

## KNOWLEDGE ON PHYSICAL ACTIVITY AND NUTRITION BEHAVIOURS IN PATIENTS WITH INCREASED BODY WEIGHT AND CARDIOVASCULAR DISEASES

### WIEDZA W ZAKRESIE AKTYWNOŚCI FIZYCZNEJ I NAWYKÓW ŻYWIENIOWYCH CHORYCH ZE ZWIĘKSZONĄ MASĄ CIAŁA I CHOROBYMI UKŁADU KRĄŻENIA

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- A. Study design/planning  
zaplanowanie badań
- B. Data collection/entry  
zebranie danych
- C. Data analysis/statistics  
dane – analiza i statystyki
- D. Data interpretation  
interpretacja danych
- E. Preparation of manuscript  
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- F. Literature analysis/search  
wyszukiwanie i analiza literatury
- G. Funds collection  
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#### Summary

**Background.** Low physical activity and the increasing number of overweight and obese people contribute to the prevalence of cardiovascular diseases in society. Classic risk factors and improper lifestyle increase the risk of their occurrence, progression and mortality in patients. The aim of the study was assessment of physical activity and nutrition behaviours in people with abnormal body weight and cardiovascular diseases.

**Material and methods.** The study involved 152 patients including 70 men and 82 women aged 23-95 years (mean 55.4 ± 14.04 years). The study used the International Physical Activity Questionnaire IPAQ in its seven-day version and an original questionnaire. The data were collected in a database and Statistica v.10 was used for a statistical analysis.

**Results.** The average energy expenditure amounted to 1.422 MET. 50% of the participant demonstrated sufficient physical activity, 36% low, and only 14% high. Only 15% of the respondents did exercises. Despite being overweight and obese, 66% of the respondents did not follow a diet and only 17% of them consumed 5 meals a day.

**Conclusions.** Despite the occurrence of cardiovascular diseases and abnormal body weight, physical activity was low in the study group, and the knowledge in this regard was limited. In addition a significant number of respondents did not exhibit healthy behaviours.

**Keywords:** obesity, risk factors, cardiovascular diseases, physical activity

#### Streszczenie

**Wprowadzenie.** Niewystarczająca aktywność fizyczna oraz stały wzrost liczby osób z nadwagą i otyłością przyczyniają się do występowania w społeczeństwie chorób układu krążenia. Rozpowszechnienie klasycznych czynników ryzyka i nieodpowiedni styl życia zwiększają ryzyko ich występowania, progresji oraz odsetka śmiertelności wśród chorujących. Celem pracy była ocena aktywności fizycznej oraz nawyków żywieniowych chorych ze zwiększoną masą ciała i chorobami układu krążenia.

**Materiał i metody.** Zbadano 152 chorych, w tym: 70 mężczyzn i 82 kobiety w wieku 23-95 lat (średnio: 55.4 ± 14.04). Do badań wykorzystano autorski kwestionariusz ankiety, a do oceny aktywności fizycznej standaryzowany Międzynarodowy Kwestionariusz Aktywności Fizycznej w wersji siedmiodniowej. Analizę statystyczną wykonano przy użyciu programu Statistica v.10.0.

**Wyniki.** Średni wydatek energetyczny badanych chorych wynosił 1.422 MET. Wśród nich, 50% badanych uzyskało wystarczający poziom aktywności fizycznej, 36% niski, a 14% - wysoki. Spośród badanych 15% respondentów uprawiało sport. Pomimo występującej nadwagi lub otyłości, 66% badanych nie stosowała diety, a jedynie 17% spożywało 5 posiłków dziennie

**Wnioski.** Pomimo występowania chorób układu krążenia oraz nieprawidłowej masy ciała aktywność fizyczna w badanej grupie była zbyt mała, a wiedza w tym zakresie – niewystarczająca. Ponadto znaczna grupa badanych osób nie przestrzegała prawidłowych nawyków żywieniowych.

**Słowa kluczowe:** otyłość, czynniki ryzyka, choroby układu krążenia, aktywność fizyczna

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## Introduction

The development of technology and mechanisation contributed to a significant reduction of physical activity in society. The most common devices linked to daily use such as washing machine, dishwasher, elevators, mobile phones and public transport caused that people move less frequently. Insufficient physical activity in combination with the omnipresent stress, the fast pace of life, poor nutrition or use of drugs contributed to an increasing prevalence of cardiovascular diseases [1].

Cardiovascular diseases are the leading causes of death in the world [2]. While in 1960 cardiovascular incidence accounted for 23.4% deaths, in 2013 it was already 45.8%. Projections for morbidity are also not optimistic. As the forecasts of the Central Statistical Office have shown, the number of deaths from cardiovascular causes in Poland will increase from 177 thousand (45.8% of the total mortality) in 2013 to 218.9 thousand in 2050 (51.1% of the overall mortality). To a large extent, the risk factors that contribute to the dissemination of cardiovascular diseases contribute can be divided into two groups: modifiable and non-modifiable [3].

The group of non-modifiable risk factors include age, sex, and positive family history, and the group of modifiable risk factors: smoking, hypertension, improper diet, stress, alcohol abuse, unsatisfactory physical activity, hypercholesterolemia, overweight, obesity and diabetes [4,5,6,7]. The presence of modifiable risk factors can be eliminated, and people can modify their habits and lead a healthy lifestyle. Then, such an elimination of risk factors reduces the risk of cardiovascular disease from 50 up to 70% [1,8].

The recommendations by American Heart Association on the prevention of cardiovascular diseases indicate that one of the significant factors is regular physical activity. Each type of exercise has a positive effect on risk factors of cardiovascular disease [9]. Daily physical activity leads to the reduction in cardiac load by slowing the heart rate in rest, lowering resting blood pressure, speeding up the return of the pulse rate after exercise to the resting level [10]. In addition, it improves emotional state and mental health, regulates body fat distribution and helps maintain a diet regimen.

Under the influence of regular exercise, there also occurs lower concentration of cholesterol, i.e. LDL, while the level of HDL, which has a significant effect of physical activity, increases. Consequently, physical activity combined with a healthy diet can help to keep the correct body weight or reduce its excess [11]. In the developed and developing countries, a significant increase in the number of the overweight or obese contributed to recognising obesity as a civilisation disease. It concerns not only older people who, for various reasons have limited their physical activity, but more and more often youth and younger persons, in particular children. The problem has become a global issue. In Europe, as many as 50 – 65% of the population have increased body weight, of which about 16% are obese. In Poland, 52% men and 29% women suffer from an increased body weight [12,13,14]. Overweight and obesity are in themselves risk factors for cardiovascular disease [15]. In patients who are burdened with cardiovascular diseases, overweight or obesity, incorrect nutrition habits, an unsatisfactory level of physical activity and coexisting diseases have negative influence on their prognosis.

The main aim of the study was an assessment of physical activity and nutrition behaviours in patients with increased body weight and cardiovascular diseases. Additionally, knowledge concerning physical activity, principles of proper nutrition and their application in daily life was assessed.

## Material and methods

The study involved 152 patients including 70 men and 82 women aged from 23 to 95, average 55,4±14,04. Characteristics of the study group are shown in Table 1.

**Table 1.** General characteristics of the study group

Variable	Average	Min	Max	SD
Age [year]	55.4	23	95	18.45
Body weight [kg]	81.7	55	135	14.04
Height [m]	1.69	1.48	1.96	0.097
BMI [kg/m <sup>2</sup> ]	28.2	25	42	3.13

The study was conducted at the Department of Physiotherapy and Hydrotherapy in MSWiA Hospital in Katowice, Poland. The study used the International Physical Activity Questionnaire (IPAQ), a seven-day self assessment format, and an original questionnaire.

The IPAQ consisted of 4 parts testing hard work, moderate work, walking and time spent sitting during the day. On the basis of the collected data, the total energy expenditure was calculated in MET (Metabolic Equiva-

lent). The original questionnaire included 29 questions relating to physical activity, knowledge in this regard, nutrition behaviours and lifestyle of the surveyed participants. All the individuals expressed their agreement to participate in the examination. The inclusion criteria for the study were the occurrence of cardiovascular disease and a BMI above 25 kg / m<sup>2</sup>. The data were collected in a database and for statistical analysis (Statistica v.10 was used).

## Results

### General characteristics of the study group patients with increased body mass and cardiovascular diseases

The general characteristics of the study group of patients with increased body mass and cardiovascular diseases are presented in Table 1.

The characteristics of the study group of patients with increased body mass and cardiovascular diseases regarding BMI are presented in Table 2.

**Table 2.** Characteristic of the study group regarding BMI

Variable	N=152	100%
<b>Underweight ( BMI &lt; 18.5)</b>	0	0%
<b>Correct range (BMI 18.5-24.9)</b>	0	0%
<b>Overweight (BMI 25-29.9)</b>	118	78%
<b>Obesity Class I (BMI 30-34.9)</b>	30	20%
<b>Obesity Class II (BMI 35-39.9)</b>	2	1%
<b>Obesity Class III (BMI ≥ 40)</b>	2	1%

It turned out that body mass index exceeded 25kg/m<sup>2</sup> in each person and every fifth tested individual was obese.

Table 3 presents characteristics of the study group of patients regarding the occurrence of cardiovascular diseases.

**Table 3.** Occurrence of cardiovascular diseases in the study group

Variable	N=152	100%
<b>Hypertension</b>	106	69%
<b>Coronary artery disease</b>	18	12%
<b>Myocardial infraction</b>	29	19%
<b>Coronary angioplasty</b>	12	8%
<b>Heart failure</b>	7	4.5%
<b>Valvulopathy</b>	13	8.5%
<b>Arrhythmia</b>	19	12.5%
<b>Peripheral vascular disease</b>	14	9%
<b>Stroke</b>	7	4.5%
<b>Other</b>	6	4%

Most patients in the study group, i.e. 106 (69%), suffered from hypertension, subsequently myocardial infarction and coronary heart disease. A few patients had a stroke and were struggling with heart failure – 7 persons (4.5%).

### Physical activity of patients with increased body mass and cardiovascular diseases

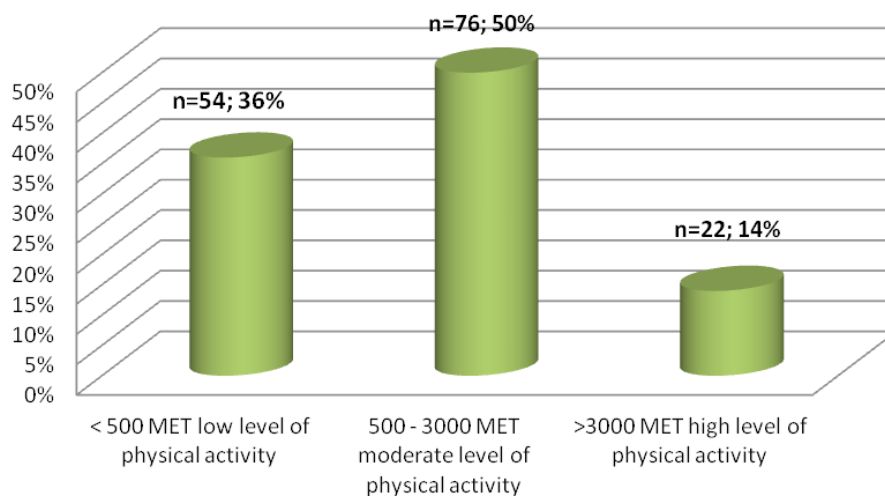
The characteristics of the study group with increased body mass and cardiovascular diseases took into account the data provided by the International Physical Activity Questionnaire: the load of hard work, moderate work, walking, total physical activity in MET (Metabolic Equivalent) and time spent sitting during the day. The data were shown in Table 4.

**Table 4.** Characteristic of the study group taking into account data of IPAQ

Variable	Average	Min	Max	SD
Hard work (MET)	333.4	0	4320	657.9
<b>Moderate work (MET)</b>	338.2	0	6720	680.1
<b>Walking (MET)</b>	746	0	5148	1020
<b>Total Physical Activity (MET)</b>	1422	0	9200	1607.4
<b>Sitting (min.)</b>	320	50	850	147

The total energy expenditure in the study group was diverse and ranged from 0 to 9200 MET. Furthermore, the surveyed participants spent their time sitting even 14 hours a day.

Taking all the data of total energy expenditure into account, the surveyed participants were qualified into three groups, those demonstrating low, moderate and highly physically activity (Figure 1).



**Figure 1.** Characteristic of the study group regarding total physical activity based on IPAQ

The study indicated that, although half of the patients achieved a sufficient level of physical activity ranging from 500 to 3000 MET, the physical activity level of 54 respondents (36%) was too low (less than 500 MET). Only 22 tested persons (14%) achieved a high level of physical activity.

The characteristics of the study group of patients with increased body mass and cardiovascular diseases also measured the knowledge on the role of physical activity in the prevention of cardiovascular disease. The findings are presented in Table 5.

**Table 5.** Level of knowledge taking into account physical activity in study group

Variable	N=152	100%
<b>Should patients which suffering from heart diseases be physically active?</b>		
Yes	137	90%
No	3	2%
I don't know	12	8%
<b>How often should people with cardiovascular disease be physically active?</b>		
Just once a week	15	10%
Few days a week	58	38%
Everyday	33	22%
I don't know	46	30%
<b>How long should one exercise to achieve beneficial changes in the circulatory system?</b>		
Two weeks	6	4%
At least a month	21	14%
At least three months	47	31%
I don't know	78	51%

How long should an exercise last?		
At least 30 minutes	96	63%
At least 60 minutes	13	8%
Above 60 minutes	2	1%
I don't know	41	27%

The characteristics of the study group with regard to activities performed during leisure time are shown in Table 6.

**Table 6.** Characteristic of the study group taking account preference of leisure time activities

Variable	N=152	100%
Watching TV	91	60%
Reading books	50	33%
Napping	23	15%
Solving crosswords	35	23%
Playing on computer	26	17%
Walking	43	28%
Working in the garden	27	18%
Meeting with friends	35	23%
Exercising	23	15%
Other	0	0%

Only 23 patients from the study group (15%) did exercises in leisure time, whereas 91 persons (60%) watched TV or read a book – 50 respondents (33%).

### Characteristics of the study group of patients with increased body mass and cardiovascular diseases regarding BMI

The characteristics of the study group regarding assessment and control of body mass as well as dietary habits are presented in Table 7.

**Table 7.** Characteristic of the study group regarding assessment and control of body mass

Variable	N=152	100%
Everyday	5	3%
Once a week	15	10%
Once a month	36	24%
Once of three months	30	20%
Semi-annually	30	20%
I do not control the process	35	23%
Subjective assessment of their own body weight		
Correct	47	31%
Slightly too large	74	49%
Definitely too large	17	11%
I cannot determine it	14	9%
Using a diet		
Yes	52	34%
No	100	66%
Regular eating		
Yes	37	25%
No	84	56%
I do not pay attention	29	19%
Number of daily meals		
2 meals	6	4%
3 meals	54	36%

4 meals	49	32%
5 meals	26	17%
I'm eating when I'm hungry	17	11%
<b>Snacking between meals</b>		
Yes	117	77%
No	35	23%

The examination of the study group showed that, despite overweight and obesity as well as cardiovascular diseases in the patients, 100 respondents (66%) did not follow a diet, 117 (77%) snacked between meals, and only 26 (17%) ate five meals a day. Moreover, 47 patients (31%) estimated their body weight as correct, although it was not the case, and 14 patients could not evaluate their body weight.

## Discussion

The results of the studies on physical activity patients with cardiovascular diseases and increased body mass confirmed the findings documented in numerous publications, which shows that the level of physical activity in these groups of patients is too low. During an average week, the patient's expenditure for walking is on average 746 MET.

A one-time moderate physical activity lasted on average 37 minutes on three days a week. As for moderate work, average weekly energy expenditure was 338 MET per week.

One-time physical activity at the intensive level lasted on average 31 minutes for 2.9 days per week. The average weekly energy expenditure related to an intense activity amounted to 333 MET. Such a result is considered insufficient. Physical activity at moderate level was demonstrated by 100 patients (66%). Intensive physical exercises were performed the least often, i.e. 67 (44%) of the surveyed, which means that the majority of respondents did not do any exercises required to accelerate the pulse and breathing.

An average for the total weekly expenditure of energy amounted to 1417 MET. When compared to the scale of the IPAQ Q, the result seems sufficient, but it should be kept in mind that this average physical activity concerns all the respondents.

The sufficient level of physical activity was exhibited only by one in two patients. The results are consistent with those published in 2013 research in which Puciato et al. examined 2,053 people using the IPAQ short version, which showed that the level of physical activity during leisure time in the studied population was low [15]. Similar results were obtained in the study conducted by Wozniak et al., which assessed physical activity and diet behaviours of people with cardiovascular diseases. Most of the patients (81% women and 66% men) showed a sufficient level of physical activity, but their nutrition behaviours did not follow the recommendations [16]. However, the study by Woźniak et al. indicated a higher percentage of those who achieved a sufficient level of physical activity compared to our results. This may indicate that the prevalence of overweight or obesity in people with cardiovascular disease is an important factor which decreasing their physical activity. What seems comforting is the fact that 90% of the surveyed realize that patients with cardiovascular diseases should be physically active. There remains a very large group of patients who do not know this.

Further, the study assessed the number of meals consumed a day as well. It was shown that the numbers varied. Some patients consumed 2 meals: 6 (4%); others 26 (17%) – 5 meals, despite an increased body weight. The biggest groups of respondents consumed 3 meals – 54 persons (36%); and 4 meals – 49 respondents (32%). The results are consistent with the already mentioned research, which concludes that few people consume only 2 meals per day (3% of the respondents) or 5 meals (17%). However, by far the most numerous groups of respondents consumed 3 meals – 46% of the respondents or 4 – 35% of the surveyed.

The study by Platta et al. assessing nutritional behaviours of patients with regard to prevention of cardiovascular diseases showed that 40% of the surveyed are overweight and 13% were patients in Obesity Class I, whereas 1% – in Obesity Class II [17]. The results of the presented study are not consistent with our findings, maybe because the former group featured 118 overweight patients (77%), which was twice higher than in our study. However, very similar results were recorded in terms of Obesity Class II, which was found in 30 of the respondents (19%). The study showed that 2% of the patients could be classified as belonging to that class, which was close to our findings.

As for lifestyle and knowledge on healthy behaviours in obese people with hypertension, a publication from 2009 reported that up to 66.7% of the surveyed women and 87.1% of the men did not follow any diet, despite the increased weight and accompanying hypertension [18]. Interestingly, these results are consistent with our studies in which up to 100 of the surveyed patients (66%) did not follow any diet despite increased body weight.



It is worth emphasising that a significant number of patients in the study group also suffered from hypertension, which is regarded as a lifestyle disease related to one's diet, unhealthy lifestyle and insufficient knowledge on nutrition [19].

Thus, despite the fact that the half of the surveyed persons achieved a sufficient level of physical activity, their knowledge in this regard was limited. What is worse, they do not follow the healthy recommendation in their daily life. The burden of cardiovascular diseases, overweight and obesity adversely affects health outcomes in this group of patients and; therefore, the results of the presented studies point to a need of introducing health education programme in the groups with the same or similar disorders as those in the study group.

## Conclusions

Basing on these results, the following conclusions have been formulated:

1. Physical activity of half of the patients with increased body weight and cardiovascular diseases was sufficient, although their knowledge in this regard was unsatisfactory.
2. Patients of the study group show incomplete knowledge on healthy behaviours and, in most cases, they did not follow them in daily life.
3. Most of the patients exhibited improper nutrition habits and did not pay attention to proper nutrition, which mainly contributes to their increased weight and, consequently, predisposes them to cardiovascular diseases.
4. Improper health behaviours and low physical activity in patients with increased body mass and cardiovascular diseases result not only from insufficient knowledge in this field but also a lack of desire and motivation to apply it in daily life.

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