Iranian Journal of Organizational Psychology

University of Sistan and Baluchestan

IJOP

Does organizational ergonomic have impact on workplace burnout?

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ARTICLE INFO

Article type:
Research Article

Article history:
Received:25 November 2024
Revised:4 December 2024
Accepted:20 December 2024

Keywords:
Organizational ergonomics,
job burnout,
employees.

A B S T R A C T

The objective of this study was to explore the influence of organizational ergonomics on the burnout experienced by administrative personnel at the University of Sistan and Baluchestan, Zahedan, Iran. The utilized research approach was of a descriptive correlation-predictive nature. The study's statistical population included all administrative personnel at the University of Sistan and Baluchestan. The study sample included 130 individuals (54 males and 76 females) chosen through convenience sampling and took part in the research. A questionnaire on burnout and organizational ergonomics was utilized to gather data. The research data were analyzed using the Pearson correlation coefficient and stepwise regression. The correlation coefficient results indicated that the emotional exhaustion sub-scale exhibited a negative and significant correlation with scores in engineering psychology, work physiology, anthropometry, and job biomechanics ($p<.05$). The depersonalization sub-scale exhibited a negative and significant relationship with scores in engineering psychology, work physiology, and anthropometry ($p<.05$). However, no notable relationship was found between depersonalization and job biomechanics. The personal accomplishment sub-scale showed a positive and significant relationship with engineering psychology, work physiology, and anthropometry ($p<.05$). However, there was no notable correlation between the personal accomplishment sub-scale and job biomechanics. The findings from stepwise regression indicated that anthropometric measures accounted for 25.4% of the variance in emotional exhaustion, while work physiology accounted for 11.3% and 12.7% of the variance in depersonalization and personal accomplishment, respectively. It is concluded that appropriate organizational ergonomics leads to enhanced productivity and diminishes occupational stress, particularly job burnout.

Introduction

Modern man, in the process of adapting to his social and occupational environment, has to endure limitations and pressures, such that these pressures in the workplace will lead to employee burnout (Seigel, 2022). Among the important psychological factors is burnout. Burnout is a symptom that arises from the interaction of various individual, interpersonal, and organizational factors (Mohammadi & Khorsandi Yamchi, 2020), and is more of a long-term stress reaction that is primarily seen among people who have face-to-face contact with other people (De Silva et al., 2009). Occupational burnout is referred to as fatigue resulting from pressures in the workplace, work boredom, as well as signs and states of exhaustion, burnout, and disengagement in employees (Omidi et al., 2023). Burnout is not only a problem

DOI: https://doi.org/

Publisher: University of Sistan and Baluchestan

How to Cite: Mirbagheri, H., Rafiee-Delfan, Z. (2024). Does organizational ergonomic have impact on workplace burnout?. *Iranian Journal of Organizational Psychology*, 1(4), 40-45. https://doi.org/

arising from sheer weakness or incapacity in employees, but is also related to the work environment and the mismatch between the inherent characteristics of the individual and the nature of their job (Fried & Fisher, 2016). Research reveals that eighty percent of the workplace stressors leading to clinician burnout are organizational (Privitera et al., 2018), and this syndrome is a multifaceted phenomenon, and its origins are complex (Leiter, 1993). Maslach and Jackson (1981) developed the idea and provided a more precise and practical definition of burnout as a psychological condition marked by emotional exhaustion, depersonalization, and diminished professional efficacy. Some resources connected to the work environment include finances, job stability, assistance, or a prosperous career. When resources are at risk, diminished, or when individuals allocate resources that fail to provide the anticipated return, stress can occur. Another aspect of the conservation of resources theory is that a person's perception of resource loss is more prominent than that of resource gain. For instance, for an educator, a negative encounter with parents will stand out more than the daily rewards he might obtain. Ultimately, the conservation of resources theory indicates that when individuals experience loss, they tend to engage more proactively to mitigate the adverse impacts of that loss (Hobfoll, 1989; Hobfoll and Freedy, 1993).

In the current industrial landscape, numerous workers must learn to adapt and respond to the challenging circumstances dictated by their surroundings and the equipment utilized, as well as manage the constraints imposed in various ways (Hegde et al., 2023). The repercussions of such a compromise can be quite severe and negatively impact the person's survival, health, safety, and productivity (Haji et al., 2022). In this scenario, the individual is either physically or mentally unsuitable for the kind of work or machinery being utilized or the setting in which they live or operate. To avoid the emergence of these issues and maintain the well-being of the workforce, ergonomic principles offer an effective strategy for individuals (Lavender, 2023). A considerable proportion of workers in any company face burnout across various nations. It is clear that preventing burnout and promoting mental health are crucial for enhancing service quality. One strategy that may help in minimizing premature aging is the implementation of comprehensive ergonomics (both micro and macro ergonomics) (Sadra Abarghouei & Jafarpour, 2017). Ergonomics is the discipline of altering the design/structure of products to make them suitable for human use. The unique aspects of human traits such as height, weight, and attributes are considered, along with details regarding human hearing, vision, temperature, and several other factors. Ergonomics is often referred to as human factors engineering (Pankhania, 2020). Stone & McCloy (2004) describe ergonomics as the examination of the relationship and effectiveness between an individual and their work environment. Ergonomic studies show a direct connection between workplace ergonomics and staff productivity. There seem to be limited studies from the healthcare field that focus on ergonomic factors related to stress, job burnout, or bullying (Haji et al., 2022; Batool et al., 2022). In a study Sadra Abarghouei & Jafarpour (2017) showed a notable negative correlation existed between burnout and factors related to comprehensive ergonomics. Haji et al. (2022) demonstrated that ergonomic principles had significant negative direct effects on occupational stress and burnout. Makhbul et al. (2013) showed that the ergonomic components of a workstation are significantly related to work stress outcomes. Omidi et al. (2023) found that safety culture influences the impact of ergonomic principles on job burnout, resulting in a greater decrease in job burnout.

Due to the limited research available on the connection between organizational ergonomics and workplace burnout, this study seeks to examine the influence of organizational ergonomics on workplace burnout among employees at the University of Sistan and Baluchestan, Zahedan, Iran.

Method

Sample and Sampling Method

The current research is a descriptive correlation-predictive investigation. The statistical population for this research includes all the administrative personnel at the University of Sistan and Baluchestan, Zahedan, Iran. The study sample includes the administrative personnel of the University of Sistan and Baluchestan, totaling 130 individuals (54 male and 76 female). They were chosen through the convenience sampling method and took part in the study.

Tools Used

Ergonomic Principles Questionnaire The Harris and Bladen (1999) Ergonomic Principles Questionnaire consists of 26 closed-ended questions that measure organizational ergonomics based on a 5-point Likert scale. This questionnaire covers 4 dimensions: engineering psychology (questions 1 to 10), work physiology (questions 11 to 15), anthropometry (questions 16 to 21), and occupational biomechanics (questions 22 to 26). In the research conducted by Harris and Bladen (1999), the reliability of the questionnaire was found to be 0.93, while in Iran, the study by Hamzavi (2012) reported a reliability of 0.82 using Cronbach's alpha coefficient. In the current research the reliability of this questionnaire using Cronbach's alpha was 0.83.

The Maslach Job burnout Inventory The Maslash Burnout Questionnaire was developed by Maslach and Jackson (1981) consists of 22 items that assess emotional exhaustion (items 1, 2, 3, 6, 8, 13, 14, 16, 20), depersonalization aspects (items 5, 10, 11, 15, 22), and feelings of personal accomplishment (items 4, 7, 9, 12, 17, 18, 19, 21). The items in this questionnaire are rated on a 7-point Likert scale. In the study by Mehrabizadeh Honarmand et al. (2013), the overall questionnaire's reliability measured by Cronbach's alpha is 0.91, while emotional exhaustion is at 0.93, depersonalization at 0.84, and lack of personal accomplishment at 0.92. The reliability of this questionnaire in the current research was assessed with a Cronbach's alpha of 0.85.

Results

The data collected from this study was analyzed using SPSS-24 software, applying descriptive and inferential statistics, which included frequency, percent, mean, standard deviation, Pearson correlation analysis and stepwise regression.

Table 1- Frequency and percentage of participants according to gender and level of education.

Category	N	percent
Gender		
Male	54	41.5
Female	76	58.5
Total	130	100.0
Education		
Diploma	9	6.9
BA/BSc	38	29.2
MA/MSc and above	83	63.8
Total	130	100.0

In the current research (Table 1), 54 participants (41.5%) in the sample were male and 76 (58.5%) were female. Regarding education, 9 (6.9%) possessed a diploma, 38 (29.2%) held a bachelor's degree, and 83 (63.8%) earned a master's degree or above.

Table 2- Mean and standard deviation of job burnout and organizational ergonomics of employees.

Variable	Sub-scale	n	Mean	SD
Job burnout	Emotional exhaustion	130	51.75	9.03
	Depersonalization	130	31.16	3.93
	Personal accomplishment	130	37.05	8.26
Ergonomics	Engineering psychology	130	29.18	5.48
	Work physiology	130	10.75	3.11
	Anthropometry	130	15.80	4.92
	Job biomechanics	130	12.01	3.96
	Total	130	67.74	13.05

Table 2 provides an analysis of the research findings. Descriptive statistics concerning ergonomic conditions and the burnout sub-scale are provided, highlighting the average and standard deviation of the variables.

Table 3- Results of Pearson correlation coefficient between burnout and organizational ergonomics (n=130).

Variable	Sub-scales	1	2	3	4	5	6	7
Job burnout	1. Emotional exhaustion	1						
	2. Depersonalization	.427**	1					
	3. Personal accomplishment	-.363**	-.367**	1				
Ergonomics	4. Engineering psychology	-.288**	-.249**	.332**	1			
	5. Work physiology	-.363**	-.337**	.356**	.580**	1		
	6. Anthropometry	-.504**	-.237**	.218*	.367**	.588**	1	
	7. Job biomechanics	-.191*	-.048	.109	.209*	.368**	.384**	1

***p<.01, *p<.05*

The results of the correlation coefficient showed that emotional exhaustion had a negative and significant correlation with engineering psychology (r=-.288, p<.01), work physiology (r=-.363, p<.01), anthropometry (r=-.505, p<.01) and job biomechanics (r=-.191, p<.05). Depersonalization had a negative and significant correlation with engineering psychology (r=-.249, p<.01), work physiology (r=-.337, p<.01) and anthropometry (r=-.237, p<.01), also there was no significant correlation between depersonalization and job biomechanics (r=-.048, p>.05). Personal accomplishment had a positive and significant correlation with engineering psychology (r=.332, p<.01), work physiology (r=.356, p<.01) and anthropometry (r=.218, p<.05), but there was no significant association between personal accomplishment and biomechanics (r=.109, p>.05).

Table 4- Results of stepwise regression of emotional exhaustion on organizational ergonomics sub-scales.

Model	R	R^2	F	Unstandardized Coefficients		Standard coefficients	t	Sig.
				B	Std.E	Beta		
Anthropometry	-.504	.254	43.66	.925	.14	-.504	60.61	.001

The findings from stepwise multiple regression indicate that only the anthropometric sub-scale was included in the regression equation, accounting for 25.4% of the variance in emotional exhaustion. Conversely, the other organizational ergonomics sub-scales did not fulfill the criteria for inclusion in the regression equation and were excluded. The anthropometric sub-scale showed a significant negative correlation with emotional exhaustion (Beta=-.504, P=.001).

Table 5- Results of stepwise regression of depersonalization on organizational ergonomics sub-scales.

Model	R	R^2	F	Unstandardized coefficients		Standard Coefficients	t	Sig.
				B	Std.E	Beta		
Work physiology	-.337	.113	16.35	.43	.105	-.337	4.044	.001

The findings from the stepwise multiple regression indicate that solely the work physiology sub-scale was included in the regression equation, accounting for 11.3% of the variance in depersonalization. Meanwhile, the other organizational ergonomics sub-scales failed to satisfy the criteria for inclusion in the regression equation, resulting in their exclusion from the analysis. The work physiology sub-scale displayed a detrimental and significant relationship with depersonalization (Beta=-.337, p=.001).

Table 6-Results of stepwise regression of personal accomplishment on subscales of organizational ergonomics.

Model	R	R^2	F	Unstandardized Coefficients		Standard coefficients	t	Sig.
				B	Std.E	Beta		
Work physiology	.356	.127	18.603	.947	.219	.356	4.313	.001

The findings from the stepwise regression show that only the work physiology sub-scale satisfied the criteria for inclusion in the regression equation and could explain 35.6% of the variance in personal accomplishment. The other sub-scales of organizational ergonomics scores failed to satisfy the criteria for inclusion in the regression equation and were excluded. Consequently, work physiology exhibited a positive and substantial correlation with personal accomplishment (Beta=.356, p=.001).

Discussion

This study aimed to explore the impact of organizational ergonomics on employee burnout at the University of Sistan and Baluchestan, situated in Zahedan, Iran. The results of the Pearson correlation revealed that emotional exhaustion showed a negative and significant relationship with engineering psychology, work physiology, anthropometry, and job biomechanics. Depersonalization showed a negative and significant relationship with engineering psychology, work physiology, and anthropometry; however, there was no significant relationship observed between depersonalization and job biomechanics. Personal accomplishment demonstrated a positive and notable correlation with engineering psychology, work physiology, and anthropometry; however, there was no significant relationship between personal accomplishment and biomechanics. The findings from stepwise regression indicated that within the sub-scales of organizational ergonomics, only anthropometry had a negative prediction on emotional exhaustion, while the work physiology sub-scale negatively predicted depersonalization and positively predicted personal accomplishment among employees at Sistan and Baluchestan University. The findings of this study are consistent with the research of Sadra Abarghouei & Jafarpour (2017); Haji et al. (2022); Makhbul et al. (2013); and Omidi et al. (2023). Sadra Abarghouei and Jafarpour (2017) indicated a significant negative correlation between burnout and aspects associated with comprehensive ergonomics. Haji et al. (2022) determined that ergonomic principles had notable adverse direct impacts on work-related stress and burnout. Makhbul et al. (2013) noted that the ergonomic features of a workstation are closely connected to work stress results. Omidi et al. (2023) determined that the safety culture affects how ergonomic principles impact job burnout, leading to a more significant reduction in job burnout. It appears that enhancing the scores of organizational ergonomics leads to a reduction in job burnout elements like emotional exhaustion and depersonalization; conversely, lowering organizational ergonomics scores raises emotional exhaustion and depersonalization levels. Additionally, improving organizational ergonomics scores correlates with higher personal accomplishment scores. There exists a direct relationship between organizational ergonomics and personal accomplishment, alongside an inverse relationship with emotional exhaustion and depersonalization. According to Stone & McCloy (2004), there is a direct link between employee productivity and workplace ergonomics. It appears that appropriate organizational ergonomics leads to enhanced productivity and diminishes occupational stress, particularly job burnout.

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