ILDIKÓ BALATONI – ADAMU UMAR GAMBO

Impact of inflation on sports consumption: A study on fitness facilities

Abstract

Fitness centers, as micro and small enterprises, are important to the economic development of a country and the health of its citizens. However, the small size of most fitness centers makes their existence precarious. This study aims to assess the impact of inflation on fitness centers. The researchers chose Debrecen, a community in Hungary with a considerable fitness sector, as the center of their investigation. Telephone interviews using structured questionnaires were conducted among all twenty fitness centers operating in Debrecen. Answers were analyzed using descriptive statistical methods. Most respondents indicated that the price of their services had increased due to energy costs. One-third believed these increases negatively affected members' physical activity (PA). In contrast, two-thirds indicated that customers were willing to accept the price increase. Despite rising costs, workforce reductions seldom occurred. Instead, fitness centers were modernized to maintain attendance and reduce energy costs, and became increasingly active online, mainly through social media. It is concluded that price increases did not significantly affect physical activity participation.

Keywords: inflation; fitness centers; turnover; physical activity; health

JEL: I15

INTRODUCTION

Physical activity is an essential part of a healthy lifestyle. Everyday exercise helps to cope with stress, prevent chronic illnesses, and (if done publicly or in a group) promote mental well-being through social interactions (Vaquero-Abellan et al., 2022). Several of our previous studies conducted before the COVID-19 pandemic found that a higher proportion of adolescents take part in regular physical activity in Debrecen and the surrounding region than the national average (Balatoni et al., 2019; Kosztin–Balatoni, 2021). Many students attend fitness classes, thanks to the significant development of sports infrastructure in the last decade, both by the city government and the University of Debrecen. The COVID-19 epidemic had a deleterious effect on Hungary, just as it did the rest of the world, resulting in people becoming isolated. People's sporting opportunities were restricted; thus, their physical activity decreased, and attendance at sports facilities dropped significantly. This decrease in exercise and fitness harmed people's physical and mental health worldwide (Puccinelli et al., 2021).

Before Hungary had recovered from the COVID-19 epidemic, the Russo-Ukrainian War began. One of the consequences of the War and the subsequent sanctions and

restrictions was the rise in energy prices in Europe, including Hungary (Adolfsen et al., 2022). Energy cost increases and the resultant inflationary trends significantly impacted the country's economy and the viability of small and medium-sized enterprises. Inflation, primarily believed to be the result of the War, significantly influences how people live in Hungary.

With this in mind, our research aims to assess the impact of gas and electricity price increases on the operation of fitness facilities in Debrecen. Our study seeks to determine whether energy-related inflation leads to significant price increases for fitness services, decreased physical activity by fitness center members, staff downsizing, and attendance.

According to our hypothesis, companies should have retained the benefits of digitization during the COVID-19 epidemic. They tried to compensate for the increase in overhead costs in 2020 by modernizing heating and lighting that rationalized energy use and by increasing the price of entrance fees. According to our assumption, the increase in ticket prices should have resulted in a decrease in the number of fitness club members, i.e., a decrease in attendance.

In our study, after a literature review on the connection between physical activity and health status, we present how fitness centers were affected by the recent economic changes. In the conclusion section, we draw attention to the fact that economic austerity has also posed serious challenges for operators of sports facilities and that government support for these businesses should be made available as needed in similar situations to promote the population's health.

1. LITERATURE REVIEW

Inactivity, a widespread hazard of our time, is one of the most significant risk factors for ill health. It is also a leading cause of death, together with smoking, obesity, and hypertension. According to WHO data, the number of obese people tripled between 1975 and 2016, and in 2016, 39% of the world's population aged 18 and over was overweight or obese (WHO, 2021). In Hungary, the proportion of overweight and obese people is 58.2% (KSH, 2019a). To make matters worse, the proportion of people in Hungary who were sedentary at work increased from 36% to 40% between 2014 and 2019 (KSH, 2019b). Obesity and a lack of physical exercise are strongly linked. Research shows that the harmful effects of a sedentary lifestyle can only be counterbalanced by regular active exercise (Thivel et al., 2018; Varga Szépné et al., 2019; Liu et al., 2023).

The relation of physical activity (PA) to health and mental well-being is an ongoing topic of discussion. Their connection is continuously investigated, with recent research findings that active and healthy lifestyles and a good diet help maintain physical health and mental stability (Mathisen et al., 2023; Seefeldt et al., 2002). People who engage in routine PA are overwhelmingly happier than those who do not and have improved self-esteem, focus, and levels of optimism (Appelqvist-Schmidlechner et al., 2023). Physical activity builds confidence and is described as a therapeutic process that impacts individual health and well-being in complex ways (Williams et al., 2023). Yoga has been determined to be an effective treatment for people with dementia, and in the elderly, physical

fitness has been found to improve their cognitive functioning and mental health (Galle et al., 2023; Karamacoska et al., 2023). Managing lifestyle activities, including physical fitness, was found to be a first-line treatment for menstrual irregularity and infertility (Cowan et al., 2023). In a different study on adult lifestyle, researchers found frequent substance use, low diet quality, and low physical activity to have devastating effects on mental health (Collins et al., 2023).

Inversely, high physical activity level is correlated with appropriate diurnal cortisol levels, translating to better psychological functioning (MoyersHagger, 2023). Research confirms that regular fitness activity is a natural prescription for developing, regulating, and improving human health, including problems of depression, blood pressure, and anxiety (Nguyen et al., 2023). Similarly, another study found that exercise improves the quality of life and serves as a treatment enhancer for people with breast cancer (Natalucci et al., 2023). PA support programs help improve physical activity (Amatori et al., 2023; Braam et al., 2010). Individual income levels affect engagement in physical activity, an economic relationship that will be considered at greater length later in this research (Lakerveld et al., 2008; Lewanczyk et al., 2023).

Researchers have also found that the COVID-19 pandemic has not only caused significant harm to human health both through viral infection and worsening mental health outcomes not caused by the infection (Adamu–Balatoni, 2022; Flanagan et al., 2021; Laczkó et al., 2023). Authorities have forced people worldwide to stay at home, with restaurants, retail outlets, and other businesses in crowded places usually open to the public ordered to close. Regulations varied from country to country, but between March and June 2021, most fitness clubs were unavailable to the public. While the fitness market had been growing strongly in the decade before the COVID-19 epidemic, the epidemic threatened the existence of many gyms. Revenues fell significantly due to COVID-19 closures.

According to Deloitte (2021), while the number of fitness club members in Europe grew by an average of 4.7% per year between 2016 and 2019, the epidemic resulted in a 15.4% decline by 2020.

During the epidemic, most fitness chains moved towards digitalization in preparation for the future and to adapt to the circumstances of the times, looking for opportunities to increase revenue, so digital workout plans were created, online classes were held, and apps were developed to ensure online check-ins. As a result, the number of virtual users increased significantly in a matter of weeks by July 2020 (Deloitte 2021). At the same time, some of those who used to attend fitness classes have turned to outdoor workouts or bought home equipment (Rada–Szabó, 2022).

Following the pandemic, interest in fitness classes started to grow again. People crave fun workout experiences, and new technologies and artificial intelligence developments allow new fitness trends to emerge (Štajer et al., 2022). However, at the same time as the epidemic was winding down, Europe and thus Hungary faced a new threat – inflation – associated with the Russo-Ukrainian War.

Inflation is an overall increase in the price of services and commodities in an economy. In the case of War inflation, European Union and US sanctions on Russia in oil

and gas, fertilizer, banking, and other critical sectors were the primary drivers. Russia is the second largest oil producer in the world after Saudi Arabia. Before the sanctions, most European countries heavily depended on Russia's export of oil and gas to generate electricity and to provide heating (Chen et al., 2023).

The long-term economic effects caused by the War are too substantial for small businesses to overcome easily. Many energy companies across Europe have been forced to raise their prices, and this increase is passed on to consumers, who must pay more for goods and services from businesses of every size, particularly small and medium enterprises, which cannot easily absorb energy cost increases (Hungary Today, 2022). In the broader sense, the situation has exacerbated adverse outcomes in the European and global economies. The sensitivity of global trade to energy cost fluctuations has led to significant commodity price increases and delivery disruptions (Ihle et al., 2022). Increased commodity prices may further jeopardize the ability of individuals to participate in fitness programs as they struggle to meet their basic needs.

2. METHODOLOGY

Our cross-sectional survey study employed telephone interviews using a structured questionnaire in the first half of 2023. Our study targeted the operators and owners of gyms and fitness centers in Debrecen that use gas heating and electricity to power their machinery and provide services.

Debrecen is the second biggest Hungarian city after Budapest. It is in Hajdú-Bihar County, and the city has a total population of 203,914, with 52.05% women and 47.95% men. Children and adolescents (between 7 and 17 years old) account for 11.75% of the population. Young adults (those between 18 and 29 years old) account for 12.05% of the population. Adults between 30 and 59 years old account for 42.95%, and the elderly account for 18.8%. According to demographic data, the employment rate in Debrecen is 65.9%, with only a 4.1% unemployment rate (BDeex, 2023).

Our survey consisted of 26 questions addressing five dimensions: operational abilities, pricing, income and expenditure, and attendance.

A Google search using the terms *fitness/gym in Debrecen* found 39 fitness centers, gyms, and similar organizations. After careful identification, six companies were found to have closed prior to the commencement of the study. The remaining 33 organizations on the list were contacted by telephone; five were found not to be fitness businesses in their activities, and eight did not wish to participate in the survey. The twenty remaining currently operating fitness centers in Debrecen were included in the study. Our respondents were the owners or operators of these fitness centers and were contacted via telephone to obtain their opinions.

The completed questionnaires were processed using the EvaSys 8.2 software (VSL Inc., Szentendre, Hungary; http://www.vsl.hu). Descriptive statistical analysis was used to evaluate the data.

3. RESULTS

3.1. OPERATIONAL ABILITIES

Fitness centers were first bracketed into four categories – 1-3 years, 4-6 years, 7-10, or more than ten years of operation. Thirty percent of fitness centers reported having been in business more than ten years, 25% reported having been in business 4-6 years, 20% of fitness centers had been in business 1-3 years, an additional 20% of fitness center had been business 7-10, and a mere 5% had been in business less than one year.

The participating fitness centers offer a range of services to their clients, including group gymnastics, saunas, snack-bars, showers and changing rooms, spin classes, squash, and gyms. Showers and changing rooms were provided by 95% of surveyed facilities; gyms were offered by 90%, group gymnastics by 85%, snack-bars by 65%, and saunas and spin classes by 30%. Squash courts were the least common amenity, only offered by 15%, and no fitness offered access to a Jacuzzi (Table 1).

Table 1 Characteristics of the fitness centers

Fitness center code	Duration of operation	Services	Measures to reduce overhead costs	
			Short term	Long term
F1	7–10 years	Group gymnastics Gym Personal gymnastics Changing rooms/showers	Increase prices	None
F2	More than 10 years	Group gymnastics Gym Solarium Changing rooms/showers Snack bar	Increase prices	Renovation Heating and lighting upgrade
F3	Less than one year	Group gymnastics Gym Spinning Solarium Massage Sauna Changing rooms/showers Snack bar	None	Renovation Heating and lighting upgrade
F4	More than 10 years	Group gymnastics Gym Solarium Changing rooms/showers Snack bar	Increase prices Suspend certain services	Renovation Heating/lighting upgrade Downsize staff
F5	More than 10 years	Group gymnastics Personal gymnastics Changing rooms/showers	Decrease season-pass prices	None
F6	1–3 years	Group gymnastics Gym Changing rooms/showers Snack bar	Increase prices	Downsize staff

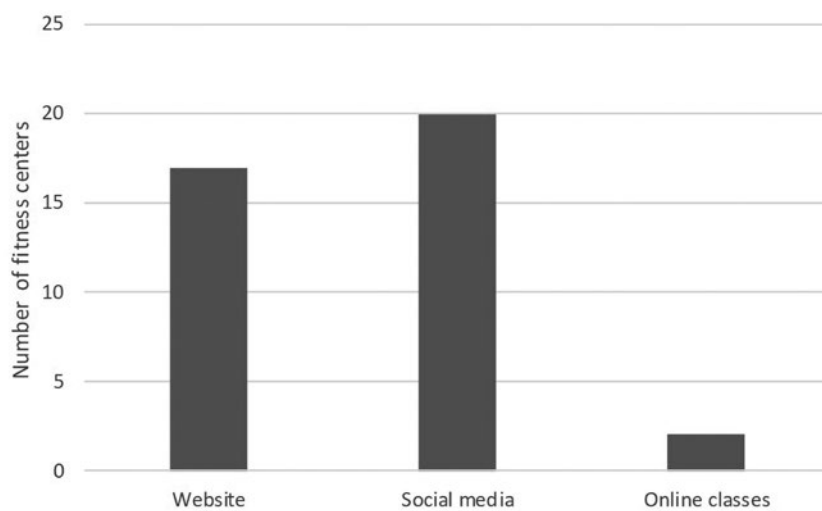
F7	7–10 years	Group gymnastics Gym Changing rooms/showers Snack bar	Increase prices	None
F8	4–6 years	Group gymnastics Gym Changing rooms/showers Spinning	Suspend certain services Reduced hours of operation	None
F9	4–6 years	Group gymnastics Gym Changing rooms/showers Snack bar	Increase prices	None
F10	4–6 years	Group gymnastics Gym Changing rooms/showers	None	Renovation Heating/lighting upgrade Downsize staff
F11	More than 10 years	Gym Changing rooms/showers Snack bar	Increase prices Suspend certain services	Renovation Heating/lighting upgrade Downsize staff
F12	7–10 years	Group gymnastics Gym Spinning Squash Personal gymnastics Sauna Changing rooms/showers Snack bar	Increase prices Suspend certain services	Renovation Heating/lighting upgrade
F13	More than 10 years	Group gymnastics Gym Spinning Sauna Changing rooms/showers Snack bar	Increase prices Reduced hours of operation	Renovation Heating/lighting upgrade
F14	More than 10 years	Group gymnastics Gym Sauna Changing rooms/showers Snack bar	Increase prices Reduced hours of operation	Renovation
F15	7–10 years	Group gymnastics Gym Changing rooms/showers Snack bar	Increase prices Suspend certain services	Renovation
F16	4–6 years	Group gymnastics Gym Spinning Squash Personal gymnastics Sauna Solarium Massage Indoor climbing Changing rooms/showers	Increase prices Decrease room temperature	Renovation

F17	1–3 years	Sauna Gym Changing rooms/showers Snack bar	Increase prices	Renovation
F18	4–6 years	Group gymnastics Gym Spinning Squash Changing rooms/showers Snack bar	Increase prices	None
F19	1–3 years	Group gymnastics Gym Changing rooms/showers	None	Renovation
F20	1–3 years	Personal gymnastics	None	Renovation

Source: Authors' questionnaire research

Timely technology adoption is crucial in today's business climate. Respondents were asked about their internet presence and use, and 85% indicated that their company had an operational website. Social media platforms are significant in our daily lives, and the level at which some organizations use them to increase their clientele base is worthy of examination. Generally, fitness centers seem eager to adopt social media as a marketing and business tool. One hundred percent of fitness centers reported having a social media presence on Facebook, WhatsApp, Instagram, or another platform to expand their organization's outreach. Figure 1 shows how many surveyed fitness centers use social media compared to other online resources.

Figure 1 Online presence of the fitness centers (website, social media, online classes)



Source: Authors' questionnaire research

Social media presence does not indicate fully embracing the internet as a business tool during COVID-19. To evaluate how these centers responded to COVID-19 shocks, researchers asked respondents if they offer online classes to their members or clients who wish to engage in sports or physical activity from their homes, offices, or anywhere outside of the fitness center at their convenience. Only 10% reported having organized classes for physical activity, while 90% admitted to no online classes (Figure 1). The number of fitness centers not offering online classes is surprisingly large, considering the growing uncertainties in today's business world.

Finally, communication is vital both within the company and outside. Therefore, to understand how these centers value email on top of social media in maintaining internal and external relations, participants were asked, and 75% of them confirmed using email to reach out to their customers and business partners.

3.2. PRICING

After evaluating the pricing strategy of the participating companies, researchers found that 85% of the 20 participating fitness centers offer discounts (such as student and pensioner passes, discounts for employees of certain companies, for those returning after a semester break, discounts for time slots, or short-term promotions), but an equal number recently increased the price of their services.

To the questions "Did your customer contest the price increase?" and "Do you believe your customers are willing to accept any price increase?" not everyone could/wanted to answer. However, 100% of those responding felt that the price increase caused resentment among club members, but two-thirds believed that the clients would remain even with the price increase and would not change their physical activity routine (Table 2).

Table 2 Pricing and pricing strategy of the fitness centers

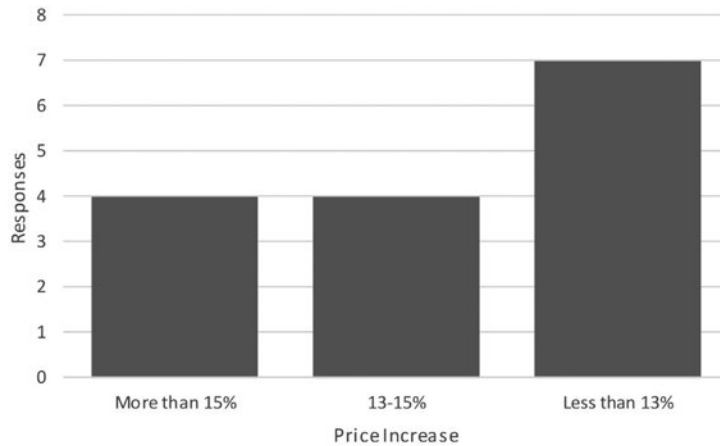
Items	Yes	No	number
1. Discounts offered	85%	15%	20
2. Price of services increase	85%	15%	20
3. Customers contest the price increase	0%	100%	14*
4. Customers willing to accept any price increase	66.7%	33.3%	15*
5. The physical activity routine of the members is affected by the price increase	35.3%	64.7%	17*

Source: Authors' questionnaire research

*Some respondents were unwilling or unable to comment on their customers' behavior.

On dealing with the increasing overhead, 85% indicated an increase in the price of their services, while 15% did not change the fees.

Figure 2 Price increase percentage



Source: Authors' questionnaire research

Price is one factor used when evaluating inflation. The respondents were asked about the percentage of price increase for their services. Figure 2 shows that out of 15 respondents who increased their prices, four reported increasing them more than 15%, and four reported increasing their prices between 13-15%. In contrast, seven respondents indicated increasing the price by less than 13%.

Combined with inflation in other domains, such as food, this increase in the price of fitness center memberships could be an economic imposition on consumers, yet there was no detectable relationship between the change in the number of guests and the price increase.

3.3. INCOME AND EXPENDITURE

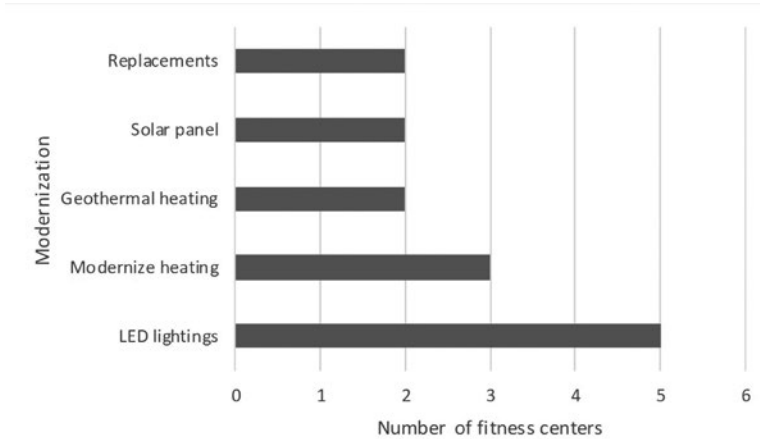
Evaluating income and expenses is very important for a company's continued survival. Maintaining the financial sustainability of a fitness club, despite gas and electricity price increases and general inflation, is possible by reducing expenses, increasing income, or some combination thereof.

Increasing revenues can be achieved by raising membership prices, increasing attendance and membership, or combining the aforementioned. Digitization, promotions (discussed above), or improvements to fitness rooms and the like can all contribute to increased profitability, and 68.8% of the respondents reported renovations or buying new machines and equipment in the last year. For 41.2% of the respondents, attendance did not change, and only 35.3% saw a decrease. Nine service providers (45%) saw no decrease in business and were able to undertake renovations despite raising their prices.

One way to reduce expenses is to reduce overhead costs through modernization and upgrades to more energy-efficient equipment. Many fitness centers did this, with 35% indicating that they upgraded their heating, lighting, or both. Ten percent installed a solar

energy source, 10% installed geothermal heating, 25% added LED lighting, 10% replaced windows and doors with more efficient ones, and 15% modernized heating (Figure 3).

Figure 3 Modernization of heating and lighting



Source: Authors' questionnaire research

In addition to reducing expenditures and dealing with operational realities, 20% of the respondents indicated reducing their workforce, a surprisingly small number.

4. CONCLUSIONS

We conducted this study to assess the impact of fuel-cost-related inflation – the rise in gas and electricity prices – on the operation of fitness centers in Debrecen. We sought to answer questions related to price increases of services, decreases in PA, declines in turnover, and workforce reductions due to inflation.

In order to evaluate inflation, pricing is a determining factor. Our results suggest that fitness centers raised prices to cover cost increases resulting from inflation, and the passing of inflation to consumers was unavoidable. We predicted this increase, fearing consumer engagement would be price-sensitive and decrease their physical activity. The results of our research establish that our fears were not fully realized, which does not establish that they were utterly unreasonable. We do not know how many fitness clubs closed during the COVID-19 epidemic or due to economic and activity restrictions imposed before our investigation. Notably, six companies were found to be closed but still included in the online database we searched at the time of the investigation, indicating that they closed their business recently.

Additionally, we caution that *some* price insensitivity on the part of consumers does not establish a *complete* inelasticity of demand for fitness center services. If inflation continues to increase, the danger of neglecting PA engagement will rise due to consumers needing to choose between ever-more expensive fitness center memberships and more pressing (and ever-more expensive) needs.

If consumers are forced to make this choice, both their health and the economy will suffer. The health effects are apparent—more obesity, more cardiovascular problems, and poorer overall life quality for the physically unengaged. The economic implications are also worthy of note. Fitness centers will lose revenue, cut back on services, and reduce their workforce, leading to higher unemployment levels. Small and medium enterprises are critical to the European economy, providing jobs and growth opportunities for employees and entrepreneurs. In 2019, 98.9% of EU businesses outside the financial services sector employed fewer than 50 people, qualifying them as micro or small enterprises (EuroStat, 2022).

A sector with this significant contribution to the economy deserves special attention, and fitness centers are an integral part of this sector.

Many fitness facilities have undergone renovation, modernization, or otherwise seen increased investment, suggesting that owners are optimistic about the future. At the same time, the battle between online training and home equipment and fitness clubs is still undecided. How many people will return to exercising in a public space post-COVID-19 remains to be seen.

The closure of fitness centers would have multiplying economic effects. We advise that more support be given to micro or small enterprises, especially fitness centers, to deal with rising overhead and other operational costs. Aid will increase the likelihood of survival of these organizations and the jobs and tax revenue they provide. This is to say nothing of the personal, economic, and community benefits of having a healthier population routinely engaging in PA.

We strongly recommend that future research focus on the opinions of potential customers and active fitness center members regarding price increases and the effects of these increases on their physical fitness engagement. Researchers should pay particular attention to the time immediately before and after the beginning of the Russo-Ukrainian War and its attendant inflation. Finally, they should investigate why some fitness centers survived this inflationary period, and others did not.

Our study is the first to analyze the situation of fitness facilities in Debrecen. This specificity makes it valuable to a particular community yet limited in its broader application. Debrecen is a small city at international level, which restricts the generalizability of this research to the national level or outside of Hungary. The number of fitness centers studied was also small, and not all centers contacted responded to our participation requests, leaving real questions about the representativeness of our sample. Finally, some of our research questions and conclusions were subjective.

Despite these limitations, we believe this research can do much to help promote the fitness industry and the overall health of the Hungarian people.

ACKNOWLEDGEMENT

The authors are indebted to the personnel of the Debrecen fitness centers for their participation in this study.

REFERENCES

- Adamu, U. G.–Balatoni, I. (2022) The effect of Covid-19 epidemic on the industry of a Sub-Saharan Country: a perspective on sports industry in Nigeria. *Metszetek Társadalomtudományi folyóirat*, 11, 1, pp. 32–48. https://doi.org/10.18392/metsz/2022/1/3
- Adolfsen, J. F.–Kuik, F.–Lis, E. M.–Schuler, T. (2022) The impact of the war in Ukraine on euro area energy markets. *ECB Economic Bulletin*, 4, pp. 46–53.
- Amatori, S.–Ferri Marini, C.–Gobbi, E.–Sisti, D.–Giombini, G.–Rombaldoni, R.–Rocchi, M. B. L.–Lucertini, F.–Federici, A.–Perroni, F.–Calcagnini, G. (2023) Short High-Intensity Interval Exercise for Workplace-Based Physical Activity Interventions: A Systematic Review on Feasibility and Effectiveness. *Sports Med.*, 53, 4, pp. 887–901. https://doi.org/10.1007/s40279-023-01821-4
- Appelqvist-Schmidlechner, K.–Heikkinen, R.–Vasankari, T.–Virtanen, T.–Pihlainen, K.–Honkanen, T.–Kyröläinen, H.,–Vaara, J. P. (2023) Relationships between psychosocial well-being and leisure time physical activity among 160.000 young Finnish men: a cross-sectional study during 2015–2021. *Archives of Public Health*, 81, 26. https://doi.org/10.1186/s13690-023-01040-3
- Balatoni, I.–Szépné Varga, H.–Müller, A.–Kovács, S.–Kosztin, N.–Csernoch, L. (2019) Sporting habits of university students in Hungary. *Baltic J. Health Phys. Activ. Suppl.* 1, 2, pp. 27–37.
- Braam, K. I.–van Dijk, E. M.–Veening, M. A.–Bierings, M. B.–Merks, J. H.–Grootenhuis, M. A.–Chinapaw, M. J.–Sinnema, G.–Takken, T.–Huisman, J.–Kaspers, G. J.–van Dulmen-den Broeder, E. (2010) Design of the Quality of Life in Motion (QLIM) study: a randomized controlled trial to evaluate the effectiveness and cost-effectiveness of a combined physical exercise and psychosocial training program to improve physical fitness in children with cancer. *BMC Cancer,* 10, 624. https://doi.org/10.1186/1471-2407-10-624
- Chen, S.–Bouteska, A.–Sharif, T.–Abedin, M. Z. (2023) The Russia–Ukraine war and energy market volatility: A novel application of the volatility ratio in the context of natural gas. *Resources Policy*, 85, 103792. https://doi.org/10.1016/j.resourpol.2023.103792
- Collins, S.–Hoare, E.–Allender, S.–Olive, L.–Leech, R. M.–Winpenny, E. M.–Jacka, F.–Lotfalian, M. (2023) A longitudinal study of lifestyle behaviours in emerging adulthood and risk for symptoms of depression, anxiety, and stress. *Journal of affective disorders*, 327, pp. 244–253. https://doi.org/10.1016/j.jad.2023.02.010
- Cowan, S.–Lim, S.–Alycia, C.–Pirotta, S.–Thomson, R.–Gibson-Helm, M.–Blackmore, R.–Naderpoor, N.–Bennett, C.–Ee, C.–Rao, V.–Mousa, A.–Alesi, S.–Moran, L. (2023) Lifestyle management in polycystic ovary syndrome–beyond diet and physical activity. *BMC Endocrine Disorders*, 23, 1, pp. 14. https://doi.org/10.1186/s12902-022-01208-y
- Flanagan, E. W.–Beyl, R. A.–Fearnbach, S. N.–Altazan, A. D.–Martin, C. K.–Redman, L. M. (2021) The Impact of COVID-19 Stay-At-Home Orders on Health Behaviors in Adults. *Obesity* (Silver Spring), 29, 2, pp. 438–445. https://doi.org/10.1002/oby.23066
- Galle, S. A.–Deijen, J. B.–Milders, M. V.–De Greef, M. H.–Scherder, E. J.–van Duijn, C. M.–Drent, M. L. (2023) The effects of a moderate physical activity intervention on physical fitness and cognition in healthy elderly with low levels of physical activity: a randomized controlled trial. *Alzheimer's Research & Therapy*, 15, 1, pp. 1–23. https://doi.org/10.1186/s13195-022-01123-3
- Ihle, R.–Bar-Nahum, Z.–Nivievskyi, O.–Rubin, O. D. (2022) Russia's invasion of Ukraine increased the synchronisation of global commodity prices. *Australian Journal of Agricultural and Resource Economics*, 66, 4, pp. 775–796. https://doi.org/10.1111/1467-8489.12496

• Karamacoska, D.–Tan, T.–Mathersul, D. C.–Sabag, A.–de Manincor, M.–Chang, D.–Steiner-Lim, G. Z. (2023) A systematic review of the health effects of yoga for people with mild cognitive impairment and dementia. *BMC Geriatrics*, 23, 37. https://doi.org/10.1186/s12877-023-03732-5
• Kosztin, N.–Balatoni, I. (2021) Magyarországi egyetemek hallgatóinak sportolási szokásai. Áttekintő irodalmi elemzés. *Acta med. sociol*., 12, 33, pp. 92–102.
• Laczkó, T.–Ács, P.–Cselik, B.–Sey, K. M.,–Stocker, M. (2023) The Role of Sports in the Subjective Psychological Well-Being of Hungarian Adult Population in Three Waves of the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, 20, 1, pp. 660. https://doi.org/10.3390/ijerph20010660
• Lakerveld, J.–IJzelenberg, W.–van Tulder, M. W.–Hellemans, I. M.–Rauwerda, J. A.–van Rossum, A. C.–Seidell, J. C. (2008) Motives for (not) participating in a lifestyle intervention trial. *BMC medical research methodology*, 8, 1, pp. 1–7. https://doi.org/10.1186/1471-2288-8-17
• Lewańczyk, A. M.–Langham-Walsh, E.–Edwards, L.–Branney, P.–Walters, E. R.–Mitchell, P.–Vaportzis, E. (2023) Back Onside protocol: A physical activity intervention to improve health outcomes in people who are unemployed or at risk of unemployment. *Evaluation and Program Planning*, 97. 102204. https://doi.org/10.1016/j.evalprogplan.2022.102204
• Liu, L.–Yan, Y.–Qiu, J.–Chen, Q.–Zhang, Y.–Liu, Y.–Zhong, X.-Liu, Y.–Tan, R. (2023) Association between sedentary behavior and depression in US adults with chronic kidney disease: NHANES 2007–2018. *BMC psychiatry*, 23, 1, pp. 1–10. https://doi.org/10.1186/s12888-023-04622-1
• Mathisen, F. K. S.–Torsheim, T.–Falco, C.–Wold, B. (2023) Leisure-time physical activity trajectories from adolescence to adulthood in relation to several activity domains: a 27-year longitudinal study. *International Journal of Behavioral Nutrition and Physical Activity*, 20, 1, 27. https://doi.org/10.1186/s12966-023-01430-4
• Moyers, S. A.–Hagger, M. S. (2023) Physical activity and cortisol regulation: A meta-analysis. *Biological Psychology*, 108548. https://doi.org/10.1016/j.biopsycho.2023.108548
• Natalucci, V.–Marini, C. F.–De Santi, M.–Annibalini, G.–Lucertini, F.–Vallorani, L.–Panico, A. R.–Sisti, D.–Saltarelli, R.–Zeppa, S. D.–Agostini, D.–Gervasi, M.–Baldelli, G.–Grassi, E.–Nart, A.–Rossato, M.–Biancalana, V.–Piccoli, G.–Benelli, P.–Villarini, A.–Somaini, M.–Catalano, V.–Guarino, S.–Pietrelli, A.–Monaldi, S.–Sarti, D.–Barocci, S.–Flori, M.–Rocchi, M. B. L.–Brandi, G.–Stocchi, V.–Emili, R.–Barbieri, E. (2023) Movement and health beyond care, MoviS: Study protocol for a randomized clinical trial on nutrition and exercise educational programs for breast cancer survivors. *Trials*, 24, 1, pp. 134. https://doi.org/10.1186/s13063-023-07153-y
• Nguyen, P. Y.–Astell-Burt, T.–Rahimi-Ardabili, H.–Feng, X. (2023) Effect of nature prescriptions on cardiometabolic and mental health, and physical activity: a systematic review. *The Lancet Planetary Health*, 7, 4, e313–e328. https://automeris.io/ WebPlotDigitizer Downloaded: 09 04 2023
• Puccinelli, P. J.–da Costa, T. S.–Seffrin, A.–Barbosa de Lira, C. A.–Vancini, R. L.–Nikolaidis, P. T.–Knechtle, B.–Rosemann, T.–Hill, L.–Andrade, M. S. (2021) Reduced level of physical activity during COVID-19 pandemic is associated with depression and anxiety levels: an internet-based survey. *BMC Public Health*, 21, 425. https://doi.org/10.1186/s12889-021-10470-z
• Rada, A.–Szabó, Á. (2022) The impact of the pandemic on the fitness sector – The general international situation and a Hungarian example. *Society and Economy*, 44, 4, pp. 477–497. https://doi.org/10.1556/204.2022.00018
• Seefeldt, V.–Malina, R. M.–Clark, M. A. (2002) Factors affecting levels of physical activity in adults. *Sports medicine*, 32, pp. 143–168. https://doi.org/10.2165/00007256-200232030-00001

- Štajer, V.–Milovanović, I. M.– Todorović, N.– Ranisavljev, M.– Pišot, S.– Drid, P. (2022) Let's (Tik) Talk About Fitness Trends. *Front Public Health*, 11, 10, 899949. https://doi.org/10.3389/fpubh.2022.899949
- Thivel, D.–Tremblay, A.–Genin, P. M.–Panahi, S.–Rivière, D.–Duclos, M. (2018) Physical Activity, Inactivity, and Sedentary Behaviors: Definitions and Implications in Occupational Health. *Front Public Health*, 5, 6, 288. https://doi.org/10.3389/fpubh.2018.00288
- Vaquero-Abellan, M.–Marquez, F. G.–Martínez, P. A. (2022) Chapter 1 - The importance of healthy lifestyles in helping achieving wellbeing. In: Vaamonde, D.–Hackney, A. C.–Garcia-Manso, J. M. (eds.): *Fertility, Pregnancy, and Wellness*. Elsevier, Amsterdam, Netherlands. pp. 1–19. https://doi.org/10.1016/B978-0-12-818309-0.00020-4
- Varga, Sz. H,–Csernoch, L.–Balatoni, I. (2019) E-sports versus physical activity among adolescents. *Balt J Health Phys Act*., 2, pp. 38–47. https://doi.org/10.29359/BJHPA.2019.Suppl.2.06
- Williams, J.–Howlett, N.–Shorter, G. W.–Zakrzewski-Fruer, J. K.–Chater, A. M. (2023) What roles does physical activity play following the death of a parent as a young person? A qualitative investigation. *BMC Public Health*, 23, 1, pp. 210. https://doi.org/10.1186/s12889-022-14542-6

INTERNET SOURCES:

- BDeex (2023) *Population in Debrecen*. BDEEX, U.S.A. https://bdeex.com/naselenie/hungary/debrecen/ Downloaded: 09 04 2023
- Deloitte: Europe Active, European Health & Fitness Market Report 2021 https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-business/European%20Health%20and%20Fitness%20Market_Reportauszug%202021.pdf Downloaded: 09 08 2023
- Deloitte: Europe Active, European Health & Fitness Market Report 2023. https://www2.deloitte.com/content/dam/Deloitte/de/Documents/consumer-business/EHFMR_2023_Auszug_Report.pdf Downloaded: 09 08 2023
- Eurostat (2023) *EU small and medium-sized enterprises: an overview.* EuroStat, Luxembourg. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/edn-20220627-1 Downloaded: 23 05 2023
- Hungary Today (2022) *European Gas and Electricity Prices More Than Five Times Higher Than in Hungary.* Hungary today, Hungary. https://hungarytoday.hu/europe-gas-electricity-prices-hungary-utility-cuts/ Downloaded: 09 03 2023
- KSH (2019a) *A népesség megoszlása táplálтság szerint a testtömeg-index (BMI) alapján*. https://www.ksh.hu/stadat_files/ege/hu/ege0039.html Downloaded: 09 03 2023
- KSH (2019b) *Testmozgás, 2019*. https://www.ksh.hu/docs/hun/xftp/idoszaki/elef/testmozgas_2019/index.html Downloaded: 09 03 2023
- WHO (2021) *Obesity and overweight*. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight#:~:text=Of%20these%20over%20650%20million%20adults%20were%20obese.,tripled%20between%201975%20and%202016 Downloaded: 09 03 2023