

THE IMPACT OF SHIFT WORK ON THE HEALTH AND WELL-BEING OF EMPLOYEES IN SELECTED MANUFACTURING COMPANIES IN POLAND

Żaklina KONOPACKA¹, Natalia HERBUTOWICZ², Dagmara SOLATYCKA³,
Justyna WOŹNIAK⁴, Barbara DELIJEWSKA^{5*}, Marcin PIERSIAK⁶

¹ Faculty of Geoengineering Mining and Geology, Wrocław University of Science and Technology;
zaklina.konopacka@pwr.edu.pl, ORCID: 0009-0000-6035-7085

² Faculty of Geoengineering Mining and Geology, Wrocław University of Science and Technology;
natalia.herbutowicz@pwr.edu.pl, ORCID: 0009-0008-2088-4700

³ State Mining Authority, Wrocław; solvejga.d@gmail.com

⁴ Faculty of Geoengineering Mining and Geology, Wrocław University of Science and Technology;
justyna.wozniak@pwr.edu.pl, ORCID: 0000-0002-4998-9919

⁵ Faculty of Geoengineering Mining and Geology, Wrocław University of Science and Technology;
barbara.delijewska@pwr.edu.pl, ORCID: 0009-0009-2103-8132

⁶ Military Clinical Hospital with Polyclinic SPZOZ in Wrocław; nicram.piersiak@gmail.com,
ORCID: 0009-0004-2199-4670

* Correspondence author

Purpose: The aim of this article is to analyse the impact of shift work on the health and well-being of employees in manufacturing enterprises, with particular consideration given to occupational health and safety (hereafter referred to as "OHS"). OHS issues represent an important component of the action plan for implementing the European Pillar of Social Rights.

Design/methodology/approach: The empirical part of the study employed a diagnostic survey method based on a proprietary questionnaire distributed to a group of 170 individuals working in a shift system. The research tool included questions concerning, among other things, the occurrence of symptoms and consequences of shift work, as well as employees' subjective evaluation of their working conditions.

Findings: The findings indicate that shift work significantly contributes to the deterioration of both physical and mental health, leading to a general decline in employee well-being. Particularly concerning are reports of chronic fatigue, sleep disturbances, and reduced concentration, all of which may substantially increase the risk of workplace accidents.

Research limitations/implications: The study was conducted on a limited sample of 170 employees from manufacturing enterprises, which restricts the generalisation of the findings to other sectors of the economy. The use of a self-report questionnaire may also involve a degree of subjectivity. Future research could include larger and more diverse groups of employees and adopt longitudinal approaches to provide a broader perspective on the long-term effects of shift work.

Practical implications: Based on the analysis, a series of recommendations were formulated for both employers and employees to help mitigate the negative effects of shift work. The proposed measures include, among others, the implementation of preventive programs,

educational initiatives, and organisational solutions aimed at promoting health and improving working conditions.

Social implications: The results draw attention to the wider social consequences of shift work, particularly its impact on employees' quality of life and family relations. They also highlight the importance of integrating occupational health and safety considerations into broader health promotion and labour policies in order to reduce the negative outcomes of non-standard working hours.

Originality/value: This article contributes to the body of knowledge on the effects of shift work on the health and well-being of employees in the manufacturing sector. It also outlines potential directions for intervention in the areas of OHS, health promotion policies, and work organisation.

Keywords: shiftwork, well-being, health, OHS.

Category of the paper: Research paper.

1. Introduction

Regulations concerning shift work in the Polish legal framework are included in the Labour Code, which constitutes the primary normative act governing issues such as conditions of employment, work schedules and systems, remuneration principles, occupational health and safety (OHS), as well as the mutual rights and obligations of employees and employers. The Labour Code defines shift work as the performance of duties according to a work schedule that involves a change in working hours for individual employees after a specified number of hours, days, or weeks (Act of 26 June 1974 – Labour Code. Journal of Laws). Issues related to shift work are also regulated by European Union legislation (Directive 2003/88/EC of the European Parliament and of the Council of 4 November 2003 on certain aspects of the organization of working time).

The introduction of shift work systems in manufacturing enterprises is primarily driven by economic considerations, such as the need to ensure continuity of technological processes, maximise the use of production resources, and enhance operational efficiency. However, this form of work organisation affects the human body in complex ways, triggering a range of physiological and psychological changes. The literature describes numerous disruptions to the human biological rhythms caused by working irregular or atypical hours (Caruso, 2014; Kuleta, 2016; Boersma, 2023), the impact of shift work on the prevalence of health problems among employees (Costa, 2000), and its influence on the risk of cardiovascular diseases (Bitner, 2013; Salska, 2015), and gastrointestinal disorders (Stranks, 2005; Łokieć, 2020). Night work, in particular, is associated with an increased risk of cardiovascular incidents, with estimates suggesting a rise of up to 3.1% (Wei et al., 2022).

Additionally, employees engaged in shift work tend to exhibit more frequent health-risk behaviors, such as excessive alcohol consumption and increased tobacco use (Ogeil, 2021). Recently, there has also been a noticeable trend of increased use of psychoactive substances among this group (<https://poradniauzaleznienia.pl/>, 20.06.2025).

The literature highlights that shift work is often accompanied by heightened fatigue and both acute and chronic stress (Łuczak, 2002), leading to decreased mental and psychophysical performance. Working night shifts especially contributes to reduced sleep quality and duration, resulting in exhaustion, mood disorders, and chronic fatigue (Matheson, 2014). Studies have shown that permanent night shifts significantly increase the risk of excessive sleepiness, which in turn directly correlates with higher accident rates (Ohayon et al., 2010). Shift work may also contribute to psychosomatic disorders, elevated stress levels, and impaired cognitive function, all of which reflect the negative effects of sleep deprivation (Vogel et al., 2012, Kecklund et al., 2016). More-over, a significant link has been established between shift work and the occurrence of headaches – the risk increases by as much as 44% (Wang, 2014).

The negative impact of shift work on mental health, particularly in terms of increased risk of depressive symptoms and anxiety disorders, has been confirmed in numerous studies (Xu, 2023; Liu, 2023). Analyses by Liu and Jia further indicate that women working in shift systems are significantly more susceptible to depressive symptoms than men (Liu, 2023). Supporting this, Park (2020) examined the relationship between work systems and suicidal ideation, taking into account gender differences. While no statistically significant differences were found among women between day and shift workers, men employed in shift work exhibited a markedly higher risk of suicidal thoughts.

Another important health-related aspect of shift work is its potential association with an increased risk of cancer. A meta-analysis by Wei et al. revealed that shift work is linked to a 2.9% increase in the overall risk of developing breast cancer. Among individuals working shifts for more than 10 years, this risk rose to 8.6% (Wei et al., 2022). Similar findings were observed concerning prostate cancer incidence (Rao et al., 2015). Research by Rao et al. (2015) indicates that night work over a period of at least five years is associated with a 2.8% increase in prostate cancer risk. These findings suggest that long-term disruption of circadian rhythms may have serious oncological consequences.

The main objective of the study conducted for this article was to identify the impact of shift work on employees' physical and mental health, as well as their overall well-being. To support this main aim, specific objectives were formulated, including:

1. Identification of the most common health-related symptoms among shift workers and their subjective assessment by respondents.
2. Recognition of consumption preferences regarding the use of psychoactive substances and stimulants among shift workers.
3. Evaluation and comparison of employees' well-being levels, taking into account both the positive and negative effects of working in a shift system.

Employee well-being can be understood in both positive and negative terms (Danna, Griffin, 1999; Warr, 1999; Bautista, Khan, 2023). Although there is no single, universally accepted definition of well-being, it is often described in the literature as a combination of health, happiness, and mental and physical wellness. It is also defined as "the presence of positive emotions and mood, absence of negative emotions, life satisfaction, fulfilment, and positive functioning" (Karademas, 2007; Bautista, Khan, 2023).

Negative well-being can be defined as deficits in these areas – not merely momentary emotions, but persistent disturbances in psychological functioning that affect day-to-day experiences, life satisfaction, and the ability to cope with stress and challenges (Scannell et al., 2002; Karademas, 2007; Karaś, 2019).

2. Methods

As part of the conducted research on the impact of shift work on the health and well-being of employees in the context of occupational health and safety (OHS) within manufacturing enterprises, three research questions were formulated:

1. How does shift work affect the physical and mental health of employees in manufacturing companies in Poland?
2. How does shift work influence the preferences of manufacturing employees regarding the use of various stimulants and psychoactive substances?
3. What actions and recommendations can help minimise the negative effects of shift work from an OHS perspective?

A quantitative research method was applied using an original, anonymous questionnaire survey. The above research questions formed the basis for structuring the questionnaire. The survey consisted of 13 questions, including 11 mandatory closed-ended questions (single- and multiple-choice) and 2 optional open-ended questions. The closed section included questions regarding the type of shift work performed, demographic variables (gender, age, education level), job position, length of service, as well as the occurrence of symptoms such as sleep disturbances, use of psychoactive substances and stimulants, and subjectively perceived effects of shift work.

Question 11 used a five-point Likert scale to assess the degree of agreement or disagreement with the presented statements. The open-ended questions (12 and 13) addressed, respectively, the positive and negative effects of shift work, and were non-mandatory. The research was conducted between 9 March and 17 March 2024 in two formats: paper-based and electronic (via an online form). Participation in the study was entirely anonymous and voluntary (Appendix).

The sampling method was purposive; the survey was addressed exclusively to employees of manufacturing companies who perform shift work. The data analysis involved several stages: preliminary data cleaning (excluding responses from individuals not employed in shift work), the development of descriptive statistics using Microsoft Excel tools (percentage distributions and graphical visualisation through charts), and the formulation of recommendations based on the obtained results.

3. Results

The research sample comprised a total of 173 respondents, of whom 3 declared that they were not employed in a shift work system and were therefore excluded from further analysis. As a result, 170 fully completed questionnaires submitted by employees working in shift-based systems were qualified for detailed analysis. The study included 117 women (69%) and 53 men (31%) from various age groups, job positions, lengths of service at their current workplace, and levels of education. The vast majority of surveyed employees (149 individuals, 88%) were under the age of 44. A total of 142 respondents (84%) held either secondary or higher education qualifications.

The questionnaire was conducted primarily in large manufacturing enterprises, which explains the high proportion of respondents working in manual labour positions (130 respondents, 77%). Managerial positions were held by 27 employees (16%), while 9 individuals (5%) worked in administrative or office-based roles. Engineering and technical staff accounted for 2% of the sample (4 respondents). The largest group of respondents had between 3 and 5 years of service at their current workplace (56 individuals, 33%). A total of 12 employees (7%) had worked in the same place for over 10 years.

Among the respondents, 68 individuals (40%) worked in a 12-hour shift system, 56 (33%) in a two-shift system, 30 (18%) in a three-shift system, and 2 (1%) in a four-shift system. An irregular or flexible working time system applied to 14 respondents (8%).

Employees working in shift-based systems frequently reported disruptions in their daily functioning, both physically and mentally. Figure 1 presents the most commonly reported negative consequences of shift work. The most frequently cited effects included: sleep disturbances, poor eating habits, general malaise, nervousness, and irritability. Less frequently reported consequences included: depression, anxiety, mood swings, reduced sex drive, lowered self-esteem, digestive issues, increased blood pressure (hypertension), and the use of stimulants or substances.

As many as 133 respondents (78.24%) reported experiencing sleep problems, either frequently or occasionally, after night shifts. Only 37 individuals (21.76%) did not experience this issue. Tied for second place in terms of frequency were eating disorders and poor well-being, each reported by 71.76% of respondents. Slightly fewer, 70% of employees, re-ported

nervousness, and 64.12% reported irritability. Approximately half of the respondents struggled with problems such as headaches, abdominal pain, muscle pain, concentration difficulties, weakness and reduced immunity, and increased susceptibility to stress, which were reported by 56.47%, 53.53%, 52.94%, and 51.76% of respondents, respectively. Changes in mental behaviour were noticed by 27.65% of respondents, decreased sexual drive by 27.06%, lowered self-esteem by 25.88%, and digestive problems (nausea, vomiting, and diarrhoea) by 20.59%. The least reported issues were substance use and high blood pressure, experienced by 15.88% and 10% of respondents, respectively.

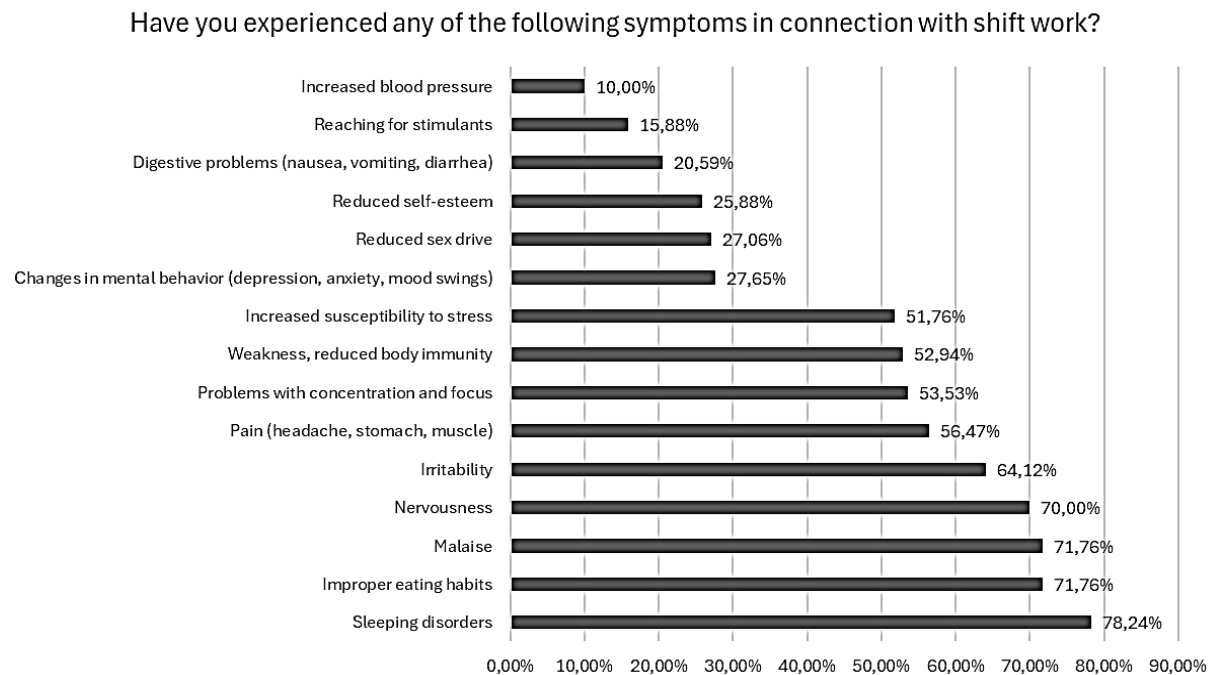


Figure 1. Prevalence of health issues associated with shift work (% of respondents per symptom).

According to the Pareto principle (which helps identify 20% of problems/symptoms responsible for 80% of reports/effects), the top 20% of the 15 health problems/symptoms consist of three main categories accounting for the majority of reports: sleep disorders – 133 mentions, poor eating habits and poor well-being – 122 mentions each. These represent key areas on which preventive or supportive health actions should focus.

Shift work often leads to increased consumption of substances such as cigarettes, alcohol, and psychoactive drugs, as illustrated in Figure 2. Employees most commonly used cigarettes, medication, and alcohol. According to the results, these three main preferences (cigarettes, medication, alcohol) account for over 90% of all mentions. These should therefore be the focus of preventive or educational activities for this study group.

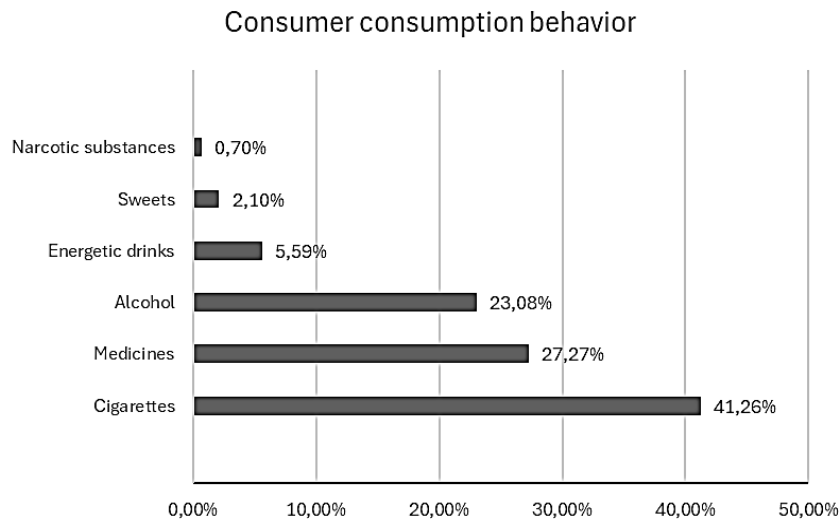


Figure 2. Shift work – respondents' consumption behaviours.

The most frequently chosen substance was cigarettes (41.26% of responses), indicating a strong connection to habits, addictions, or stress (van Amelsvoort, 2006; Costa, 2010). Medications (27.27%) and alcohol (23.08%) also represent significant consumption preferences among respondents and may reflect health issues, stress (Dorrian et al., 2017; Richter et al., 2021), and similar factors. Energy drinks (5.59%) and sweets (2.10%) were less important to the studied group but may indicate a need to obtain energy from sources other than sleep (Jay et al., 2006; Heath et al., 2012; Farinetti et al., 2024). Psychoactive substances were marginally present among respondents, accounting for only 0.70%.

Figures 3 and 4 present respondents' attitudes towards the positive (Figure 3) and negative (Figure 4) aspects of shift work.

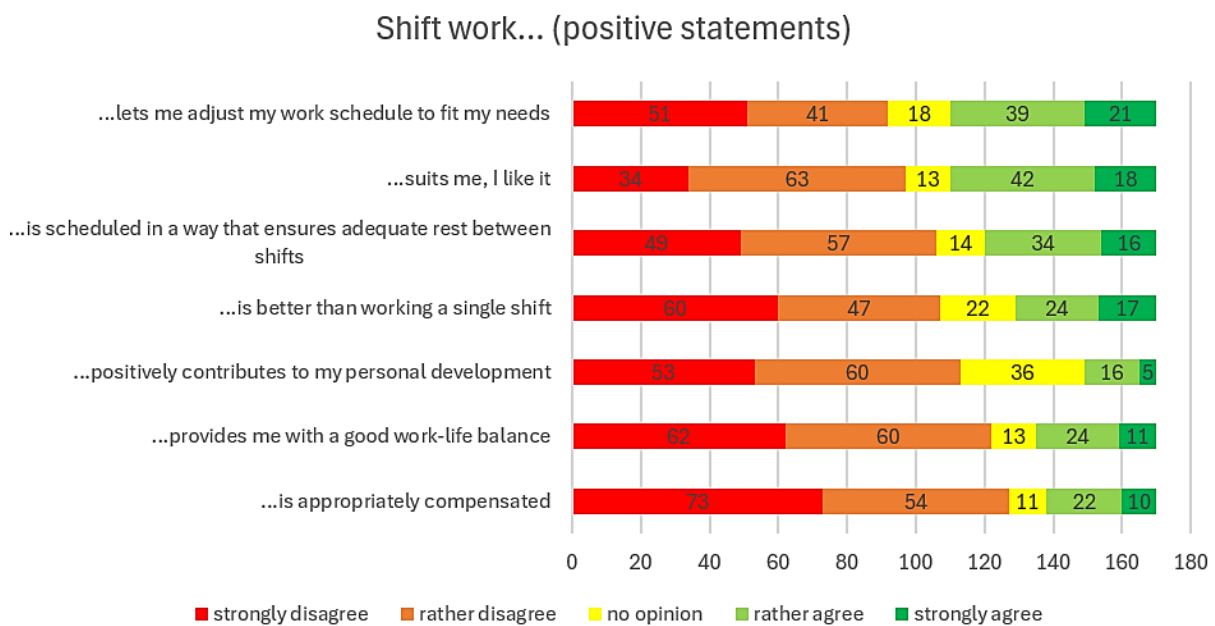


Figure 3. Responders' opinions on shift work (positive statements).

The vast majority of employees (73%) believed that shift work was not adequately compensated. For 72% of respondents, such work did not provide a balance between private and professional life; 66% felt it did not positively influence their personal development, and 62% reported insufficient rest between shifts. At the same time, 35% of respondents declared that they liked shift work. Similarly, 35% had the opportunity to adjust their work schedule to their individual needs (Figure 3).

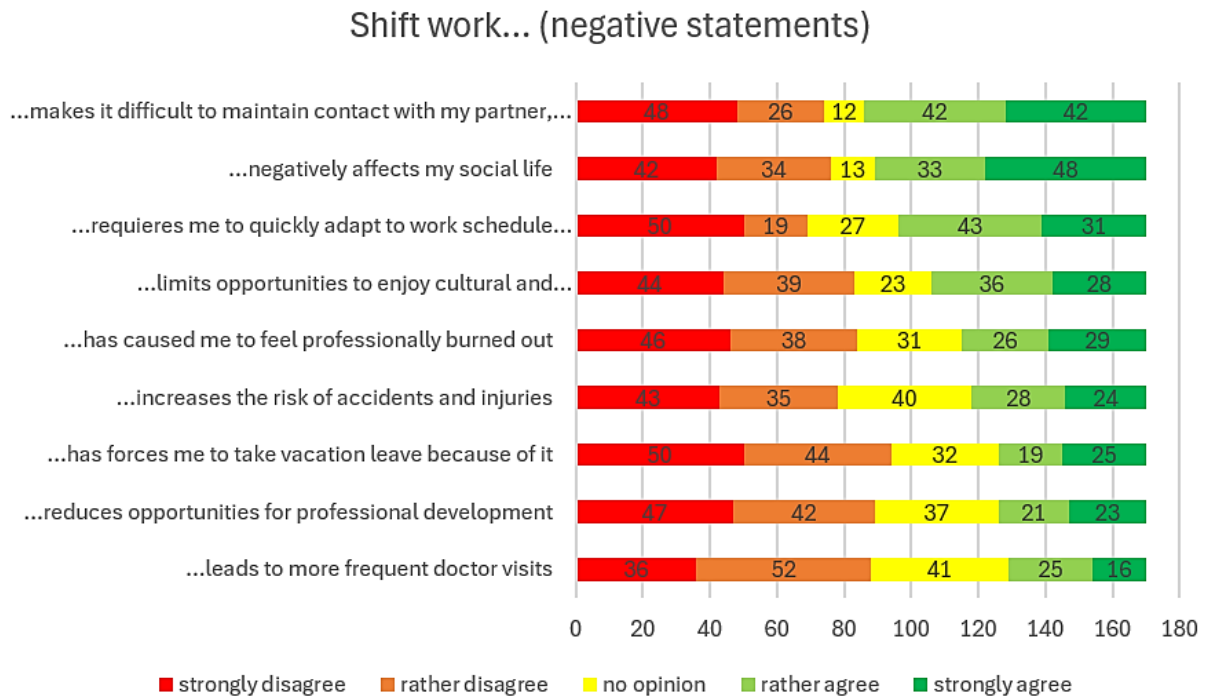


Figure 4. Responders' opinions on shift work (negative statements).

Among the negative aspects of shift work, respondents considered the greatest burden to be the difficulty in maintaining contact with family and close ones (49%) and the adverse impact on social life (48%). A relatively large portion also felt that shift work hindered their ability to enjoy cultural and entertainment activities (38%) and led to occupational burnout (32%). About 26% thought the shift system limited their development opportunities, and 24% reported increased medical visits (Figure 4).

Opinions on various aspects of shift work were divided. Analysis of Figure 4 shows that a considerable number of respondents did not find that shift work hindered contact with loved ones or affected their social life (44% and 45%, respectively). As many as 52% did not agree with the view that shift work reduced their opportunities for development.

Among the positive aspects of shift work, respondents mentioned the following:

- more free time,
- the ability to take care of matters (e.g., administrative tasks) from Monday to Friday.

The most frequently indicated negative effects were:

- sleep problems,
- physical fatigue,
- lack of balance between private and professional life.

Shift work poses significant challenges for many employees, both in terms of maintaining a balance between professional and private life and preserving good physical and mental health. The literature highlights a range of preventive measures that can effectively minimize or even completely eliminate the negative effects of shift work. However, it is important to remember that the effectiveness of these measures may vary; not every preventive action will be equally suitable or effective for every worker. Therefore, the approach to prevention should be flexible and tailored to individual needs as well as the specific conditions of the work environment.

One key element of a preventive strategy may be the optimization of work time organization, for example, by modifying shift schedules to take into account employees' individual chronotypes and their preferences regarding circadian rhythms (including sleep and activity).

Actions that help maintain the health and well-being of employees working in shift systems include maintaining proper sleep hygiene, adopting healthy eating habits, engaging in regular physical activity, and implementing techniques for stress management and psychophysical recovery.

Preventive measures can also be initiated and supported by the employer. These include, among others: introducing flexible work schedules, organizing regular and free preventive health check-ups, conducting training on stress management, and coping with the adverse aspects of shift work, and promoting health awareness in the workplace. Equally important is providing ergonomic workstations and optimal environmental conditions (adequate lighting, microclimate, noise reduction), which directly affect employee comfort and occupational health and safety.

4. Summary and discussion

The shift work system is an integral component of many sectors of the economy, enabling continuous operations and uninterrupted service provision by businesses, institutions, and organisations. Despite the numerous advantages this work model offers – including increased flexibility in working hours and the ability to better align schedules with diverse organisational and production needs – it also presents a number of serious challenges. Therefore, it is essential to conduct an in-depth analysis of the effects of shift work and to implement appropriate strategies to minimise its undesirable consequences.

The results of the survey indicate that employees working in shift-based systems often experience significant disruptions to their daily rhythms. Since shift work includes night shifts, the normal sleep-wake cycle is disturbed, which may have potential consequences for both physical and mental health (Torquati et al., 2019). Based on the study, the most commonly reported complaints among shift workers include sleep disturbances, general discomfort,

and unhealthy eating habits. These workers also more frequently resort to alcohol, medication, and cigarettes as a way to cope with stress and tension associated with this system of work. As noted by Richter (2020), alcohol is sometimes used by shift workers as a sleep aid, which further increases the risk of addiction and sleep disorders.

A work system based on variable hours and times of day not only disrupts the body's biological rhythm but also negatively affects social functioning – reducing time for family life, interpersonal relationships, and access to cultural and recreational activities. The literature highlights that shift work conflicts with the human circadian rhythm, leading to numerous psychological and physiological issues (Srivastava, 2010).

It is important to note that despite the many difficulties associated with shift work, some employees may still perceive certain benefits. The flexibility of working hours allows them to attend to administrative matters, schedule medical appointments at convenient times, and manage their free time more effectively.

Therefore, the evaluation of shift work should not be one-sided. Its impact on employee well-being largely depends on individual factors such as lifestyle, adaptability, health condition, and personal preferences.

In order to minimise the negative effects of shift work, it is crucial for both employees and employers to take preventive action. From the employee's perspective, helpful practices include adopting healthy eating habits, maintaining regular physical activity, proper sleep hygiene, and using supportive supplements such as melatonin. Employers, on the other hand, should aim to provide ergonomic working conditions, introduce flexible scheduling, and ensure regular preventive health screenings. It is worth emphasising that the effectiveness of these measures depends on how well they are tailored to the specific needs of the employees and the organisational conditions of the given production enterprise.

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Appendix

1. Is your work organized in a shift system?

- a) Yes, I work in a shift system
- b) No, I do not work in a shift system
- c) I am not professionally active, I do not work at all

2. Gender

- a) Female
- b) Male

3. Age

- a) Under 18
- a) 19–34 years old
- b) 35–44 years old
- c) 45–54 years old
- d) 55–64 years old
- e) Over 65

4. Education

- a) Primary
- b) Secondary
- c) Vocational
- d) Higher

5. Job position

- a) Manual labor / physical work
- b) Managerial
- c) Administrative / office work
- d) Engineering / technical
- e) Other (respondent could enter their own answer)

6. Length of service at your current workplace

- a) Less than 1 year
- b) 1–2 years
- c) 3–5 years
- d) 6–10 years
- e) 11–15 years
- f) Over 15 years

7. What type of working time system is used at your workplace?

- a) Two-shift work
- b) Three-shift work
- c) Four-shift work

- d) 12-hour shift work
- e) Irregular or flexible work schedule
- f) Other (respondent could enter their own answer)

8. Do you experience sleep problems after night shifts?

- a) Yes, frequently
- b) Yes, occasionally
- c) No
- d) Not applicable

9. Shift work makes me reach for...

(multiple answers possible)

- a) Cigarettes
- b) Medicines
- c) Alcohol
- d) Narcotic substances
- e) Other (respondent could enter their own answer)

10. Have you experienced any of the following symptoms related to shift work?

(multiple answers possible)

- a) Increased blood pressure
- b) Reaching for stimulants
- c) Digestive problems (nausea, vomiting, diarrhea)
- d) Reduced self-esteem
- e) Reduced sex drive
- f) Changes in mental behavior (depression, anxiety, mood swings)
- g) Increased susceptibility to stress
- h) Weakness, reduced body immunity
- i) Problems with concentration and focus
- j) Pain (headache, stomach, muscle)
- k) Irritability
- l) Nervousness
- m) Malaise
- n) Improper eating habits
- o) Sleeping disorders
- p) Other (respondent could enter their own answer)

11. Shift work...

| Shift work... | Answers | | | | |
|--|--------------------------|-----------------|-------------------|--------------|-----------------------|
| | <i>Strongly disagree</i> | <i>Disagree</i> | <i>No opinion</i> | <i>Agree</i> | <i>Strongly agree</i> |
| • ... suits me, I enjoy it | | | | | |
| • ... is appropriately compensated | | | | | |
| • ... has a positive impact on my personal development | | | | | |
| • ... is better than working a single (day) shift | | | | | |
| • ... provides a proper work-life balance | | | | | |
| • ... allows me to adjust my schedule to my needs | | | | | |
| • ... is organized in a way that ensures proper rest between shifts | | | | | |
| • ... requires me to quickly adapt to schedule changes (e.g. shift plan updates) | | | | | |
| • ... makes it harder to maintain contact with my partner, family, or loved ones | | | | | |
| • ... negatively affects my social life | | | | | |
| • ... limits my access to cultural and leisure activities | | | | | |
| • ... has led to professional burnout | | | | | |
| • ... increases the risk of accidents and injuries | | | | | |
| • ... results in more frequent visits to the doctor | | | | | |
| • ... caused me to take vacation leave because of it | | | | | |
| • ... reduces opportunities for professional development | | | | | |

12. The beneficial effects of shift work are...**13. The adverse effects of shift work are...**