44	0.94			
Using university sports infrastructure	Never	3.59	0.97	51231	<0.001	802
	used	3.87	0.87			
Participation in university sports program	Never	3.56	0.99	55961.5	<0.001	802
	was	3.89	0.83			
Health conscious eating	No	3.11	1.06	53.1	<0.001	794
	both yes and no	3.52	0.89			
	yes	3.84	0.92			
Management support	Below the average	3.46	1.02	56829.5	<0.001	758
	Above the average	3.84	0.86			
Diversity of teacher roles	Below the average	3.9	0.86	53980.5	<0.001	758
	Above the average	3.45	0.99			
good working conditions	Below the average	3.42	1.02	59151	<0.001	790
	Above the average	3.87	0.84			
peer support	Below the average	3.42	1.03	56059.5	<0.001	776
	Above the average	3.87	0.83			
development opportunities	Below the average	3.45	1.02	27113.5	<0.001	756
	Above the average	3.83	0.82			
Workplace Bullying	Below the average	3.69	0.89	35825	<0.001	595
	Above the average	3.34	1.02			
Work-private life conflicts	Below the average	3.92	0.84	54302.5	<0.001	788
	Above the average	3.38	0.99			
Emotional exhaustion at work	Below the average	4.01	0.79	45162.5	<0.001	784
	Above the average	3.29	0.97			
Work engagement	Below the average	3.35	0.99	49532	<0.001	752
	Above the average	3.88	0.83			

Source: CEETHE 2023.

Multilevel linear regression was used to examine the role of demographic and job characteristics, health behaviours, and workplace stress sources and resources on SAH. The model is significant, with the included explanatory variables explaining 34% of the model. The values of VIF and tolerance in all three models showed no multicollinearity between the included variables. Subjective perceptions of health worsen with age ($\beta = -0.160$, $p < 0.001$, $CI[-0.022; -0.007]$) and are negatively influenced by emotional exhaustion ($\beta = -0.242$, $p < 0.001$, $CI[-0.013; -0.005]$), harassment at work ($\beta = -0.126$, $p = 0.002$, $CI[-0.013; -0.003]$), work-life conflict ($\beta = -0.157$,

$p=0.001$, $CI[-0.009;-0.002]$) and being Ukrainian ($\beta=-0.099$, $p=0.049$, $CI[-0.546;-0.001]$). Belonging to a high physical activity group ($\beta=0.080$, $p=0.039$, $CI[0.009;0.319]$), health-conscious eating ($\beta=0.146$, $p<0.001$, $CI[0.081;0.216]$) and work engagement ($\beta=0.139$, $p<0.001$, $CI[0.003;0.011]$) are positively associated with better subjective health (Table5).

Table 5. Predictors of SAH among academics in five CEE countries (regression indicators, $N=644$).

	Beta	t	sig.	Lower Bound	Upper Bound
Constant		8.940	<0.001	2.790	4.361
Gender	0.024	0.646	0.518	-0.093	0.184
Age	-0.160	-3.912	<0.001	-0.022	-0.007
Leader position	0.006	0.144	0.886	-0.145	0.168
Academic degree	0.005	0.137	0.891	-0.166	0.191
Job title	0.055	1.326	0.185	-0.051	0.264
Country: HU	0.045	0.783	0.434	-0.135	0.315
Country: UA	-0.099	-1.973	0.049	-0.546	-0.001
Country: RO	0.083	1.690	0.091	-0.038	0.502
Classical teacher	-0.005	-0.097	0.923	-0.194	0.176
Leader teacher	0.011	0.230	0.818	-0.181	0.230
Researcher teacher	-0.048	-1.071	0.285	-0.315	0.093
STEM and agriculture	0.017	0.395	0.693	-0.149	0.224
Medicine and health	0.077	1.756	0.080	-0.019	0.343
Social and economic	0.048	1.217	0.224	-0.075	0.319
High PA	0.080	2.074	0.039	0.009	0.319
Moderate PA	0.036	0.955	0.340	-0.077	0.223
Using university sports infrastructure	0.020	0.525	0.600	-0.121	0.209
Participation in university sports program	0.040	1.016	0.310	-0.078	0.246
Participation in university recreation program	-0.002	-0.043	0.966	-0.140	0.134
Smoking	0.024	0.688	0.492	-0.024	0.050
Heavy drinking	-0.009	-0.260	0.795	-0.076	0.059
Health conscious eating	0.146	4.312	<0.001	0.081	0.216
Management support	-0.014	-0.264	0.792	-0.006	0.004
Workload	0.013	0.385	0.700	-0.003	0.004
Diversity of teacher roles	0.007	0.175	0.861	-0.004	0.005
Performance evaluation	0.001	0.040	0.968	-0.004	0.004
Good working conditions	0.032	0.670	0.503	-0.003	0.005
Peer support	0.004	0.067	0.946	-0.004	0.005
development opportunities	0.025	0.400	0.689	-0.004	0.006
Workplace Bullying	-0.126	-3.129	0.002	-0.013	-0.003
Work-private life conflicts	-0.157	-3.258	0.001	-0.009	-0.002
Emotional exhaustion at work	-0.242	-40.931	<0.001	-0.013	-0.005
Work engagement	0.139	3.489	<0.001	0.003	0.011

Sources: CEETHE 2023.

*Reference values for dichotomous variables: male; no leader position; no academic degree; assistant professor or lower; Serbia and Slovakia; organiser teachers; humanities and arts; not using sport infrastructure; not participated in sport/recreation programs

Discussion

Our study examined the background and associations of self-rated health and health behaviours (PA, smoking, binge drinking, nutrition) with workplace stress and resources among academics in five CEE countries (Hungary, Slovakia, Serbia, Romania and Ukraine). Our main question was: which factors do influence self-assessed health? The results of our international survey ($N=821$) show that 62.7% of academics rate their health as good or very good, i.e. almost 40% do not, and about the same number suffer from a chronic disease. Similar proportions were reported by Fetherston and colleagues (2021): 56.7% of Australian academics and 60.2% of British academics reported that their health was good or very good.

In our first hypothesis, we expected better health among younger men, those with higher positions and those with a doctoral degree. Our hypothesis was partially confirmed, as we did not find significant differences by gender and age, but by country and discipline: those working in Serbia and in medicine, health and sport sciences, and those with a doctorate, rated their health as better. In terms of discipline, it is clear that academics who deal with health and the factors that influence it on a daily basis not only conduct research, but also consider

it important to incorporate their findings into their own lives. For them, maintaining good health is an important value and goal, which goes hand in hand with a better subjective perception of their health. Kwiecień-Jaguś and colleagues (2021) also found in their research that medical professionals have higher levels of physical activity than those in business or education. Although no significant differences were found between age groups, the presence or absence of a doctorate is associated with time spent in the field. Early career academics without a degree have a double burden: they have to learn how to teach effectively, do research, carry out administrative tasks, prepare more for teaching, find common ground with students, doing talent management, sometimes develop students or even provide emotional support, while at the same time studying for a doctorate, carrying out their own research and writing a dissertation. It is not only the work-life balance, but also the roles of teacher, researcher and doctoral student that need to be constantly juggled and effectively managed. These difficulties have been reported by young academics in the Czech Republic and France (Goncharuk & Cirella, 2022; Mudrak et al., 2018), and our previous interview research also found that young teachers find it difficult to cope with multiple roles, especially teaching, at the beginning of their careers. They often have the additional burden of studying for a PhD or writing a dissertation in addition to teaching, leaving little time for other academic work (Kovács et al., 2024c). It is therefore no coincidence that the youngest have the lowest levels of well-being and work engagement and the highest levels of emotional exhaustion at work, but with age the perception of stress decreases and resources increase (Kovács et al., 2024b). In addition, the need to pay more attention to the health of early career teachers is supported by our finding that they are the group with the highest number of occasional smokers and heavy drinkers. However, self-rated health is significantly negatively affected by age when all explanatory variables are included in a model, because of the age-related decline in health, particularly physical health, and the increasing prevalence of disease.

Our second hypothesis was that there would be a positive association between individual physical activity and the sports and recreational opportunities provided by the university and the SAH. Our hypothesis was confirmed, as more physically active academics who used the sports infrastructure of their institution and participated in sports events at least once rated their health as better, and belonging to a group with a high level of physical activity positively influenced SAH, independently of all other variables involved. Much previous research has shown that regular physical activity is essential for maintaining health, preventing obesity and many diseases (cardiovascular disease, osteoporosis, type II diabetes, etc.), and contributing positively to psychological and mental well-being, protecting against depression and other mental illnesses (Holtermann et al., 2013; Kim et al., 2012; Kwiecień-Jaguś et al., 2021; Singh et al., 2023). One of the main findings of our research is that we have shown that sports opportunities provided by higher education institutions are positively correlated with self-perceptions of health. However, it is important to note that the proportion of academics who do not meet the WHO recommendation of 150 minutes of moderate-intensity physical activity per week is high (36.8%), and there are significant differences between countries and genders in this, similar to the studies by Fetherston et al. (2021) and Koen et al. (2018). In line with these studies, a very low proportion of teachers used their university's sports infrastructure in the past year (75%) and participated in a sports event organised by their institution (69.6%), 56.3% never participated in an institutional leisure programme for physical and mental recharge. Importantly, we find that physical activity contributes directly to academics' well-being (Kovács et al., 2024a) and health, not only directly, but also by reducing certain sources of stress, such as work-life conflict or the diversity of teacher roles.

In our final hypothesis, we supposed that smoking, heavy alcohol consumption, sources of work stress and emotional exhaustion would negatively influence SAH, whereas health-conscious eating, work engagement and work resources would positively influence SAH. Our hypothesis was partially confirmed, as we found no significant association with smoking and alcohol consumption, while work engagement, health-conscious eating were positively associated, while work-life conflict, burnout and workplace harassment, if the respondent is Ukrainian, were negatively associated. Work-life balance conflict occurs when an individual is unable to draw a line between work and family life, which in turn reduces the individual's motivation and satisfaction in both areas. When academic staff feel overwhelmed, irritable, distracted and out of control at work, they experience lower levels of well-being and balance and more conflict between their personal life and work (Bell et al. 2012), which can lead to burnout and poorer mental and psychological health (Fetherston et al., 2012). Bullying is the most damaging manifestation that can occur in the workplace, as it results in constant negative interactions with others, carries a myriad of psychosocial risks (Malik et al., 2017), and has serious adverse health effects as each day at work brings more and more insults.

In higher education and its changing environment, there are many workplaces demands and stressors, such as publication pressure, role ambiguity, excessive or uneven workload, lack of feedback or peer support, etc.,

that place a heavy psychological and emotional burden on academics and lead to burnout (Converso et al., 2019; Han et al., 2020; Naidoo-Chetty & du Plessis, 2021). If these pressures are such that the lecturer feels emotionally exhausted and tired, and perceives their work as meaningless and hopeless, this will also have a negative impact on their subjective health. Iyaji et al (2020) also found in their research that clarity of work roles significantly affects the health of academics, as manifested in depression, aggression, impatience, withdrawal and procrastination. However, if academics enjoy their work, feel fulfilled in it and enjoy new tasks and challenges at work, this contributes to feeling healthier or more satisfied with their work (Han et al., 2020). This, and the positive role of PA and mindful eating, underpins a holistic approach to health: taking care of our physical and mental health, living and working in a way that recharges and nourishes us physically and mentally will make us feel healthier, regardless of age, gender, location, job title and sources of work stress. However, this holistic approach also applies to negative factors: the war situation in Ukraine and its impact on everyday life (fear of conscription, families torn apart, the need to buy certain products, price increases, power cuts, etc.) are psychological and emotional burdens that can also be reflected in self-perceptions of health.

In our study, we presented the results of a survey of academics in a specific region (CEE) of five countries and identified the main demographic, work-related factors, health behaviours, sources of stress at work and resources that play a role in self-rated health, but also have limitations. It was not possible to obtain a representative sample from all institutions, and two countries have a very low number of items in our sample, so our results are limited and cannot be generalised to the countries studied, but only to the academics in the institutions where a representative sample was collected. However, studies on the teaching profession, especially in this region, are very rare and our results will certainly contribute to the scientific discourse and to the preparation of policy decisions.

Conclusions

The results of our study indicate that a significant proportion of academics in the CEE region surveyed do not feel (very) healthy, suffer from chronic diseases, are physically inactive and are characterised by poor dietary habits and health-damaging behaviours. To change this, it is important to introduce and implement targeted prevention programmes in the higher education institutions surveyed, with a strong emphasis on community physical activity, effective stress management methods, and family-friendly and safe workplaces. Particular attention should be paid to mentoring and socialising of early career teachers to help them balance the different teaching roles and the demands of their doctoral research, and to support them professionally, psychologically, emotionally and mentally.

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