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Analysis of Biological Stress Response as the Impact of Workplace Bullying on Performance Perception

Dian Priharja Putri[1*], Eka Rika Fitriyani[1], Elis Nurhayati[1], Linawati[1], Nurhaeni[1], Siti Hasanah[1], Yayah Junayah[1], Juana Sopa[1], Lia Yuliawati[1]

[1] Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara, Jakarta, Indonesia.

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Corresponding Author:
Dian Priharja Putri
putridianpriharja@gmail.com

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Abstract: This study aims to determine the extent to which workplace bullying is related to employees' performance perception at health centers and its impact on biological stress. The research was conducted on all employees at eight health centers in Regency X, randomly selected. Workplace bullying was measured using the Negative Acts Questionnaire Revised (NAQ-R), translated into Indonesian. Performance perception was measured using the Performance Perception Questionnaire. Biological stress was assessed through cortisol levels in saliva. Among the 240 participants, the majority (60%) rarely experienced workplace bullying, with an average score of 41.00 (SD=6.532). Most participants (67.1%) had a high perception of performance, with an average score of 67.12 (SD=9.747). Pearson's test results showed a value of 0.038 with a coefficient of -0.207, indicating a significant correlation between workplace bullying and performance perception. The findings also indicate that biological stress levels, measured through cortisol, correlate with lower performance perceptions. Workplace bullying contributes 4.285% to performance perception. This study provides preliminary evidence that workplace bullying can affect employee performance through biological stress mechanisms, highlighting the importance of interventions to reduce workplace bullying to improve employee well-being and performance.

Keywords: Biological stress; Cortisol levels; Performance perception; Workplace bullying

Introduction

In the context of an increasingly competitive and stressful world of work, workplace bullying or bullying in the workplace has emerged as a serious problem that affects the mental and physical health of employees, as well as the overall performance of the organization (Elnahla & McKay, 2020; Singh et al., 2024; Sorensen et al., 2021). Workplace bullying refers to a series of aggressive, intimidating, or harmful behaviors that are systematically carried out against individuals in a work environment (Österman & Boström, 2022). These actions can include repeated insults, threats, social isolation, or unfair treatment. The impact of this bullying often extends far beyond psychological disorders, including physical health issues and significant impacts on an individual's productivity and perception of performance (Holm et al., 2023; Persky et al., 2020). One of the important aspects of the impact of workplace bullying that needs to be studied is the biological stress response. This response involves various systems in the body, especially hormonal and neurobiological systems that are integrated to regulate how the body responds to stress. Cortisol, the main hormone produced by the adrenal glands, serves as a biomarker of biological stress and plays an important role in the regulation of various bodily functions such as metabolism, immune response, and cognitive function (Man et al., 2023; Vinkers et al., 2021). When individuals experience chronic stress due to bullying, cortisol production and regulation can be disrupted, ultimately impacting the individual's physical and mental health.

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Prolonged exposure to stress can cause changes in cortisol levels, which can be measurable in blood or saliva. Chronic elevated cortisol levels are often associated with various health problems such as sleep disturbances, high blood pressure, metabolic disorders, and decreased immunity. In addition to health impacts, biological stress can also affect an individual's perception of their performance at work. Performance perception is the way individuals assess their effectiveness and productivity in their work, which can be influenced by psychological and physiological factors (Caplin et al., 2021; Nielsen et al., 2020). When individuals experience high stress, they may feel less effective at their jobs, which can lead to decreased motivation and job satisfaction. Workplace bullying can create an unsupportive work environment, which in turn can improve the biological stress response. For example, individuals who experience bullying may face prolonged feelings of anxiety and depression, which activate the HPA (Hypothalamic-Pituitary-Adrenal) system. Activation of this system leads to increased production of cortisol and other stress hormones (Leistner & Menke, 2020; Rein et al., 2019). Long-term excess production of cortisol can lead to changes in the way the body responds to stress and affect overall mental and physical health.

Meanwhile, the perception of individual performance can also be affected by the psychological and physiological impact of stress. When employees feel pressured or threatened, they may experience a decrease in concentration, motivation, and the ability to complete tasks effectively (Nielsen et al., 2020; Özer & Escartín, 2023). This can result in decreased productivity and job satisfaction, as well as a negative impact on interpersonal relationships in the workplace. Thus, the impact of workplace bullying is not only limited to the targeted individual, but can also spread to all teams and organizations. Biological stress theory provides the foundation for understanding how psychological stress, such as that caused by workplace bullying, can trigger significant physiological reactions. According to this theory, psychological stress can trigger the body's response involving the production of stress hormones such as cortisol. Cortisol serves as a key indicator of stress intensity and can provide an overview of the impact of psychological stress on an individual's physical and mental health. Previous research has shown that chronic stress exposure can affect hormonal balance and the immune system, which can contribute to a variety of health problems.

On the other hand, performance perception theory emphasizes that individuals judge their effectiveness and productivity based on subjective and objective factors. Performance perceptions are influenced by a variety of factors including mental and physical health, as well as workplace experiences. The biological stress caused by workplace bullying can affect an individual's perception of their performance by interfering with their ability to focus and complete tasks effectively (Duplessis et al., 2021; Generaal et al., 2017). This can lead to a decrease in self-assessment and job satisfaction, which can ultimately affect overall performance. In the context of human resource management and occupational health, a better understanding of the relationship between biological stress responses and performance perception is essential. Identifying the biological impact of workplace bullying can help organizations design and implement strategies to mitigate the negative impact of workplace bullying (Aas et al., 2020; Boudrias et al., 2021). This includes the development of psychological support programs, interventions to improve employees' physical and mental health, and policies that support a healthier and more inclusive work environment.

This study aims to provide new insights into how biological stress caused by workplace bullying affects the perception of individual performance. By analyzing cortisol levels as a key indicator of biological stress, it is expected to find a significant relationship between stress response and performance perception (Allen et al., 2014; Lelli et al., 2019). These findings will make an important contribution to the scientific and practical literature in the fields of occupational health and human resource management (Lopes & Soares, 2018; Said & Tanova, 2021). By understanding the biological mechanisms underlying workplace bullying impacts, organizations can design more effective interventions to improve employee well-being and overall organizational performance.

Method

This study uses a quantitative approach to explore the relationship between workplace bullying and employee performance perception by assessing variations in both variables and measuring the correlation coefficient between the two (Rein et al., 2019; Sudo, 2016). The design of this study aims to identify the extent to which variations in workplace bullying levels are related to variations in performance perceptions. The study was conducted in eight health centers in District X that were randomly selected, with participants being all employees who had worked for at least one year at the health center, and did not include the head of the health center, the head of the administrative sub-division, or the personnel department.

The instrument used to measure workplace bullying is the Negative Acts Questionnaire Revised (NAQ-R), which was developed and has been translated into Indonesian Language and adapted to the social and cultural context of employees in Indonesia (An & Kang,

2016; Dåderman & Ragnestål-Impola, 2019; Feijó et al., 2022). The NAQ-R consists of 22 items divided into three dimensions: work-related bullying (11 items), person-related bullying (6 items), and physical intimidation bullying (5 items). A higher total score (5) indicates a more frequent frequency of bullying, while a lower score (1) indicates a rarer frequency. The internal consistency of the NAQ-R showed satisfactory results with Cronbach's alpha value of 0.897.

To measure employee performance perception, a Performance Perception Questionnaire was used which was adapted from the research scale and compiled based on dimensions and indicators developed. This questionnaire includes 19 items divided into three dimensions: work results (6 items), work behavior (6 items), and work-related personal traits (7 items). The internal consistency of this questionnaire also showed satisfactory results with Cronbach's alpha value of 0.728 (Aleksic et al., 2024; Basirimoghadam et al., 2023). The data obtained from these two instruments were analyzed to determine the correlation between workplace bullying and performance perception, as well as the impact of biological stress measured through cortisol levels in saliva on employee performance perceptions see Figure 1.

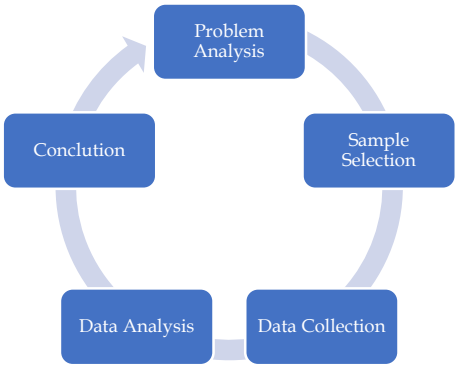

Figure 1. Research stages

Result and Discussion

Characteristics of Respondent

The results of this study provide a clear overview of the relationship between workplace bullying and employees' performance perceptions in the context of health centers. The data analysis reveals a significant correlation between the level of bullying experienced by employees and their perception of individual performance. Additionally, this research highlights how biological stress, measured through cortisol levels in saliva, can influence employees' performance perceptions. These findings offer valuable insights into the negative impact of workplace bullying on employee well-being and productivity, emphasizing the urgency of developing effective intervention strategies to reduce bullying in the workplace.

Table 1. Characteristics of Respondents

Variable	Number (N)	Percentage (%)
Age		
20-40 years old (early adult)	192	80.0
41-60 years old (intermediate adult)	48	20.0
Gender		
Woman	169	70.4
Man	71	29.6
Employee Status		
Civil servants	127	52.9
PPPK	35	14.6
Honorary	78	32.5
Job Type		
Health Workers	220	91.7
Non-Health Workers	20	8.3
Working Period		
<2 years	12	5.0
2-5 years	58	24.2
5-10 years	80	33.3
10-20 years	74	30.8
20-30 years old	15	6.3
>30 years	1	0.4

Of the total 240 participants, the majority had an age range of 20-40 years (80.0%), most (70.4%) were female, 52.9% were civil servants, the majority (91.7%) were health workers, and the working period was 5-10 years (33.3%).

Table 2. Dissertation of Research Data

Variable	Mean	Score		SD
		Min	Max	
Workplace bullying	41.00	25.00	60.00	6.53
Employee performance	67.12	40.00	82.00	9.75

The majority (60.0%) rarely became victims of *workplace bullying* with an average score of 41.00 (SD=6.53) with a minimum score of 25.0 and a maximum score of 60.0. The majority (67.1%) had a high performance perception with an average performance perception score of 67.12 (SD=9.75) with a minimum score of 40.0 and a maximum score of 82.0.

Normality Test

The normality test of data using the Kolmogorov-Smirnov test with SPSS 28.0 on *workplace bullying* showed a normal distribution with values of Z = 1.241 and p = 0.07 or p>0.05 and the perception of employee performance showed a normal distribution with values of Z = 0.785 and p = 0.43 or p>0.05.

Table 3. Normality Test Results

Variable	Z	p	Information
Workplace bullying	1.24	0.07	Normal spread
Employee performance	0.78	0.43	Normal spread

Linearity Lest

The significance value of linearity using the F test with SPSS 28.0 the *deviation value from linearity* is 0.128 (p>0.05) which shows that *workplace bullying* and employee performance perception have a linear relationship.

Table 4. Linearity Test Results

Variable		F	p	Information
Workplace bullying Employee performance	Linearity	0.562	0.032	Linear
	Deviation from Linearity	0.128	0.079	

Workplace Bullying and its Impact on the Perception of Work Performance

The results of the normality test showed that the distribution of data was normal, while the linearity test showed that *workplace bullying* and performance perception showed a linear relationship. The results of the assumption test in this study are met, so the parametric statistical test is suitable to be applied is the *Pearson Product Moment* test. The value of the product *moment test results of Pearson* is p = 0.04 with a coefficient value of -0.21. The results showed that p was less than 0.05 (p<0.05), meaning that there was a significant correlation between *workplace bullying* and performance perception. The contribution of *workplace bullying* to performance perception with a coefficient value (r^2) obtained by the Determination Coefficient (Kd) is 4.285%, indicating that *workplace bullying* contributes 4.285% to performance perception, and the rest is influenced by other factors.

Table 5. Pearson Product Moment Test Results

		Workplace bullying	Employee performance
Workplace bullying	Person correlation	1	-0.21
	Sign. (2-tailed)	.	0.04
	N	24	240
Employee performance	Person correlation	-0.207	1
	Sign. (2-tailed)	0.038	.
	N	240	240

Data analysis from this study shows that there is a significant negative relationship between workplace bullying and employee performance perception. The correlation coefficient values of r = -0.207 and p = 0.038 (p < 0.05) indicate that the more often employees experience workplace bullying, the lower their perception of their own performance. In contrast, a lower frequency of bullying is associated with a perception of higher performance. These findings confirm that workplace bullying not only has an impact on employees' mental and emotional health, but also affects their perception of their performance at work (Ågotnes et al., 2021; Nielsen et al., 2024; Teo et al., 2020).

These results are in line with previous findings by which show that workplace bullying has a negative impact on the health of its victims, causing psychosomatic and psychiatric disorders that can reduce employee performance. This study not only shows the relationship between bullying and performance, but also provides an insight into how biological stress plays a role in this relationship. Biological stress, which is characterized by increased levels of stress hormones such as cortisol, can affect various aspects of health, including sleep quality, cognitive ability, and overall physical health (Generaal et al., 2017). High cortisol levels can interfere with bodily and mental functioning, which in turn can affect an individual's ability to work effectively.

Workplace bullying attacks employees' psychological aspects such as self-esteem and self-confidence. A decline in these aspects can reduce the ability of employees to work effectively and contribute optimally in the workplace. Research highlights how bullying affects self-esteem and self-confidence, which ultimately decreases work effectiveness. Biological stress caused by bullying can result in decreased performance by disrupting hormonal balance and affecting employees' mental and physical health (Albayrak et al., 2024; White et al., 2023). For example, workers who experience bullying can experience sleep disturbances and health problems such as hypertension, which affect their concentration and productivity.

The findings from support the results of this study by showing that workplace bullying has a significant influence on employee performance. The negative impacts of bullying behavior include increased absenteeism, decreased productivity, depression, anxiety, and physical health problems (Yu & Zhao, 2021). This research adds a new dimension by highlighting the role of biological stress as a mediator between workplace bullying and performance perception. Previous research has also shown that bullying victims tend to experience stress disorders that can interfere with their quality of life and work effectiveness.

In this context, biological stress plays a key role in linking workplace bullying experiences to decreased performance. When employees experience bullying,

they may experience chronic stress that disrupts their hormonal balance (Cuda et al., 2022; Lamontagne et al., 2022). Prolonged stress can lead to decreased cognitive function, memory impairment, and other health problems that affect their ability to function properly. Research before shows that demeaning behavior, shouting, and criticizing in front of others have a negative effect on performance perception. This reflects how the stress arising from the experience can affect the employee's ability to function optimally in the workplace.

This study found that the frequency of workplace bullying in the District X Health Center was relatively rare, with the majority of respondents reporting that they did not experience bullying often. This is in line with the results of high performance perception among employees. According to individuals who rarely experience bullying tend to feel more comfortable and motivated to make the best contribution at work. This positive quality of work life can reduce biological stress and improve performance (Ågotnes et al., 2021). However, even though the frequency of bullying is low, the biological stress that may arise from negative experiences can still affect the perception of performance.

The perception of high performance in this study reflects a generally positive work environment, with low intensity of bullying. Research supports these findings by showing that a work environment free from bullying tends to support high performance and job satisfaction (Teo et al., 2020). Biological stress arising from workplace bullying can interfere with performance by affecting the hormonal balance and mental health of employees. This study provides evidence that reducing bullying in the workplace can create a healthier environment and support improved performance.

The results of the linearity test showed that there was a linear relationship between workplace bullying and employee performance perception, with a deviation from linearity value of $p = 0.128$ ($p > 0.05$). This suggests that the relationship between the two variables is consistent and predictable linearly, which is consistent with the significant impact of bullying on performance. This suggests that although the frequency of bullying is low, its impact on performance remains significant through biological stress mechanisms.

The determination coefficient of 4.285% shows that workplace bullying contributes little to the perception of performance, and there are other factors that affect employee performance, such as individual competence, organizational support, and job satisfaction. Biological stress due to workplace bullying may be just one of the many factors that affect employee performance (Feijó et al., 2022). These additional factors need to be considered to get a more comprehensive picture of how bullying affects job performance.

Overall, the results of the study show that although the frequency of workplace bullying in the District X Health Center is low, the impact on employee performance remains significant, especially through biological stress mechanisms. The biological stress that arises from bullying can affect hormonal balance and mental health, which in turn affects the employee's job performance (Allen et al., 2014; Lelli et al., 2019). Efforts to reduce bullying and create a supportive work environment are essential to improve employee performance and well-being. Additional factors that affect the perception of performance must also be considered to ensure that all aspects that contribute to employee performance are considered in an effort to improve the quality of the work environment and the effectiveness of the organization.

Conclusion

Based on the results of the analysis, it was found that there was a negative correlation between the intensity of workplace bullying and the perception of employee performance, with a correlation coefficient value of $r = -0.207$ and $p = 0.038$ ($p < 0.05$). This indicates that the more often employees experience bullying, the lower their perception of their performance. On the other hand, employees who rarely experience bullying tend to have a higher perception of performance. The frequency of bullying in Puskesmas is relatively rare, which is reflected in the perception of generally high performance among employees. The study revealed that biological stress, measured through the psychological and hormonal impact of bullying, plays an important role in explaining this relationship. The biological stress caused by bullying can disrupt hormonal balance and mental health, which in turn affects job performance. These findings support the results of previous research that shows that workplace bullying has a negative impact on employee health and performance. Although bullying's contribution to performance perception was only 4.285%, it still shows that bullying has a significant impact through biological stress mechanisms. Other factors that affect performance, such as individual competence, organizational support, and job satisfaction, also need to be considered. Overall, this study emphasizes the importance of creating a bullying-free work environment to improve employee performance and well-being. Reducing bullying and managing biological stress can help improve the perception of performance and overall quality of work. Going forward, more research is needed to explore additional factors that

affect employee performance and to develop more effective strategies for addressing workplace bullying.

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The following statements should be used Conceptualization, DPP, ERF, EN, L, N, S, YJ, JS, LY contributed to the data collection process, data processing, article writing.

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Conflicts of Interest
The authors declare no conflict of interest.

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