

Vahid Ibrulj¹
Zoran Nešić
Duško Petrović

Research paper
DOI – – 10.24874/QF.25.080



THE IMPACT OF PHYSICAL FATIGUE ON THE PERFORMANCE OF EMPLOYEES IN PUBLIC UTILITY COMPANIES IN THE REPUBLIC OF SERBIA

Abstract: *This study examines the impact of physical exhaustion as a dimension of burnout on employee performance in public utility enterprises in Serbia. Physical exhaustion, characterized by a decrease in physical energy and the ability to perform work tasks, has become an increasingly significant factor affecting workforce productivity and overall health. Utilizing a structured questionnaire distributed to 101 employees across six public utility companies, the research identified a statistically significant negative correlation between physical exhaustion and job performance at a confidence level of 0.01. Findings reveal that high levels of physical exhaustion result from excessive workload, inadequate workplace conditions, and insufficient recovery time, leading to decreased efficiency and productivity. This research underscores the urgent need for interventions to mitigate physical exhaustion among employees, thus enhancing their work performance and the quality of services provided to the community.*

Keywords: *job burnout, physical exhaustion, employee performance, public utility enterprises, Republic of Serbia.*

1. Introduction

In modern society, physical exhaustion represents an increasingly significant factor affecting the work activity and overall health of employees. From an organizational standpoint, especially in public utility companies, where services are essential for the functioning of society, understanding the impact of physical exhaustion on worker performance becomes a crucial issue. These companies, which provide basic services such as water supply, waste disposal, and infrastructure maintenance, often face high workloads and demands for service provision, which can lead to stress and burnout at work.

Physical exhaustion, as an aspect of burnout, can manifest through various symptoms, including fatigue, decreased work efficiency, declining job satisfaction, and even physical complaints such as headaches and back pain.

These symptoms not only affect individuals but also the entire organization, as they can lead to reduced productivity, an increase in errors, and higher absenteeism. In public utility companies, where teamwork and collaboration are essential, physical exhaustion can create additional tensions and challenges within the team. Furthermore, circumstances such as inadequate working conditions, lack of breaks, and high stress levels make employees more vulnerable to physical exhaustion. In many cases,

¹ Corresponding author: Vahid Ibrulj
Email: arzelenilo@gmail.com

employees are unaware of the detrimental effects that physical exhaustion has on their mental and physical health, which further complicates the situation.

Therefore, it is crucial for organizations to develop strategies to prevent exhaustion by promoting healthy work practices, flexible work schedules, and providing adequate support for employees. The aim of this paper is to analyze the impact of physical exhaustion as a dimension of burnout on the work performance of employees in public utility companies in the Republic of Serbia. Understanding the relationship between physical exhaustion and work performance is a vital step toward creating an adequate work environment that supports employees and enables them to efficiently carry out their tasks in public utility companies. Additionally, this paper can serve as a foundation for further research addressing this important issue, providing deeper insights into how organizations can safeguard the health and well-being of their employees, thereby enhancing the quality of services they provide to the community.

2. Physical exhaustion as a dimension of burnout at work

Physical exhaustion is a key aspect of workplace burnout, which has become an omnipresent topic in modern working environments. Burnout, as a psychological phenomenon, encompasses emotional, mental, and physical fatigue that arises from prolonged stressors in the workplace. Unlike mental or emotional exhaustion, physical exhaustion refers to a reduction in an individual's physical energy and ability to perform work tasks, which can have serious consequences on performance, productivity, and overall employee well-being (Harjanti & Todani, 2019). One of the main causes of physical exhaustion is excessive workload, whether through long working hours, physically demanding tasks, or a lack of adequate breaks (Walters & Raybould, 2007). In public utility companies, where

employees are often exposed to physical exertion, such as outdoor work or operating heavy machinery, the risk of physical exhaustion is even higher. In addition to physical demands, contributing factors such as emotional stress (Sexton et al., 2022), lack of support from colleagues or management, and inadequate working conditions can further contribute to the overall level of exhaustion (Radivojevic et al., 2025).

Physical exhaustion has numerous consequences for both individuals and organizations. Employees experiencing physical exhaustion often exhibit reduced productivity and creativity, which can lead to poorer business outcomes. Furthermore, errors in tasks, increased mistake rates, and a significant decrease in operational efficiency are just some of the negative effects that may arise. Additionally, physical exhaustion can manifest through specific health issues such as musculoskeletal disorders, leading to increased absenteeism and higher healthcare costs (Danzer, 2019; Bodescu et al., 2022).

To address issues related to physical exhaustion, organizations should develop strategies that promote health and a healthy work style. This may include implementing regular breaks throughout the workday, providing physical and emotional support to employees, and ensuring adequate working conditions. Additionally, educating employees about the importance of work-life balance and promoting an active lifestyle can further reduce the risk of physical exhaustion.

3. Research methodology

Based on the previous discussion, the research is based on the hypothesis H1: that physical exhaustion, as a dimension of burnout at work, has a negative impact on the performance of employees in public utility companies in the Republic of Serbia. The research model can be graphically represented as follows.

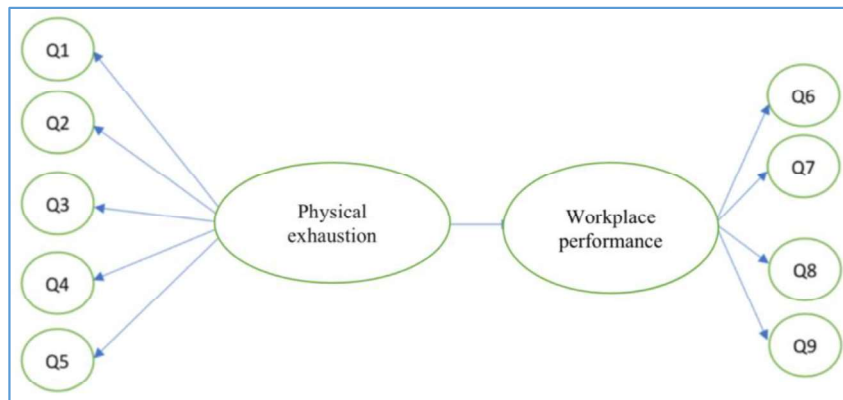


Figure 1. Research model

One empty single line should be left before
The research was conducted on a sample of 101 employees from 6 public utility companies in the Republic of Serbia. Employees completed a questionnaire during the year 2024. All questionnaires were completed validly. The data were collected based on a structured questionnaire, which was developed based on relevant statements proposed in the scientific literature. Specifically, the questionnaire contains two sub-scales: one for measuring job performance, consisting of four questions, and the second sub-scale consisting of questions related to physical exhaustion. The questionnaire is presented in Table 1. Participants responded to all questions using a rating scale from 1 ("strongly disagree") to 5 ("strongly agree"). Thus, a five-point Likert scale was used. The validity of the questionnaire was tested through factor analysis, while the adequacy of the sample was evaluated using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO test value is 0.894, while Bartlett's test of sphericity results in $\chi^2(36) = 1311.3$. Both tests indicate that the sample is adequate and can be further utilized in the study.

The results of the factor analysis for the validity of the questionnaire are also presented in Table 1.

The results of the validity analysis of the questionnaire show that the items are grouped according to expectations. All factor loadings are

greater than 0.5. The average extracted variance (AVE) for each sub-scale is greater than 0.5, indicating the convergent validity of the questionnaire (Josimović et al., 2025). Furthermore, reliability coefficients are greater than 0.7, which indicates the reliability of the sub-scales. It is important to note that the factor loadings from the confirmatory factor analysis are greater than 0.4 and that there are no cross-loadings greater than 0.3, which indicates the convergent validity of the structural part of the model. The collected data were processed using the JASP statistical software package.

4. Analysis and discussion of results

The results of the assessment of the model parameters are presented in Table 2. The research results indicate that hypothesis H1 can be accepted as confirmed, since the regression coefficients describing the impact of physical exhaustion as a dimension of burnout on the performance of employees in public utility companies in the Republic of Serbia are statistically significant at the 0.01 confidence level. As can be seen, the coefficient has a negative sign, indicating that physical exhaustion, as a dimension of burnout, negatively impacts employee performance in these companies. This finding emphasizes the urgent need for attention and interventions that could help prevent physical exhaustion among employees in public utility companies. Physical exhaustion, caused by prolonged

physical exertion, inadequate working conditions, or excessive work engagement, can lead to a decrease in efficiency and

productivity, thereby directly affecting the quality of services that these companies provide to citizens.

Table 1. Questionnaire for Data Collection.

	Items	Source	Factor loading	AVE	Reliability
Physical exhaustion (FI)	In the last month, I still felt tired from finishing work.	(Harjanti & Todani, 2019)	0.831	0.598	0.881
	I feel tired when facing work tasks.		0.839		
	I have sleep disorders.		0.762		
	In the last month, I felt that there was a change in my diet.		0.782		
	I feel tired from work.		0.639		
Workplace performance (EP)	I always do my work carefully.	Ramos-Villagrasa et al. (2019)	0.885	0.632	0.795
	I was able to complete the task well.		0.902		
	I am sure that my work assignments are in accordance with the expertise that I have.		0.674		
	I can do several tasks at once.		0.692		

Table 2. Results of estimation of parameters of AMOS model

	EI	Impact on employee performance
Coefficient	-0.372	
Standard error	0.026	
Critical value	-14.307	
P-value	0.000	

Source: Authors

Furthermore, the results suggest that physical exhaustion plays a significant role in the business outcomes of public utility companies, and that reducing it can indirectly influence business success by

enhancing employee performance at work. Therefore, it is essential for the management of public utility companies to implement strategies that will reduce physical exhaustion, such as organizing adequate working hours, providing necessary resources for recovery, and educating employees about the importance of maintaining physical health. Given the increasing significance of the work environment and employee health, taking steps to reduce physical exhaustion will not only improve employee performance but also contribute to overall satisfaction and efficiency within public utility companies.

5. Conclusion

The research has shown that physical exhaustion, as a dimension of burnout, has a significant negative impact on the performance of employees in public utility companies in the Republic of Serbia. The results were confirmed through statistical analyses, which indicated that high levels of physical exhaustion can lead to a decrease in work efficiency, productivity, and overall employee satisfaction. This finding implies the necessity of focusing on physical health as a key factor for improving work performance and the quality of services that public utility companies provide to the community.

Given the identified causes of physical exhaustion, such as excessive workloads, inadequate working conditions, and lack of necessary breaks, it is evident that it is essential for the management of these companies to develop and implement strategies that will enable the reduction of physical exhaustion. This could include regulating working hours, providing support in the form of education on maintaining

physical health, and ensuring adequate resources for employee recovery.

This paper provides a foundation for further research in this area, highlighting the need for additional analyses and the development of programs that will facilitate a better understanding and management of physical exhaustion. By focusing on the health of workers, public utility companies will not only improve their employees' performance but also contribute to overall satisfaction and efficiency, ensuring higher quality services for all citizens. Taking active steps to reduce physical exhaustion in the workplace leads to higher standards in service delivery and enhances organizational efficiency, which will positively reflect on the operations and reputation of public utility companies in the Republic of Serbia.

Acknowledgment: This study was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, and these results are parts of the Grant No. 451-03-136/2025-03/200132 with University of Kragujevac - Faculty of Technical Sciences Čačak.

References:

- Danzer, N. (2019). Job satisfaction and self-selection into the public or private sector: Evidence from a natural experiment. *Labour Economics*, 57, 46-62.
- Bodescu, D.m Robu, D., Lităreanu, F., Puiu, I., Gafencu, M.&Lipşa, D. (2022). Work Satisfaction in the Food Industry. *A Premise for Economic Performance*, 7, 1015 .
- Harjanti, D., & Todani, F. A. (2019). Job burnout and employee performance in hospitality industry: The role of Social Capital. *Jurnal Teknik Industri*, 21(1), 15-24.
- Josimović, M., Čočkalović, D., Osmanović, S., Cvjetković, M., & Radivojević, N. (2025). The Influence of Competitiveness Factors on Sustainable Business Performance in the Hotel Industry: From the Perspective of the Perception of Hotel Service Users. *Sustainability*, 17(5), 2277.
- Radivojevic., N., Pikoc, M., Jovanovic, R., Cvjetkovic, M & Cvjetkovic, M. (2025). The Impact of Employee Satisfaction with Care on the Performance of Employees in the Food Industry in the Republic of Serbia. *JEESM*, 2, 1-15.
- Ramos-Villagrasa, P. J., Barrada, J. R., Fernández-del-Río, E., & Koopmans, L. (2019). Assessing job performance using brief self-report scales: The case of the individual work performance questionnaire. *Revista de Psicología del Trabajo y de las Organizaciones*, 35(3), 195-205.

- Sexton, J. B., Adair, K. C., Proulx, J., Profit, J., Cui, X., Bae, J., & Frankel, A. (2022). Emotional exhaustion among US health care workers before and during the COVID-19 pandemic, 2019-2021. *JAMA network open*, 5(9), e2232748-e2232748.
- Walters, G., & Raybould, M. (2007). Burnout and perceived organisational support among front-line hospitality employees. *Journal of Hospitality and Tourism Management*, 14(2), 144-156.

Vahid Ibrulj
JKP Zelenilo
Arandjelovac,
Republic of Serbia
arzelenilo@gmail.com
ORCID 0009-0008-1906-5564

Zoran Nešić
University of Kragujevac,
Faculty of Technical Science,
Čačak,
Republic of Serbia
zoran.nesic@ftn.kg.ac.rs
ORCID 0000-0001-6004-373X

Duško Petrović
Collage of Organizational
studies EDUKA Beograd,
Beograd,
Republic of Serbia
dusko.petrovic@vos.edu.rs
ORCID 0009-0002-3125-5789
