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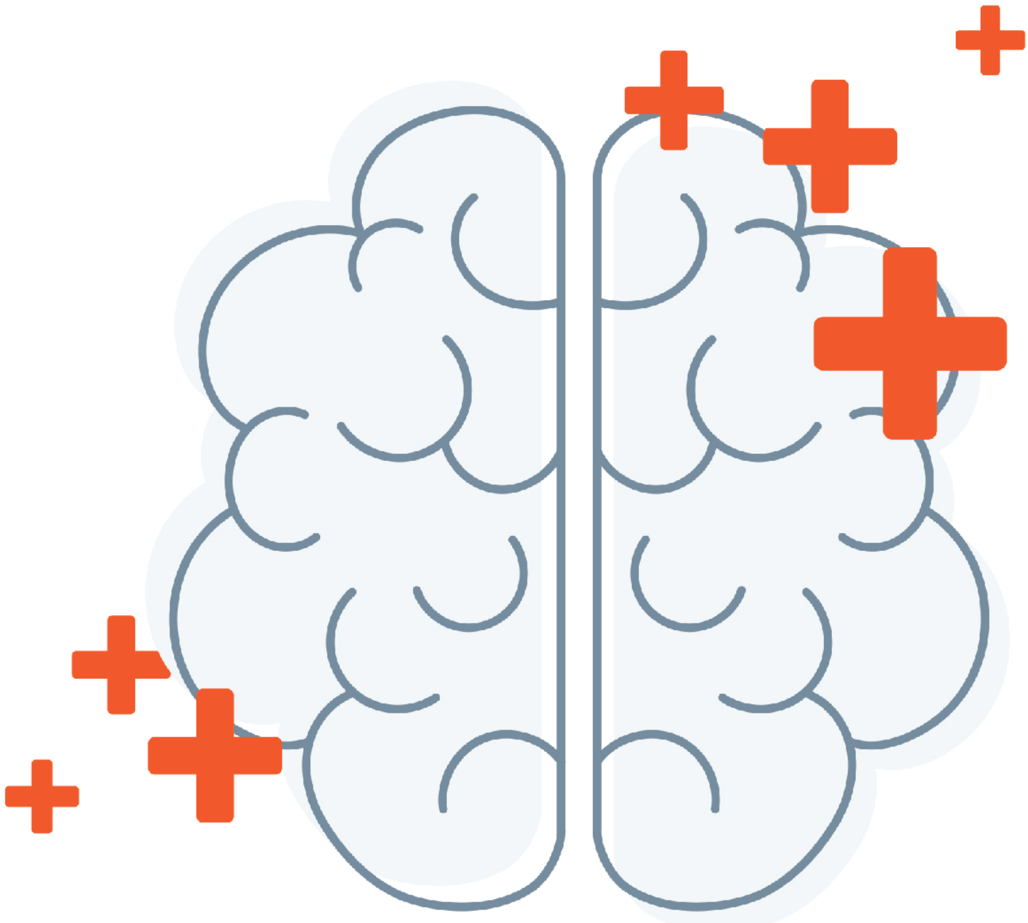

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Physical activity and risk factors in subjects with overactive bladder

Aktywność fizyczna i czynniki ryzyka u osób z pęcherzem nadaktywnym

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Abstract

The aim of the study was to assess physical activity in subjects with overactive bladder OAB. The additional aim was to assess the relationships between physical activity and OAB risk factors.

Material and methods. We studied a total of 109 subjects (101 women and 8 men). The mean age was 33.30 years (SD = 11.15). The study was conducted with the use of a comprehensive online questionnaire. The research tools were: our proprietary questionnaire and the following questionnaires: OABSS, PSS-10, IPAQ-SF. The study population consisted of 51 subjects with OAB who scored ≥ 2 points for Q3-urgency and ≥ 3 points for the total score in the OABSS questionnaire. The clinical control group consisted of 58 healthy subjects.

Results. Physical activity in the study population was significantly lower ($p = 0.039$, $t = 2.09$) than in the clinical control group. Moreover, there was correlation between physical activity and hip size ($r = -0.31$, $p < 0.05$) In the clinical control group there was correlation between physical activity and stress ($r = 0.36$, $p < 0.001$) and between physical activity and WHR ($r = 0.26$, $p < 0.05$).

Conclusions. 1. Subjects with overactive bladder reduced their physical activity. 2. The poorest physical activity was found in patients with large hip size. 3. In subjects with overactive bladder, stress, age, BMI, waist size and intensity of condition were not related to physical activity. 4. Physical activity may be one of the efficient form of treatment for people with OAB.

Key words:

exercises, urinary bladder, strong urge to urinate

Streszczenie

Cel pracy. Celem głównym badań była ocena aktywności fizycznej u osób z pęcherzem nadaktywnym OAB. Celem dodatkowym była ocena zależności między aktywnością fizyczną a czynnikami ryzyka OAB tj.: wiekiem, BMI, obwodem talii, obwodem bioder, WHR, stresem.

Materiał i metody. Ogółem przebadano 109 osób (101 kobiet i 8 mężczyzn). Średnia wieku wynosiła 33,30 lat (SD = 11,15). Badanie przeprowadzono za pomocą rozbudowanej ankiety online. Narzędzia badawcze stanowiła: autorska ankieta oraz kwestionariusze: OABSS, PSS-10, IPAQ-SF. Do grupy badanej zakwalifikowano 51 osób z OAB, które w kwestionariuszu OABSS uzyskały ≥ 2 punkty w pytaniu nr 3 i ≥ 3 punkty w ogólnym wyniku. Do grupy kontrolnej zakwalifikowano 58 zdrowych osób.

Wyniki. Aktywność fizyczna w grupie badanej była istotnie niższa ($p = 0,039$, $t = 2,09$) niż w grupie kontrolnej. Dodatkowo u osób z OAB stwierdzono korelację między aktywnością fizyczną i obwodem bioder ($r = -0,31$, $p < 0,05$). W grupie kontrolnej stwierdzono korelacje między aktywnością fizyczną i stresem ($r = 0,36$, $p < 0,001$) oraz między aktywnością fizyczną i WHR ($r = 0,26$, $p < 0,05$).

Wnioski. 1. Osoby z pęcherzem nadaktywnym ograniczały aktywność fizyczną. 2. Najniższą aktywność fizyczną wykazywali pacjenci, u których występował duży obwód bioder. 3. U osób z pęcherzem nadaktywnym stres, wiek, BMI, obwód talii oraz nasilenie choroby nie miały związku z aktywnością fizyczną.

Słowa kluczowe:

ćwiczenia, pęcherz moczowy, silne parcie

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Introduction

Overactive bladder is a social disease. It is estimated that problems related to OAB affect 2% to 53% of the population. Large discrepancies in the incidence of OAB are related to differences in defining OAB [1]. International Continence Society defines overactive bladder syndrome as a condition characterized by urinary urgency, with urinary frequency and nocturnia, unrelated to infection or any other known pathologies [2]. The mechanism of the occurrence of OAB is complex and not fully understood, and it is the subject of numerous scientific studies [1, 3–7].

OAB risk factors include: advanced age [4], smoking [2], high BMI [8, 9], drinking coffee [1], winter and cold [10], stress [11, 12] and depression [6]. However, when considering risk factors it is difficult to say whether they are primary or secondary to the symptoms of OAB.

The overactive bladder syndrome negatively affects the patient's physical, mental and social spheres. Intensification of the ailments results in: reduction of fluid intake, withdrawal from social life, resignation from hobbies, and also reducing physical and sexual activity [6, 12].

Treatment of overactive bladder includes pharmacotherapy [13, 14], bladder training [15], pelvic floor muscle training [16, 17], and behavioural therapy [1, 3, 5]. Pharmacotherapy often causes a number of side effects, and consequently approximately 75% of patients resign from this type of treatment. Bladder training aims to increase the intervals between micturition. Pelvic floor muscle training aims to improve the control and flexibility of pelvic floor muscles. Behavioural therapy includes: lifestyle changes, weight reduction and cutting down on substances. There are only a few reports on physical activity and its role in treatment of OAB patients. [2, 12, 18, 19]. It has been proven that general physical activity done once a week for 1.5 hours reduce OAB symptoms as early as after 12 weeks from its introduction [18]. In turn, other authors report that OAB patients significantly reduce physical activity [2, 12, 19]. The need to conduct this study comes from the fact that there have been only very few papers on this issue so far.

The main aim of this study was to assess physical activity in subjects with overactive bladder syndrome. An additional aim was to assess the relationships between physical activity and OAB risk factors, i.e. age, BMI, waist size, hip size, WHR, and stress.

Materials and methods

The study was conducted from May to August 2021. A total of 109 subjects, 101 women (92.70%) and 8 men (7.30%) were involved in the study. The inclusion criterion was age from 18 to 65 years. The exclusion criteria were: infection, lower urinary tract pathologies, and neurological disorders. 51 subjects with OAB were qualified for the study population. They scored ≥ 2 points for Q3-urgency and ≥ 3 points for the total score in the OABSS questionnaire. 58 healthy subjects were qualified for the clinical control group.

Table 1 presents the characteristics of the subjects in their groups. Additionally, their mean age, body mass, body height and BMI

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were compared. The analysis revealed statistically significant differences in their body mass and BMI. Subjects from the study population had significantly greater body mass and BMI. The remaining differences were not statistically significant.

Tab. 1. Study population characteristics

		Study group (n = 51)	Control group (n = 58)	p
Gender	Women	47 (92.20%)	54 (93.10%)	
	Men	4 (7.80%)	4 (6.90%)	
Education	Secondary	20 (39.20%)	20 34.50%)	
	Vocational	1 (2.00%)	0 (0%)	
	Higher	30 (58.80%)	38 (65.50%)	
Smoking	Non-smokers	41 (80.40%)	49 (84.50%)	
	Ex-smokers	6 (11.80%)	0 (0%)	
	Smokers	4 (7.80%)	9 (15.50%)	
Age		32.96 (10.58)	33.60 (11.71)	0.765
Weight		69.06 (14.74)	63.79 (9.88)	0.034
Height		168.22 (7.35)	168.64 (7.95)	0.775
BMI		24.36 (4.78)	22.33 (2.59)	0.008

Comments. For the qualitative variables, we presented the numbers together with the percentages. For the quantitative variables, we presented the means together with standard deviation. We used the Student's t-test for independent trials to conduct the comparisons.

Due to the pandemics of Covid-19 we used a detailed online questionnaire to conduct the study. The questionnaire consisted of the following: our proprietary questionnaire, Overactive Bladder Symptom Score (OABSS), International Physical Activity Questionnaire (IPAQ) – the abbreviated version, and Perceived Stress Scale (PSS-10). The questionnaire was posted on online groups for people with overactive bladder; it guaranteed full anonymity and it was voluntary.

The questions from our proprietary questionnaire concerned basic personal data, i.e. gender, year of birth, body mass, body height, waist size, hip size, education, and smoking. The subjects measured their waist and hip size on their own, using the descriptions and illustrations included in the questionnaire.

The OABSS (Overactive Bladder Symptom Score) was used to assess the intensity of the OAB symptoms, and to qualify the involved subjects into the suitable group (study population or clinical control group). The tool consists of 4 questions. OAB is diagnosed if the total score is a minimum

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of 3 points, and if question 3 scores a minimum of 2 points [2, 3, 13, 18, 20].

International Physical Ability Questionnaire (IPAQ) allowed for assessment of subjects' general physical activity. Physical activity is expressed in the units of MET-minutes a week. On the basis of the obtained results, the subjects were qualified into one of the three categories: low physical activity (below 600), moderate physical activity (600–1500 or 600–3000) or high physical activity (over 1500 or 3000 MET minutes a week). The study used the Polish abbreviated questionnaire version which consists of 7 questions on all the types of physical activity related to daily living, work and leisure [21, 22].

The Perceived Stress Scale (PSS-10) was used to assess intensity of stress experienced in the last month. The questionnaire consists of 10 statements with the following multiple-choice answers: never, almost never, sometimes, quite often, very often. The possible score ranges from 0 to 40. There are 4 categories of scores: 0–6 points denotes low stress, 7–19 moderate stress, 20–25 high stress, and over 25 points – very high stress [11, 12].

Statistical analysis

Statistical package IBM SPSS v26 was used to analyse the variables. A series of Student's t-tests for independent trials and the Pearson's' r correlation coefficient analysis were conducted. The compliance of the distributions with the normal distribution was verified with the Shapiro-Wilk test. The distribution of variables was not normal, however, the asymmetry did not exceed the absolute value of 2 in any of the cases. On this basis we decided that the analysed distribution was close enough to normal distribution for us to conduct the parametric statistical tests. The level of statistical significance was set at α = 0.05.

Results

To verify the differences in physical activity between the study population and the clinical control group we used the Student's t-test for independent trials. We found statistically significant difference between the groups (Tab. 2). The clinical controls had higher physical activity in comparison with the study population. Cohen's d value points to a low strength of the observed effect. Figure 1 presents the differences between the compared means 1.

Tab. 2. Comparison of physical activity between study population and clinical control group

	Study group (n = 51)		Control group (n = 58)				95% CI		
	M	SD	M	SD	t	p	LL	UL	Cohen's d
Physical activity	2155.55	1663.59	2892.10	1981.95	2.09	0.039	36.34	1436.77	0.40

n – number of observations, M – the mean, SD – standard deviation, t – Student's t-test; p – statistical significance, 95%CI – confidence interval for the differences between means; LL and UL – lower and upper limit of the confidence interval

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The mean physical activity in the study group was 2155.55 MET, and the control group was higher at 2892.10 MET. The difference between the mean groups in the study and control groups is presented in Figure 1.

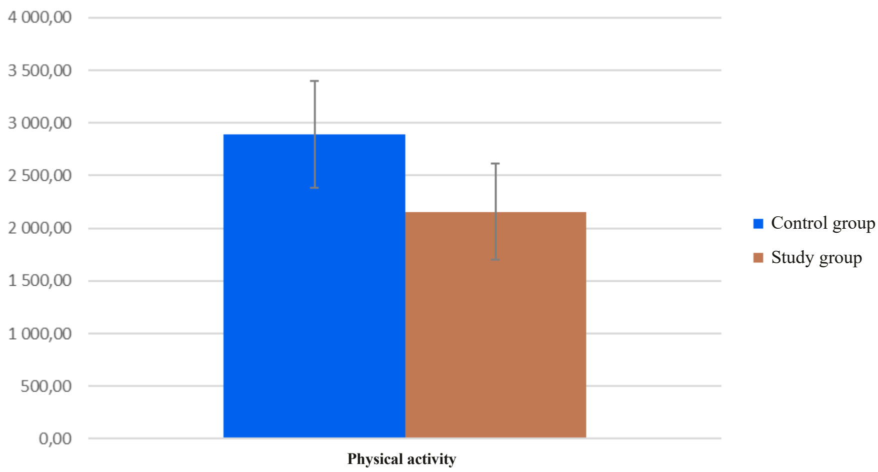

Fig. 1. Mean physical activity with the 95% confidence interval for the clinical control group and the study population

Then, we analysed correlation of physical activity with the remaining quantitative variables (age, BMI, waist size, hip size, excerbations of symptoms of OABSS, stress, WHR), separately for the study population and for the clinical control group (Table 3).

Tab. 3. Correlation coefficients of physical activity and the remaining variables for the study population and the control group

	Study group	Control group
Age	−0.24	0.13
BMI	−0.18	0.12
Waist size	−0.18	0.12
Hip size	−0.31*	−0.09
OABS	−0.21	−0.03
Stress	−0.14	0.36**
WHR	0.05	0.26*

**** – p < 0,001; ** – p < 0,01; * – p < 0,05*

In the study population we found statistically significant ($p < 0.05$) negative ($r = -0.31$) moderate relationship between physical activity and hip size. This means that physical activity decreased with increasing hip size.

In the clinical control group we found statistically significant ($p < 0.01$), positive relationship of physical activity with stress ($r = 0.36$) (moderate correlation). This means that physical activity increased with increasing stress.
In the clinical control group we found statistically significant also with WHR ($r = 0.26$) (weak correlation). This means that physical activity increased with increasing stress and WHR.

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The remaining differences were not statistically significant.

Discussion

Our study confirmed that subjects with overactive bladder reduced their physical activity.

Turkish authors came to similar conclusions. Tahra et al assessed physical activity of patients with urinary incontinence, including those with OAB. Their study involved 25 subjects. They used a number of tests and questionnaires (IPAQ-SF, UDI-6, OAB-V8, up and go test, Tineti gait, Berg balance scale etc.). It turned out that compared to the clinical control group, people with urinary incontinence significantly reduced their physical activity [22].

Dąbek studied correlation between physical activity and urinary urgency. She used the GPPAQ (The General Practice Physical Activity Questionnaire) and studied 85 subjects aged 18 to 45 years. The subjects kept voiding diaries for three days. They assessed, inter alia, urinary urgency. The author found that physically inactive subjects had strong urinary urgency more often [19].

US authors assessed physical activity of 4145 subjects aged 30 to 79 years. In a 5-year follow up, the same subjects were surveyed. It turned out that subjects who had low physical activity were 2–3 times more likely to have lower urinary tract symptoms (LUTS) than subjects with high physical activity [24].

Matsumoto believed that physical activity improved blood flow in the bladder and pelvis. The author studied 379 subjects (304 women and 65 men) aged over 65 years. He found OAB in 61 subjects. Matsumoto proved that general physical activity done once a week for 1.5 hours decreases OAB symptoms as quickly as after 12 weeks. Interestingly, physical activity did not involve bladder training, pelvic floor muscle training or other elements of physical therapy. Instead, it consisted of general exercise: power, balance, aerobic and stretching exercises. The author believed that in OAB patients physiotherapy operates too locally, in contrast to the exercise programme he used [18].

Studies on rats suggested that physical activity may prevent OAB. De Olivera et. al divided 28 rats randomly into 4 groups: 1 – rats with physical activity and standard diet, 2 – rats with physical activity and fat-rich diet, 3 – rats without physical activity and with standard diet, 4 – rats without physical activity and with fat-rich diet. Physical activity meant that the animals swam 5 times a week for 60 minutes. After twelve weeks of experiment all rats were given urodynamic tests. Group 3 and 4 rats, who did not have physical activity, had higher body mass, greater number of micturitions and higher postvoid pressure. It showed that physical activity may prevent bladder dysfunctions induced by fat-rich diet [25].

An interesting matter, although difficult in terms of methodology, involves risk factors of OAB. Numerous authors [3, 4, 7, 26, 27] include the following among them: advanced age, high BMI, gender (female), natural birth, menopause, short sleep, smoking, drinking coffee and

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alcohol, unemployment, depression. Zhu et al. performed a meta analysis, as a result of which they distinguished 28 out of 4374 articles on OAB risk factors. Detailed analysis showed that people with OAB had significantly higher BMI and age than clinical controls. Additionally, OAB was significantly more common among the unemployed [28].

According to numerous authors, high BMI is the main factor predisposing for developing OAB [9, 11, 26, 27, 29]. Our study confirmed this. Subjects with OAB had significantly higher BMI than clinical controls.

Hagovska et al. showed that the body fat percentage (BFP) is a more reliable parameter than BMI. 206 overweight young women (BMI 25 to 29.9) were qualified for their study. The women were divided into two groups. The first group were 90 women, with BFP below 32% and the second group were 116 women with BFP above 32%. Both groups completed the OAB-q questionnaire. The results showed that young women with BFP above 32% were 95% more likely to develop OAB than women with BFP below 32% [8].

Link et al. studied the relationship between different methods of measuring obesity (waist size, hip size, WHR, and BMI) and OAB. They studied 5503 people, including 657 women with OAB and 269 men with OAB. They found that OAB risk increases with increase of BMI, waist size and hip size. The relationship between WHR and OAB was not statistically significant.

In our own study we analysed whether physical activity was related to the waist size, hip size, WHR and BMI. In people with OAB physical activity correlated only with hip size. The greater was the hip size in people with OAB, the lower was their physical activity.

According to Nocturnia et al. behavioural therapy should be the therapy of first choice in patients with OAB. Patients with OAB should reduce body mass, avoid: coffee, alcohol, hot spices, smoking and fluid intake two hours before sleep. According to the authors, improving general health is the most important recommendation for patients with OAB. The best way to achieve this is through increased physical activity [7].

The value of the conducted study

The conducted study has a practical value. The obtained data show that patients with OAB reduce physical activity and that it is related to hip size. Simultaneously, studies by other authors prove that physical activity may be one of the efficient form of treatment for people with OAB. Reliable scientific data may increase OAB patients' motivation for physical activity.

Limitations of the conducted study

It is worth continuing studies on a larger number of patients and under careful supervision of a physiotherapist. Because of the Covid-19 pandemics it was impossible to conduct the study in hospital. In addition, it seems worth to extend the study tools to include questionnaires on quality of life in order to obtain an answer to the question: what was the reason for reducing physical activity?

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Conclusions

1. Subjects with overactive bladder reduced their physical activity.
2. The poorest physical activity was found in patients with large hip size.
3. In subjects with overactive bladder stress, age, BMI, waist size and intensity of condition were not related to physical activity.
4. Physical activity may be one of the efficient form of treatment for people with OAB.

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