

Assessment of physical activity of people employed in the IT sector during the COVID-19 pandemic

Ocena poziomu aktywności fizycznej osób zatrudnionych w sektorze IT podczas pandemii COVID-19

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Abstract

Introduction. Assessing the physical activity of IT workers during the COVID-19 pandemic can help to discern its hypothetical relationship with gender, the form of work, or other factors.

Material and methods. The study lasted from July 29, 2021 to September 14, 2021. For the assessment, a questionnaire was conducted based on the IPAQ-SF (International Physical Activity Questionnaire – Short Form) and original questions about the impact of the COVID-19 pandemic on lifestyle, including physical activity assessed on the scale –3/0/3. 363 employees of the IT sector (63 women, 300 men; average age: 29; average BMI 26.17) met the conditions for inclusion in the study.

Results. In total, 26.17% were in the insufficient group, 54% in the sufficient group and 19.83% in the high physical activity group. Overall, 51.24% estimated that the pandemic had a negative effect on their physical activity, 31.40% had no effect, and 17.36% had a positive impact.

Conclusions. IT sector employees are mostly characterized by low physical activity. Therefore, they meet the WHO guidelines for the amount of physical activity with a positive effect on health. There are no interactions in mentioned population between undertaking various types and intensities of physical activity and gender, working shifts and working methods. In future research on physical activity, it is worth considering other factors that may be behind it.

Key words: physical activity; public health; COVID-19 pandemic; lifestyle medicine

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Introduction

Restrictions introduced during the coronavirus disease 2019 (COVID-19) pandemic had a significant negative impact on lifestyle changes. On March 20, 2020, the Polish government declared an epidemic state in Poland [1] and

introduced numerous restrictions to limit the spread of the COVID-19 virus: recommended self-isolation, quarantine periods, closure of sports facilities, fitness clubs, gyms and swimming pools. These restrictions resulted in a significant reduction in opportunities for physical activity [2]. Findings indicate that the changes have affected people's lifestyles

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and may have an impact on medical problems that will pose significant challenges to the healthcare system in the years to come [3, 4].

IT workers, due to the nature of their work, spend most of their time working at a computer, in a sitting position. According to the World Health Organization (WHO), a sedentary lifestyle contributes to an increased risk of type 2 diabetes, hypertension or mental health disorders, i.e.: depression, anxiety. In order to minimise the risk, extended periods of physical activity of any intensity are recommended [5]. For 18–64 year-olds, the WHO recommends 150–300 minutes of moderate- or 75–150 minutes of high-intensity activity per week.

Physical inactivity and its consequence – obesity – are modifiable risk factors for most non-communicable diseases [6]. They increase mortality and result in fewer years of disability-free life [7, 8].

This study aims to assess physical activity in IT workers during the COVID-19 pandemic and investigate if, among these individuals, there was a link between undertaking physical activity (of different types and intensities) and gender/form of work/work shift.

Material and methods

Design and selection for the study

The cross-sectional study was designed and made available online, through various social media channels (bringing together people employed in the IT sector, e.g., Facebook groups, Instagram, private companies) and e-mails (personal correspondence), approximately 1.5 years after the outbreak of the COVID-19 pandemic in Poland from July 29, 2021 to September 14, 2021. Responses were collected using the online survey application Google Sheets and processed into an Excel file for analysis. The inclusion criteria for the study was employment in the IT sector (regardless of seniority or location). Data were collected from 416 respondents and 363 of them met all the conditions of the survey. Respondents who answered “I am unable to specify” to any of the questions from the International Physical Activity Questionnaire – Short Form (IPAQ-SF) [9] were excluded. There were no other exclusion criteria. The IPAQ-SF form, in a validated Polish version, was chosen for the survey. The choice of the questionnaire was due to its simple question and answer design, sufficient to provide an initial preview of the physical activity of this group.

Population characteristics

A total of 416 IT employees took part in the survey, 363 of whom met the conditions of the survey (63 women, 300 men). The respondents ranged in age from 18 to 64 years, with a median age of 29 years. The height of the participants averaged 178.7 cm (SD = 8.14), while body

Table 1. Demographic data and weight of respondents

Variables		Number (%)
Respondents	Participants	363 (100)
	Women	63 (17.36)
	Men	300 (82.64)
BMI	Underweight	5 (1.38)
	Normal body weight	172 (47.38)
	Overweight	115 (31.68)
	Obesity	71 (19.56)
Experience (position)	Junior	55 (15.15)
	Mid/Regular	155 (42.70)
	Senior	153 (42.15)
Work shift	First shift	312 (85.95)
	Second shift	5 (1.38)
	Other (First or second shift per week OR first or second shift per month)	40 (11.02)
	No data	6 (1.65)
Form of work	Remote work	236 (65.01)
	Work at the place of employment	32 (8.82)
	Hybrid work	95 (26.17)

weight was 47–135 kg. The mean body mass index (BMI) was 26.17 kg/m² (SD = 4.81) and the median was 25.35 kg/m². The demographic characteristics of the participants including gender, BMI category, experience, form of work during the pandemic (remote work, work at the place of employment, hybrid work) and work shift are shown in Table 1. Those declaring to work the first shift worked from morning to afternoon hours, while those declaring to work the second shift worked from afternoon to morning hours. Respondents who marked the distractor “other” did not have one work shift and worked both first and second shift over the course of a week or month.

Questionnaire structure

The questionnaire included a statement of voluntary participation in the survey and the objectives of the survey, as well as an anonymity and confidentiality clause. Completion and submission of the questionnaire was tantamount to informed consent to participate in the study. Sociodemographic data such as age, gender and self-reported biometric data on height and weight were collected. Respondents, given their employment in the IT sector, were asked about their experience in the industry (Junior, Mid/Regular, or Senior), the form of work during the pandemic (hybrid, remote, or at the place of employment), and their work shift. Using questions from the IPAQ-SF, physical activity (including walking

time) and time spent sitting during the day were examined. The questionnaire included additional -3/0/+3-scaled questions on respondents' subjective assessment of the impact of the pandemic on their physical activity.

IPAQ-SF

The IPAQ-SF was used for estimating the amount of time spent on physical activity during the week. This questionnaire is adapted to many populations (including Polish population). The IPAQ-SF assesses three specific types of activity: walking, moderate (sufficient) physical activity and intense physical activity. Due to the scoring protocol, data are converted to MET-minutes/week values. Metabolic equivalent (MET) is a specific metabolic equivalent and its values vary for each category of energy expenditure (3.3 MET for walking, 4 MET for moderate-intensity physical activity and 8 MET for high-intensity physical activity). In order to calculate the weekly energy expenditure (MET-minutes/week) for each type of physical activity, the following formula is used: weekly energy expenditure (MET-min/week) = MET × exercise duration (minutes) × frequency. The total MET-minutes/week is the sum of walking MET-min/week, moderate activity MET-min/week and intense activity MET-min/week. According to the scoring protocol of the IPAQ-SF, participants were categorised into three levels of physical activity: insufficient, sufficient and high.

Participants categorised as having a high level of physical activity:

- performed intense exercise (total min. 1500 MET-min/week) for minimum 3 days per week;
- or undertook min. 7 days of any combination of efforts of varying intensity levels exceeding 3000 MET-min/week.

Participants in the sufficient physical activity group:

- performed min. 20 minutes of intense exercise per day for min. 3 days a week;
- or performed 30 minutes of moderate exercise (or walking) for min. 5 days a week;
- or performed any combination of physical activity (walking, moderate or intense exercise) – 600 MET-min/week.

Participants in the insufficient physical activity group did not undertake any activity or did not meet the criteria for a high or sufficient level.

Those with sufficient, satisfactory levels met the WHO guidelines for recommended physical activity with a positive effect on health.

The final question in the IPAQ-SF asked about daily sedentary time, obtaining it in hours and minutes.

Author questions

Respondents matched the level of perceived change resulting from the pandemic in -3/0/+3-scaled questions.

Responses of -3 to -1 meant that the pandemic had a negative effect, a response of 0 meant no effect and responses of +1 to +3 meant a positive effect.

Data analysis

All statistical analyses were performed using STATISTICA 13 statistical software (StatSoft Inc., Tulsa, OK, USA). Participants were divided into subgroups (gender, form of work, work shift). Based on the mean responses and the results of the statistical tests, the direction of correlation (positive or negative) was assessed. The Mann-Whitney U test and χ^2 test were performed to verify the hypothesis of non-significance of differences between the medians and verify the correlation between type and intensity of physical activity/gender. The Kruskal-Wallis test was performed to calculate of the correlation between type and intensity of physical activity/form of work, type and intensity of physical activity/work shift. The Spearman's rank correlation coefficient test was performed to analyse the correlation between BMI and type of physical activity. The Shapiro-Wilk test was performed to assess the distribution of variables.

Results

Physical activity of respondents and time spent sitting

The average amount of time during which surveyed IT employees performed activities requiring either intense or moderate physical activity ranged from 0 to 150 minutes (median = 30 minutes) per day. The average amount of time for walking more than 10 minutes continuously ranged from 0 to 200 minutes per day (median = 29 minutes).

In the case of the IT sector on weekdays, the total time spent sitting ranged from 4 to 20 hours on weekdays, with a median of 10 hours.

After the calculation of all the respondents' physical activity values and time spent sitting, and taking into account the IPAQ-SF scoring protocol, the participants were divided into three physical activity categories: high, sufficient, insufficient, as shown in Table 2.

Table 2. Number and percentage of respondents according to high, sufficient or insufficient levels of physical activity

Level of physical activity	Number of persons	Percentage of persons
High	72	19.83%
Sufficient	196	54.00%
Insufficient	95	26.17%

Table 3. Correlations between type of physical activity and body mass index (BMI)

Variable	BMI
Engaging in activities that require intense physical activity (that cause significant acceleration of breathing and heart rate, for example, aerobics, fast running, fast cycling, digging)	p = 0.55 R Spearman = 0.031
Doing activities that require moderate physical activity (which leads to slightly faster breathing and a slightly faster heartbeat, for example, lifting lighter weights, cycling at normal pace, playing volleyball)	p = 0.588 R Spearman = -0.029
Walking min. 10 min. continuously (including strolling or walking home)	p = 0.006* R Spearman = -0.144
Sitting (including weekdays, Monday to Friday)	p = 0.33 R Spearman = 0.051

*When p < 0.05, the result is statistically significant

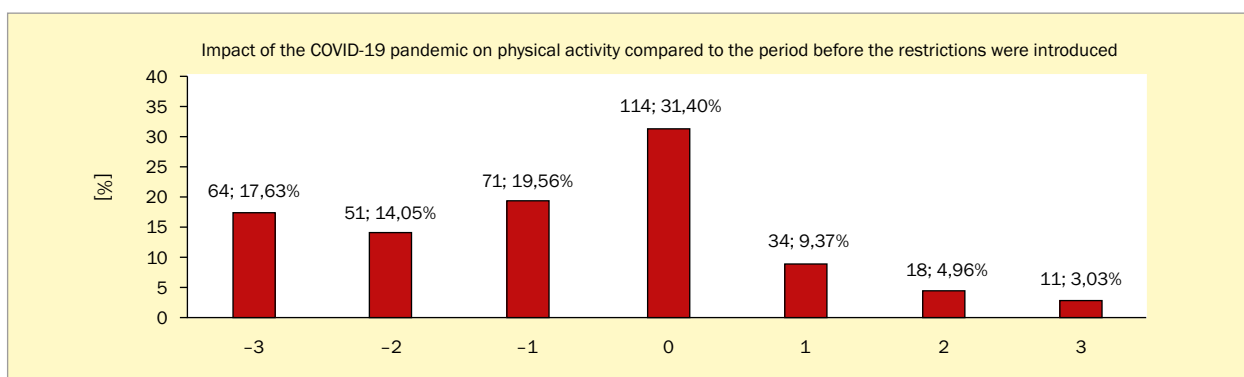


Figure 1. Responses to the question about self-reported opinion on the impact of the pandemic on physical activity (expressed in number of respondents and percentages)

Correlations

The statistical correlations obtained in the study are shown in Table 3. The only statistically significant variable is walking min. 10 minutes continuously, which correlates with a lower BMI.

Results of a question about the self-reported opinion on the impact of the COVID-19 pandemic on physical activity

The majority of respondents (51.24%) reported a reduction in physical activity due to the COVID-19 pandemic (responses ranging from -3 to -1). Less than half of respondents (31.40%) recognised its neutral impact on this area of lifestyle (response 0), while a significant minority (17.36%) noticed an increase in physical activity (responses 1 to 3). The responses are shown in Figure 1.

Discussion

A subjective lifestyle assessment of the participants revealed that the COVID-19 pandemic had a negative impact on their physical activity. More than half of respondents,

51.24%, noticed a reduction in its level due to the global situation. This may have been caused by a reduction in opportunities for physical activity (closure of sports facilities: gyms, swimming pools, fitness clubs) to which employers encourage their employees, for example, by providing them with subsidised starter packs or giving them benefits, i.e. MultiSport cards. Other studies have also shown a negative impact of the pandemic on physical activity [10–13].

The majority of respondents worked from home (remote work) during the pandemic (65.01%), which may have been a factor in the long time spent sitting during the day. According to Hernández et al. [14] study involving remote workers, 70.1% reported a more sedentary lifestyle due to the pandemic. The change of workplace from office to home may also have affected the reduction in physical activity because some corporations allow physical activity by providing sports equipment in the office.

The participants from the IT sector, after converting the MET values and referring to the IPAQ criteria, were mostly characterised by a sufficient level of physical activity (54%). In contrast, this is due to the relatively long duration of walking rather than the duration of physical

activity undertaken. Insufficient levels of physical activity were 26.17%. Another study involving Biobank employees in the United Kingdom indicates inadequate levels of physical activity in IT workers, which was not observed in other employees [15]. While it can be assumed that the IT sector is characterised by this lifestyle, a survey conducted on office workers of Swiss organisations in Switzerland and using the same questionnaire provides different results. That survey revealed an insufficient level of physical activity at 17%; however, a significant number of respondents in that survey were women (71.10%) compared to the other surveys [16]. This suggests that there is a relationship between gender and physical activity levels, but there was no such correlation in this study. In contrast, longer walking time was found to correlate with lower BMI ($p = 0.006$), with the majority of respondents having a BMI indicating a normal body mass (47.38%) or overweight (31.68%).

No other Polish studies investigating these areas in the IT sector were noted during the material collected. This survey was conducted on employees of various IT companies, thus providing a broader and more generalised overview of the physical activity of this group.

The limitations of this survey relate, among other things, to the inadequacies of the self-reported questionnaire method used in the IPAQ-SF. Respondents gave answers based on what they were able to recall. It cannot be ruled out that the amounts of physical activity entered in this survey were indicative, i.e., they could turn out to be as much or less in reality. The respondents may also have omitted short, sporadic activities, which would also have

affected the results. Responses were collected using an online questionnaire, making it impossible to verify the identity of the person who filled it in. The lack of surveys of persons with a similar lifestyle (resulting from professional work, i.e.: office work/IT sector) prior to the pandemic is another limitation, as it is thus impossible to indicate how the COVID-19 pandemic affected the physical activity of such a group.

Conclusions

This survey reveals that IT employees are mostly characterised by sufficient levels of physical activity. As such, they meet the WHO guidelines for the amount of physical activity undertaken with a positive effect on health. Moreover, neither the work shift nor gender, nor form of work are related to undertaking physical activity of different types and intensities. It can be assumed that there are other factors that determine this or, if the group of respondents had been more numerous (especially the representation of women), such relationships would have emerged. In the future, it is worth exploring this, starting by consulting experienced individuals in the IT sector and comparing physical activity levels to other non-IT office workers. The COVID-19 pandemic alone had a negative impact on the uptake of physical activity in more than 50% of the population.

Conflict of interest

None declared.

Streszczenie

Wstęp. Ocena aktywności fizycznej pracowników sektora IT podczas pandemii COVID-19 może pomóc dostrzec jej hipotetyczny związek z płcią, formą pracy czy innymi czynnikami.

Materiał i metody. Badanie trwało od 29 lipca 2021 do 14 września 2021. W celu dokonania oceny przeprowadzono ankietę opartą o IPAQ-SF (*International Physical Activity Questionnaire – Short Form*) oraz autorskie pytania dotyczące wpływu pandemii COVID-19 na styl życia, w tym aktywność fizyczną ocenianą w skali –3/0/3. Warunki włączenia do badania spełniło 363 pracowników sektora IT (63 kobiety, 300 mężczyzn, średni wiek: 29 lat, średni wskaźnik masy ciała: 26,17 kg/m²).

Wyniki. Łącznie 26,17% badanych znajdowało się w grupie niewystarczającej, 54% w grupie dostatecznej i 19,83% w grupie wysokiej aktywności fizycznej. Oszacowano, że pandemia miała negatywny wpływ na aktywność fizyczną wśród 51,24% badanych, brak wpływu – 31,40%, a pozytywny wpływ u 17,36%.

Wnioski. Wśród badanych pracowników sektora IT, większość wykazywała niską aktywność fizyczną. W związku z tym spełniają oni warunki wytycznych Światowej Organizacji Zdrowia dotyczące podejmowanej aktywności fizycznej o pozytywnym wpływie na zdrowie. Wśród tej populacji nie dostrzeżono powiązania między podejmowaniem aktywności fizycznej różnego rodzaju i o różnej intensywności a płcią, formą pracy ani zmianą, podczas której się pracuje. W kolejnych badaniach dotyczących aktywności fizycznej warto rozważyć wzięcie pod uwagę innych czynników, które mogą to determinować.

Słowa kluczowe: aktywność fizyczna, zdrowie publiczne, pandemia COVID-19, medycyna stylu życia

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