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# RESULTS OF A STUDY ON OCCUPATIONAL AND NON-OCCUPATIONAL DETERMINANTS OF OBESITY AMONG BLUE-COLLAR WORKERS

Elżbieta Łastowiecka-Moras

Central Institute for Labor Protection – National Research Institute, Warsaw, Poland
Department of Ergonomics

**Highlights**

- Workplaces should play a significant role in preventing obesity.
- Excessive body weight was found in 61.1% of the men in the study.
- Obesity is a major health issue among blue-collar workers.

**Abstract**

**Background:** Obesity is a serious health problem among workers. Blue-collar workers, despite the fact that their work involves physical effort, may also have difficulty maintaining a healthy body weight. A survey was conducted to determine the prevalence of overweight and obesity among blue-collar workers employed in various sectors of industry. The study also examined the influence of selected occupational and non-occupational factors on excessive body mass in this group of workers. **Material and Methods:** The survey was conducted using the computer assisted personal interview method among a group of 542 men, blue-collar workers aged 25–65 years, with an average age of 43.9 years. **Results:** Excessive body weight, defined by body mass index, was present in 61.1% of the study group of men. In almost half of the overweight and obese subjects, waist circumference values exceeded 94 cm, which is characteristic of abdominal obesity. Overweight and obese workers were significantly more likely to work >40 h/week, had poorer work ability measured by the *Work Ability Index* (WAI) and lower activity measured by the *International Physical Activity Questionnaire* (IPAQ) compared to normal-weight workers. **Conclusions:** It seems that for the subjects studied, the key to achieving or maintaining normal weight should be to strengthen lifestyle activities. Workplaces should play a supportive role by encouraging recreational activities and providing adequate time for rest and recovery. Med Pr Work Health Saf. 2025;76(5):373–383

**Key words:** obesity, physical activity, overweight, occupational factors, blue-collar workers, non-occupational factors

Corresponding author: Elżbieta Łastowiecka-Moras, Central Institute for Labor Protection – National Research Institute, Department of Ergonomics, Czerniakowska 16, 00-701 Warsaw, Poland, e-mail: ellas@ciop.pl
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## INTRODUCTION

Obesity is classified as a chronic, non-communicable disease that does not tend to resolve on its own [1]. According to the World Health Organization, in 2022, 43% of adults worldwide were overweight and 16% were obese and by 2030, approx. 1 billion people worldwide will be struggling with this condition [2,3]. In Poland, a study conducted as part of the National Health Program showed that 2016–2020, overweight affected 62% of men and 43% of women, while obesity was observed in 16% of men and 12% of women [4].

Untreated obesity, particularly abdominal obesity, can result in >200 health complications [5]. These primarily include cardiovascular diseases, such as atherosclerosis, stroke, and hypertension, hypercholesterolemia and dyslipidemia, type 2 diabetes, musculoskeletal disorders (mainly osteoarthritis and inflammatory joint diseases such as rheumatoid arthritis), osteoporosis, metabolic syndrome, sleep apnea syndrome, chronic venous insufficiency in the lower limbs, depression, anxiety and other emotional disorders, and an increased risk of developing cancers [6–8].

The primary factor leading to excessive weight gain is the prolonged consumption of calories exceeding the

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body's energy requirements, resulting in a positive energy balance [9]. The most significant factors leading to a positive energy balance include a high-calorie diet and insufficient physical activity relative to food intake [10].

The link between sedentary work and difficulties in maintaining a healthy body weight is widely known. However, it is less obvious that obesity can also be a serious problem in blue-collar workers. Computerization of work is responsible for reducing the amount of daily physical activity performed by these workers [11,12]. On the other hand, occupational duties often lead to fatigue and an aversion to physical activity during leisure time and can contribute to the development of bad eating habits and a tendency to gain weight.

The aim of the study was to assess the prevalence of overweight and obesity among blue-collar workers employed in various sectors of the economy and to evaluate the impact of selected occupational and non-occupational factors on the occurrence of overweight/obesity in this group.

## MATERIAL AND METHODS

The study covered 542 men, aged 25–65 years, doing physically demanding work with a min. 5 years of experience. The study was conducted on a nationwide scale August–September 2023. The sample size was initially set at 500 individuals, but a greater number of surveys were ultimately completed. Additional participants were included in the research sample, which finally amounted to 542 individuals. The participants represented small, medium, and large enterprises with diverse business profiles. The anonymous survey was carried out using the computer assisted personal interview (CAPI) method. In the CAPI quantitative research, a trained interviewer asked questions during a face-to-face meeting with the respondent, and the answers were recorded directly into a computer system. The questionnaire developed for the study was based on commonly used questionnaires and consisted of the following sections: personal data (age, education, anthropometric data), job characteristics (general organization of work, physical workload, self-assessment of working conditions, exposure to occupational hazards), health status (disease entities as reported by the worker, self-assessment of health condition) and lifestyle factors (eating habits, physical activity level at leisure time, sleep hygiene, the frequency of alcohol consumption). To assess the nutritional status of the participants, the body mass index (BMI) was used, based on the respondents' self-reported current weight and height. The optimal BMI range for adults (18.5–24.9 $kg/m^2$) is associated with the lowest risk of obesity-related complications [13]. Overweight is defined as a BMI 25.0–29.9 $kg/m^2$, obesity class I as a BMI 30.0–34.9 $kg/m^2$, obesity class II as a BMI 35.0–39.9 $kg/m^2$, and obesity class III as a BMI of ≥40.0 $kg/m^2$.

Respondents were asked to measure and report their current waist circumference following the instructions provided in the questionnaire. Based on the criteria of the International Diabetes Federation, abdominal obesity in the European adult population is diagnosed when waist circumference is ≥80 cm for women and ≥94 cm for men. The risk of metabolic complications is significantly higher, with a waist circumference of ≥88 cm for women and ≥102 cm for men [14].

Additionally, 2 questionnaires were employed: the *Work Ability Index* (WAI) to assess work ability, and the *International Physical Activity Questionnaire* (IPAQ) – long form to evaluate the level of physical activity. The WAI consists of 7 questions, 5 of which focus on subjective assessments and remaining 2 questions serve as objective health indicators. The cumulative index of WAI ranges 7–49 pts, with a higher score indicating better work ability. It is divided into the categories: poor (7–27 pts), moderate (28–36 pts), good (37–43 pts) and excellent work ability (44–49 pts) [15].

The IPAQ long form is a 27-item self-reported questionnaire. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health-related physical activity. The questionnaire is divided into 5 independent sections and provides information on physical activity related to work, transportation, household chores, recreation, sports, and time spent sitting. The questionnaire allows for the comparison of physical activity levels among adults (aged 15–69 years) in units of energy expenditure measured in metabolic equivalent of task (MET). Metabolic equivalent of task represents the resting energy expenditure, based on an oxygen consumption rate of 3.5 ml/min/kg of body weight. For low-intensity activity, a value of 3.3 METs is assigned (e.g., walking), for moderate-intensity activity, the value is 4 METs (e.g., cycling at a normal pace), and for high-intensity activity, the value is set at 8 METs (e.g., aerobics, fast cycling, running). The results of the questionnaire allow respondents to be categorized into 1 of 3 physical activity levels: high, sufficient, and insufficient [16].

The Commission for Bioethics at the Institute of Rural Health, Lublin, Poland, approved the planned research (Decision No. 9/2023, June 20, 2023).

### Statistical analysis

Data analysis was performed using SPSS v. 28 (IBM Corp., Armonk, NY, USA). The associations between variables were assessed with Pearson's $\chi^2$ test and independent samples Student's t-test. The $\chi^2$ test was applied to nominal variables, accompanied by effect size measures such as φ or Cramér's V. For quantitative variables, parametric tests were used to compare means (M) between 2 groups of blue-collar workers: those with normal body weight and those with overweight or obesity. Statistical significance was set at $p < 0.05$.

A multinomial logistic regression analysis was conducted to identify independent predictors of overweight and obesity, with normal weight as the reference category. Separate odds ratios were reported for overweight vs. normal weight and obesity vs. normal weight.

## RESULTS

Aside from the relationships outlined in the article, no other statistically significant differences were identified.

### Personal data

The study group consisted of 542 men with an average age of 43.9 years (standard deviation [SD] = 12.29 years). The number and percentage of the participants, taking into account body weight according to the BMI and abdominal obesity are presented in Table1.

### Job characteristics

The total work experience in the study group was M±SD 21.9±11.9 years (min.–max 5.0–46.0 years). The majority of respondents represented industries typical for physically demanding work, such construction (38.9% of responses), food industry (17.9%), and utilities (16.2%).

The vast majority of respondents were employed on a full-time employment (82.3%). Among participant, 217 individuals (40.0%) reported working >40 h/week. Among participants who work >40 h/week 68 (31.3%) were normal weight while 99 (45.6%) were overweight and 50 (23.1%) were obese.

Working >40 h/week was more common in case of individuals with obesity ($p = 0.004$). Among the respondents, 33.4% reported working in a shift system. More than 1 in 5 respondents (22.5%) worked during night hours.

The factors present in the work environment to which the surveyed men were most frequently exposed during working hours are shown in Table 2.

Analyzing the results in terms of physical effort related to work, a diversity in perception of the strength of work was observed. Nearly half of the respondents – 258 workers (47.6%) – described their work as heavy (Table 3).

In response to whether the work they perform is too heavy relative to their abilities, nearly half of the respondents – 266 individuals (49.1%) – answered "yes" and this answer was more frequent in the group with obesity ($p < 0.001$) (Table 4).

### Results of the *Work Ability Index*

The total WAI score in the study group ranged 15–49 pts, with M±SD 37.8±6.1 pts, placing it in the category of good work ability. Significant correlations were found between work ability indices and body weight, particularly in the following items: current work ability com-

**Table 1.** Study participants by body mass index (BMI) categories and waist circumference – the study conducted in Poland, August–September 2023

| Variable | M±SD | Min. | Max | Participants (N = 542) | |
|---|---|---|---|---|---|
| | | | | n | % |
| BMI category [kg/m²] | 26.4±3.77 | 18.7 | 41.0 | | |
| normal body mass (18.5–24.99 kg/m²) | 22.8±1.43 | 18.7 | 24.9 | 211 | 38.9 |
| overweight (25.0–29.99 kg/m²) | 27.1±1.26 | 25.0 | 29.8 | 220 | 40.6 |
| obesity (≥30.0 kg/m²) | 32.3±2.33 | 30.0 | 39.5 | 111 | 20.5 |
| class I (30.0–34.99 kg/m²) | 31.6±1.48 | 30.0 | 34.9 | 95 | 85.6 |
| class II (35.0–39.99 kg/m²) | 36.7±1.75 | 35.0 | 39.5 | 15 | 13.5 |
| class III (≥40.0 kg/m²) | 41.0 | – | – | 1 | 0.9 |
| Waist circumference [cm] | | | | | |
| <94 cm (normal) | 85.6±4.48 | 70 | 93 | 315 | 58.1 |
| ≥94 cm (abdominal obesity) | 100.9±6.99 | 94 | 130 | 130 | 24.0 |
| no data | | | | 97 | 17.9 |

**Table 2.** Work environment factors on which the surveyed men were most frequently exposed* – the study conducted in Poland, August–September 2023

| Risk factor | Participants (N = 542) | |
|---|---|---|
| | n | % |
| Standing for prolonged periods | 223 | 41.1 |
| Working in awkward or forced positions | 190 | 35.0 |
| Performing monotonous tasks | 188 | 34.7 |
| Frequent bending | 177 | 32.6 |
| Lifting and carrying loads ≤10 kg | 163 | 30.1 |
| Engaging in strenuous physical effort that caused fatigue | 135 | 24.9 |

* Multiple-answer questions.

**Table 3.** Strength level of work by subjective feeling of respondents – the study conducted in Poland, August–September 2023

| Strength level of work | Participants (N = 542) | |
|---|---|---|
| | n | % |
| Very heavy | 105 | 19.4 |
| Heavy | 258 | 47.6 |
| Medium | 179 | 33.0 |

pared with the lifetime best ($p < 0.001$), work ability in relation to job demands ($p < 0.001$), estimated work impairment due to diseases ($p < 0.001$), mental resources ($p < 0.001$) and total work ability score ($p < 0.001$).

All components of WAI – except for the estimated impairment of work ability due to conditions diagnosed by a doctor and absenteeism due to illness – were significantly higher in the group of men with normal body weight compared to individuals in the obese groups. The greatest differences between the compared groups were observed in the variables of total work ability and current work ability compared to the best ability in life.

**Health status**

Responses of the participants regarding their subjective assessment of health by BMI are shown in Table 4. Significantly more individuals with obesity ($p < 0.001$) compared to those with healthy body weight and overweight rated their health status as poor or very poor.

Among the currently reported chronic diseases, respondents most frequently mentioned musculoskeletal disorders (189 participants – 34.9%), hypertension (144 participants – 26.6%), and obesity – 79 (14.6%). Notably, although obesity was identified based on the BMI in 111 individuals, only 79 respondents mentioned it as a currently existing disease. Most of the participants – 355 (65.5%) – were satisfied with their body weight.

**Lifestyle**

Subsequently, respondents were asked about the factors of a healthy lifestyle that they consider most important for maintaining health. For the largest group of respondents – 411 individuals (75.8%) – sleep emerged as the most significant factor (Figure 1).

As regards dietary habits, the vast majority of respondents – 482 individuals (88.9%) – preferred a traditional diet based on a variety of products. The most popular types of snacks consumed between meals in the group of participants were: fruits – 236 workers (43.6%), vegetables – 118 (21.8%), sandwiches – 272 (50.2%), sweets – 166 (30.6%) and fast food – 96 (17.7%). Significantly more individuals with obesity compared to those with normal body weight and overweight preferred sweets and fast food between meals ($p = 0.022$). In the Table 4, other dietary habits that differ group with normal body weight and group with overweight and obesity are shown.

The vast majority of surveyed individuals – 395 people (72.9%) – reported drinking alcohol. The response distribution for the question regarding alcohol consumption is shown in the Table 4.

In the group of individuals with obesity, the percentage of those consuming alcohol was statistically higher ($p < 0.001$). The frequency of alcohol consumption in the study group by BMI is presented in Table 4. In the group of individuals with obesity, the percentage of those reporting alcohol consumption several times a week or even everyday was significantly higher compared to the group with normal body weight ($p < 0.05$).

Subsequently, respondents were asked about sleep hygiene. The answers to the questions about sleep hours by BMI are presented in Table 4. Significantly more individuals with obesity compared to those with normal body weight and overweight slept <6 h/night ($p < 0.05$). Among respondents, 220 workers (40.6%) do not feel rested after sleep. Statistically, more individuals experiencing insufficient rest after sleeping were found in the obesity group ($p < 0.001$).

The next survey questions regarded physical activity after work. Responses on the need for physical activity after work indicated that only 289 workers (53.3%) feel the need for physical activity. Statistically, more workers who said "yes" were in the group with normal weight ($p = 0.001$). Walking was the most popular ac-

**Table 4.** Answers to the questions by body mass index (BMI) in the study group – the study conducted in Poland, August–September 2023

| Variable | Participants | | | | | | | | p |
|---|---|---|---|---|---|---|---|---|---|
| | BMI: normal | | BMI: overweight | | BMI: obesity | | total | | |
| | n | % | n | % | n | % | n | % | |
| Do you think that the work you perform is too heavy according to your abilities? | 211 | | 220 | | 111 | | 542 | | 0.001 |
| yes | 66 | 31.3 | 130 | 59.1 | 68 | 61.3 | 266 | 49.1 | |
| no | 145 | 68.7 | 90 | 40.9 | 43 | 38.7 | 276 | 50.9 | |
| How do you rate your current health status? | 211 | | 220 | | 111 | | 542 | | <0.001 |
| very good | 30 | 14.2 | 18 | 8.2 | 11 | 10.0 | 57 | 10.5 | |
| good | 133 | 63.1 | 92 | 41.8 | 50 | 45.0 | 274 | 50.6 | |
| poor | 37 | 17.5 | 91 | 41.4 | 39 | 34.7 | 173 | 31.9 | |
| very poor | 11 | 5.2 | 19 | 8.6 | 11 | 10.3 | 38 | 7.0 | |
| Dietary habits* | 211 | | 220 | | 111 | | 542 | | 0.022 |
| eating meals despite not feeling hungry | 56 | 26.5 | 186 | 56.2 | 66 | 59.4 | 242 | 44.6 | |
| snacking between meals | 125 | 59.2 | 167 | 50.4 | 67 | 60.1 | 292 | 53.9 | |
| having the largest meal late in the evening or even at night | 65 | 30.8 | 148 | 44.7 | 50 | 45.2 | 213 | 39.3 | |
| consuming fast food | 31 | 14.7 | 81 | 24.5 | 38 | 34.6 | 112 | 20.7 | |
| adding sugar to drinks | 89 | 42.2 | 104 | 31.4 | 66 | 59.2 | 193 | 35.6 | |
| Do you currently drink alcohol, even occasionally? | 211 | | 220 | | 111 | | 542 | | 0.001 |
| yes | 134 | 63.5 | 186 | 78.6 | 75 | 67.6 | 395 | 72.9 | |
| no | 77 | 36.5 | 47 | 21.4 | 36 | 32.4 | 147 | 27.1 | |
| How often do you consume alcohol? | 134 | | 186 | | 75 | | 395 | | 0.05 |
| 1–2 times/month | 72 | 53.7 | 60 | 31.4 | 22 | 29.6 | 154 | 38.9 | |
| 1–2 times/week | 53 | 39.6 | 95 | 53.6 | 45 | 60.2 | 193 | 48.9 | |
| several times a week but not everyday | 3 | 2.2 | 21 | 10.3 | 6 | 7.9 | 30 | 7.6 | |
| everyday | 6 | 4.5 | 10 | 4.6 | 2 | 2.3 | 18 | 4.6 | |
| How many hours do you usually sleep at night? | 211 | | 220 | | 111 | | 542 | | 0.05 |
| <6 h | 22 | 10.4 | 44 | 20.0 | 24 | 22.0 | 89 | 16.4 | |
| 6–7 h | 95 | 45.0 | 132 | 60.0 | 66 | 59.4 | 295 | 54.4 | |
| 8–9 h | 91 | 43.2 | 40 | 18.2 | 18 | 16.1 | 151 | 27.9 | |
| >9 h | 3 | 1.4 | 4 | 1.8 | 3 | 2.5 | 7 | 1.3 | |

* Multiple-answer questions.

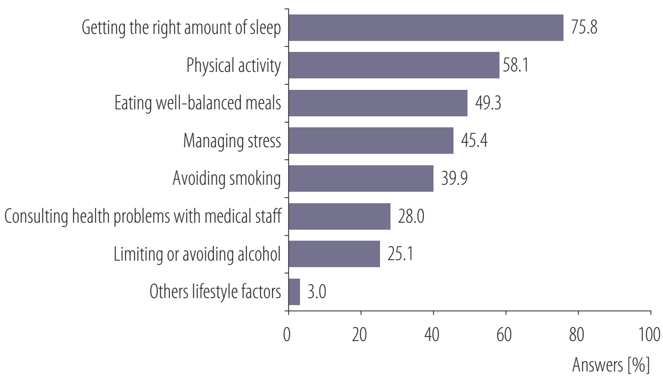
tivity, preferred by more than half of the respondents. The frequency of physical activity after work in the study group is presented in Figure 2.

## Results of the *International Physical Activity Questionnaire*

The questionnaire results, considering the level of physical activity, showed that in the study group physical level classified as low concerned 21 workers (3.9%), moderate – 374 (69.0%) and high – 147 (27.1%).

The results of the analysis of physical activity levels measured by the IPAQ, depending on BMI showed that low and moderate level of physical activity was statistically more common among respondents with overweight and obesity compared to those with normal body weight. Physical activity categories by IPAQ long form are presented in Table 5.

Statistically significant differences were found in all areas of physical activity except for housework, house maintenance, and caring for family and time spent sitting.




Multiple-choice question with no limit on the number of answers.

**Figure 1.** Answers to the question: Which lifestyle factors do you consider most important for health? (N = 542) – the study conducted in Poland, August–September 2023

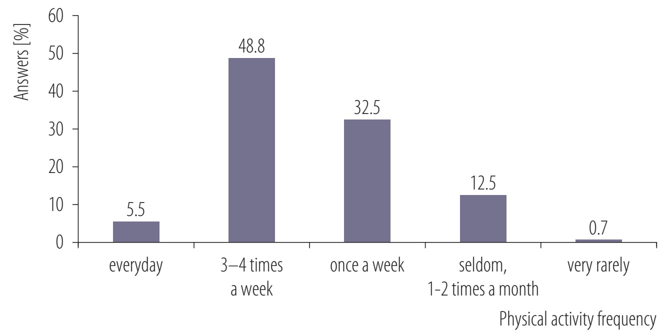



**Figure 2.** Frequency of physical activity after work in study group (N = 289) – the study conducted in Poland, August–September 2023

In every case, individuals with normal body weight, as defined by BMI, showed higher level of physical activity.

### A multinomial logistic regression

Table 6 presents the results of a multinomial logistic regression analysis examining factors associated with overweight and obesity, using normal BMI as the reference group.

Significantly associated with both overweight and obesity were age, working >40 h/week, perceiving one's job as too physically demanding and low physical activity. Short sleep duration (<6 h/night) and overeating when not hungry and low work ability were significantly associated with obesity, but not with overweight.

## DISCUSSION

Based on an analysis of 1.45 million occupational health check-ups performed 2016–2020 in Poland, the study found a rising prevalence of obesity and severe obesity among professionally active adults [17].

The results of the study indicate that excessive body weight, as defined by BMI, was observed in more than half (61.1%) of the study group. Nearly half of the participants (41.5%) exhibited abdominal obesity, strongly correlated with an increased risk of diseases, particularly those affecting the cardiovascular system [18,19].

Among the many occupational factors studied, working >40 h/week was correlated with higher occurrence of overweight and obesity. Global studies have shown that working >40 h/week, as well as working >6 h/week of overtime, is associated with weight gain [20,21]. Long working hours (>40 h/week) were linked to a higher incidence of obesity, likely due to irregular meals, fatigue, and reduced physical activity. Workers with excess weight were more likely to perceive their tasks as overly demanding, which may stem from obesity-related physical limitations.

Workers who perform shift work, particularly night shifts, experience disrupted circadian rhythms, which negatively affect metabolism and eating habits [22,23]. Global research identifies shift work as a risk factor for the development of chronic diseases, including obesity.

**Table 5.** Physical activity categories by *International Physical Activity Questionnaire* (IPAQ) long form in the study group (N = 542) – the study conducted in Poland, August–September 2023

| Variable | IPAQ long form score [MET-min/week] | | | p |
|---|---|---|---|---|
| | M±SD | min. | max | |
| IPAQ long form physical activity category | 2086.4±995.1 | 83.0 | 5907.0 | 0.001 |
| job-related | 1153.4±749.2 | 60.0 | 3860.0 | 0.008 |
| transportation | 284.7±290.0 | 0.0 | 2265.0 | 0.040 |
| recreation, sport, and leisure-time | 308.6±288.1 | 0.0 | 1878.0 | 0.429 |
| housework, house maintenance, and caring for the family | 284.0±290.0 | 0.0 | 2265.0 | 0.002 |
| time spent sitting | 1564.8±857.1 | 0.0 | 5040.0 | 0.467 |

A meta-analysis of 63 studies involving >693 000 participants conducted by Łagowska et al. [24] showed a significant association between shift work and increased BMI. The strongest effects were observed among men, industrial workers, and those with >13 years of shift work.

As shown by studies conducted by Sooriyaarachchi et al. [25] in the group of healthcare workers, workers on shift schedules were more than twice as likely to develop metabolic syndrome compared to daytime workers. In the study, 34.4% of employees worked in a shift system but no relationship was found between overweight/obesity and shift work.

The next set of questions focused on the respondents' subjective assessment of the difficulty of their physical work. The physical workload is influenced by both work-related factors and individual ones, such as health status, age, and physical capacity. In the case of workers with overweight or obesity, additional factors may contribute to an increased workload, such as gait disturbances, physical limitations, daytime fatigue caused by sleep apnea or certain medications used to treat obesity-related complications [26–29].

Nearly half of the participants (47.6%) described their work as heavy, and 49.1% believed that the work they performed was too heavy in relation to their capabilities. Statistically, individuals with obesity were more likely to perceive their work as overly difficult.

Next, the results regarding work ability in the surveyed group of men were analyzed. The extent to which an individual's work ability matches the job's requirements determines the actual workload experienced by the individual during work. Numerous studies indicate that factors such as age, education, type of work, and health status negatively affect work ability, as measured by the WAI. According to a Casolari et al. [30], overweight and obesity, alongside the worker's age, are among the primary factors significantly reducing work ability.

The study among Polish hospital nurses showed that work ability significantly decreased with age and years of service among nurses [31]. Additionally, a higher level of education was associated with better work ability. No significant differences were observed in WAI based on job position or number of employers.

Older age, presence of comorbidities, and obesity were linked to lower WAI scores in the study conducted by Casolari et al. [32]. A similar conclusion was reached in the study of Thanapop [33].

The study conducted in Finland identified that lower education levels, chronic diseases, and obesity were associated with lower WAI scores [34]. Projections suggest that work ability may continue to decline unless preventive health measures are implemented.

**Table 6.** Results of multinomial logistic regression predicting overweight and obesity (N=542) – the study conducted in Poland, August–September 2023

| Variable | OR | 95% CI | p |
|---|---|---|---|
| Age | | | |
| overweight vs. normal group | 1.02 | 1.00–1.05 | 0.045 |
| obesity vs. normal group | 1.05 | 1.02–1.09 | <0.001 |
| Work >40 h/week | | | |
| overweight vs. normal group | 1.62 | 1.11–2.36 | 0.012 |
| obesity vs. normal group | 1.84 | 1.19–2.85 | 0.006 |
| Job too heavy | | | |
| overweight vs. normal group | 1.45 | 1.01–2.09 | 0.043 |
| obesity vs. normal group | 2.58 | 1.71–3.89 | <0.001 |
| Low physical activity | | | |
| overweight vs. normal group | 1.94 | 1.28–2.94 | 0.002 |
| obesity vs. normal group | 2.92 | 1.85–4.62 | <0.001 |
| Sleep <6 h/night | | | |
| obesity vs. normal group | 1.89 | 1.14–3.15 | 0.015 |
| Overeating when not hungry | | | |
| obesity vs. normal group | 2.12 | 1.34–3.34 | 0.001 |
| Low work ability index | | | |
| obesity vs. normal group | 3.41 | 2.11–5.50 | <0.001 |

The studied group of workers demonstrated good work ability measured by WAI, though there were clear differences in the level of work ability between workers with overweight/obesity and those with normal body weight. All components of the WAI – except for the estimated impairment in work ability due to doctor-diagnosed conditions and sickness-related absences – were significantly lower in men with overweight/obesity. The greatest differences between the groups were observed in the overall WAI score and the current work ability compared to their best-ever level.

The next set of survey questions focused on the health and lifestyle of the surveyed men. In the studied group, respondents reported conditions that may be consequences of untreated or poorly managed obesity, including hypertension (26.6% of respondents), type 2 diabetes (6.6%), and gallstones (5.4%). Unfortunately, despite the survey results showing that more than half of the surveyed men (61.1%) had excessive body weight, only 33.0% of respondents believed that their weight was outside the normal range. Studies show that women tend to notice overweight more readily and are more motivated to reduce their weight, while men are less likely to see themselves as overweight [35–37].

Unhealthy dietary habits, such as frequent consumption of fast food, sweets, and late-night meals, were common among overweight individuals. Despite their physically demanding jobs, nearly half of the workers did not engage in recreational physical activity, contributing further to weight gain. Poor sleep quality and shorter sleep duration were also more frequent in individuals with obesity, potentially exacerbating metabolic imbalances.

Higher alcohol consumption among overweight workers further highlights lifestyle factors contributing to obesity. Given its high caloric content and impact on appetite regulation, alcohol likely plays a role in excessive weight gain.

The analysis of responses regarding key lifestyle elements for health revealed that for the vast majority of respondents (75.8%), sleep was the most important factor, followed by regular physical activity (58.1%), and finally, a nutrient-rich diet (49.3%). Unfortunately, this positive result, suggesting that respondents are aware of the importance of a varied diet for health, was not confirmed in other parts of the study. Particularly concerning were the findings on fruit and vegetable consumption: 19.9% of respondents reported not eating any fruit, and as many as 31.9% said they did not eat vegetables at all. This is an alarming result, indicating a potential lack of essential nutrients in the diet of this group.

An analysis of sales data conducted by Food and Agriculture Organization of the United Nations shows that Poland has consistently ranked among the countries with the lowest fruit consumption in Europe, nearly half the average of the European Union [38].

In the surveyed group, many other unhealthy behaviors were also identified, which contradict the principles of a balanced diet. These included snacking between meals (53.9% of respondents), consuming fast food (20.7%), eating meals despite not feeling hungry (44.6%), having the largest meal late in the evening or even at night (39.3%), and adding sugar to drinks (35.6%). Most of these habits were statistically more common among individuals with overweight or obesity.

A notable finding in the surveyed group is the high percentage of individuals consuming alcohol (72.9%). Alcohol is quite calorie-dense and can contribute to the development of overweight or obesity [39]. It has also been observed that people who drink alcohol before a meal tend to eat larger portions and consume more fatty and unhealthy snacks compared to non-drinkers [40]. Additionally, it is important to highlight alcohol's impact on individuals who engage in physical activity, including occupational activity. Numerous studies clearly show that alcohol can negatively affect physical performance and health [41–43].

Sleep was identified by the surveyed individuals as a key element of a healthy lifestyle. Over half of the respondents (54.4%) reported sleeping 6–7 h/night, which is below the recommended 7–9 h/night for adults. Additionally, a large group of respondents (40.6%) did not feel rested after a night's sleep. Statistically, individuals with overweight and obesity were more likely to report issues related to shorter and less effective sleep. Keramat et al. [44] found that individuals who had poor sleep duration and poor sleep quality were exposed to a higher risk of being obese compared with their counterparts who had good sleep duration and good sleep quality. Ghrelin, an appetite-inducing neuropeptide, increases, while leptin, which should suppress appetite, decreases. Sleep deficiency also leads to reduced insulin sensitivity and increased cortisol levels [45]. Moreover, sleep deprivation alters appetite and dietary preferences, replacing healthy foods with high-calorie options [46]. Consequently, the onset of obesity triggers further complications, such as sleep apnea [47,48].

The final aspect studied was recreational physical activity. The prevalence of not engaging in recreational physical activity is a significant issue among working individuals [49]. An active lifestyle associated with professional work, often mismatched with the employee's capabilities, can lead to fatigue and contribute to a reluctance to participate in recreational activities during free time. Additionally, performing physically demanding work may lead to various health problems, which can also limit physical activity both professionally and recreationally [50–52].

From a medical standpoint, the most recommended type of exercise is continuous endurance activity that engages large muscle groups. Such activity is a crucial component of many sports disciplines (e.g., running, cycling), household tasks (e.g., cleaning, gardening), and recreational activities (e.g., dancing). In the studied group, only 5.5% respondents declared engaging in recreational activities every day.

The results of the study conducted using the IPAQ indicated that individuals with a normal body weight had significantly higher levels of activity across all types of physical activity assessed, except for household activities and sedentary behavior.

### Strengths and limitations of the study and future implications

The use of well-established and standardized instruments, such as the WAI and the IPAQ, strengthens the reliability of the measurements and allows for meaningful comparisons with national and international data. The study's comprehensive approach is also noteworthy, as it assessed not only nutritional status and physical activity but also sleep quality, dietary habits, alcohol consumption, working conditions, and self-perceived health.

The results have important practical and research implications. They demonstrate that physically demanding work alone does not offer protection against overweight and obesity, underscoring the need for integrated workplace health interventions. Such strategies should promote balanced nutrition, regular physical activity, adequate sleep, and responsible alcohol consumption.

Nevertheless, the study has several limitations typical of self-reported surveys. The data are based on participants' declarations, which may not always reflect actual behaviors or conditions – particularly with regard to anthropometric measurements, dietary intake, and physical activity. Moreover the study group is quite large, but at the same time very diverse which causes that many factors may influence the results. These limitations should be considered when interpreting the findings and drawing conclusions.

The author plans to conduct a follow-up qualitative study involving a smaller cohort of blue-collar workers in order to gain more in-depth insights into their health status, health behaviors, occupational experiences, and perceptions of lifestyle. The next phase of the study will include detailed anthropometric measurements as well as comprehensive questions regarding, among other aspects, dietary habits.

## CONCLUSIONS

In summary, despite certain methodological limitations, the study offers important insights into the health behaviors and challenges faced by blue-collar workers. The findings highlight the urgent need for workplace-based interventions that support healthy eating, regular physical activity, and sufficient rest. Educational initiatives, structured wellness programs, and improved working conditions could play a crucial role in reducing obesity-related risks. Physical labor alone is insufficient to maintain a healthy weight – comprehensive, multifaceted strategies are essential to support long-term health among this population.

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