

Analysis of Factors Influencing Stress Management and Work Balance of Islamic Nurses (Case Study of Islamic Hospitals in Indonesia)

Qomariyatus Sholihah¹, Endra Yuafanedi Arifianto², Mohamad Anas³, Wahyudi Kuncoro⁴, Izzati Putri Kuncoro⁵, Ridwan Danuarta Galisong⁶

¹Lecturer in Industrial Engineering, Professional Engineering Study Program, Faculty of Engineering and Head of Environmental Occupational Health and Safety Division, Brawijaya University, Malang, Indonesia

Email: qomariyatus@ub.ac.id

²Lecturer in Industrial Engineering, Brawijaya University, Malang, Indonesia

³Lecturer, Department of Sociology, Faculty of Social and Political Science, Universitas Brawijaya, Malang, Indonesia

⁴Student of the Specialist Medical Education Program and Lecturer, Faculty of Medicine, Islamic University of Malang, Indonesia

⁵Faculty of Medicine, Department of Medicine, Brawijaya University, Malang

⁶Environmental Science Doctoral Program Student and Staff, Division of Occupational Safety, Health, and Environment Unit, Brawijaya University, Malang, Indonesia

Received: 25th Aug, 2026 | Revised: 1st Sep, 2026 | Accepted: 5th Sep, 2026 | Available Online: 7th Sep, 2026

ABSTRACT

This study analyzes key factors influencing work-life balance and stress of Muslim nurses in several Islamic hospitals in Indonesia. Using a quantitative approach with a survey method, data were collected through structured questionnaires from professional medical personnel. The MICMAC method was used to identify key factors affecting stress management of Muslim nurses. The results of the analysis categorized these factors into four quadrants: Quadrant 1 (key factors with high influence and dependence), Quadrant 2 (dependent factors), Quadrant 3 (independent factors but less influential), and Quadrant 4 (autonomous factors with minimal impact). The surge of patients and limited access to health facilities were placed in Quadrant 1, indicating their crucial role in stress management. In contrast, factors such as (6) poor air circulation and (7) sudden loss of staff had a lower impact and were positioned in Quadrant 4. Implementing targeted strategies to address key factors can improve the well-being of medical personnel and ensure optimal health care quality.

Keywords: work stress, work-life balance, islamic nurse, stress management, health policy.

How to cite this article: Sholihah Q, Arifianto EY, Anas M, Kuncoro W, Kuncoro IP, Galisong RD., Analysis of Factors Influencing Stress Management and Work Balance of Islamic Nurses (Case Study of Islamic Hospitals in Indonesia). Int J Drug Deliv Technol. 2026;16(6): 1408-1418; DOI: 10.25258/ijddt.16.6.175

INTRODUCTION

Professional medical personnel are a key element in the health care system, where their work-life balance greatly determines the quality of services provided to the community (Denning, et al., 2021). A good work-life balance not only supports the productivity of medical personnel but also has an impact on patient safety and the overall effectiveness of health services (Roth, et al, 2021). However, various factors in the work environment can affect this balance, both directly and indirectly, which can ultimately contribute to the stress levels and job satisfaction of medical personnel (Imamura, et al., 2021). To better understand the factors that influence the work-life balance of medical personnel in Indonesia, a study was conducted using a survey method using a structured questionnaire. This approach allows for systematic data collection from various sources, thus providing a clearer picture of the condition of the work-life balance of medical personnel in the field. In addition, this survey method also helps identify the main factors that cause work-life imbalance and how medical personnel respond to these challenges.

The respondents in this study consisted of professional medical personnel, academics, and policy makers in the health sector. The involvement of various parties aims to gain more comprehensive insights into the challenges faced by medical personnel (Adamopoulos, 2021). Academics can provide theoretical and analytical perspectives,

while policymakers can highlight how health regulations and policies affect the work-life balance of medical personnel (Sahu, et al., 2022). Through the results of this study, it is hoped that the right solution can be found to improve the work-life balance of medical personnel in Indonesia. With data-based recommendations, related parties can design more effective policies to support the welfare of medical personnel and improve the quality of health services for the community. Awareness of the importance of work-life balance for medical personnel needs to be continuously improved so that they can carry out their duties optimally without experiencing excessive work pressure.

This study aims to analyze the main factors that contribute to stress and work-life balance of medical personnel. Several aspects that are the focus of the study include work environment factors, health policies, social conditions, work safety, economic factors, and sudden events that may occur in daily practice (Sholihah & Kuncoro, 2014). By understanding these factors, more effective strategies can be designed to improve the welfare of medical personnel and create a more conducive work environment (Dullah, et al., 2023).

LITERATURE REVIEW

1. Environmental Factors

The work environment is one of the main factors that affect the work-life balance of medical personnel. Inadequate temperature and air circulation conditions can cause fatigue and decreased productivity of medical personnel (Wolkoff, et al., 2021). In addition, high noise from medical equipment can increase stress and interfere with communication between medical personnel (Dierickx, et al., 2021). Insufficient or excessive lighting can also have a negative impact on eye health and work comfort (Hoshi, et al., 2022). In addition, an unergonomic workspace can increase the risk of musculoskeletal disorders (Cruz-Ausejo, et al., 2023). Poor work environment hygiene also contributes to an increased risk of nosocomial infections. Exposure to radiation and hazardous chemicals in medical environments is an additional risk factor that can endanger the health of medical personnel in the long term (Mahesh, et al., 2022).

2. Policy Factors

Suboptimal work policies can lead to work imbalance and increased stress in medical personnel (Lee & Shin, 2023). Inappropriate work shifts can disrupt circadian rhythms and cause chronic fatigue (Dawson, et al., 2021; Sholihah, et al., 2015). Lack of leave or rest time also has a negative impact on the physical and mental well-being of medical personnel (Min, et al., 2020). High workloads without policies that support the well-being of medical personnel can lead to burnout and high turnover (Alzoubi, et al., 2024). Support for the mental health of medical personnel is important to reduce work stress (Mail, et al., 2024). Effective stress management training can help healthcare workers better manage work pressure (Bahraseman, et al., 2021). In addition, adequate incentives and compensation play an important role in maintaining the motivation and well-being of healthcare workers (Sitopu, et al., 2021).

3. Social Factors

Social factors in the work environment also play an important role in the work-life balance of healthcare workers. Support from coworkers and superiors can increase job satisfaction and reduce stress levels (Azila-Gbetteor, et al., 2022). Conversely, conflicts with coworkers can create an unhealthy work environment and hinder productivity (Cheng, et al., 2021). The relationship between healthcare workers and patients and their families can also be a stress factor if not managed properly (Stojanov, et al., 2020). High workloads and minimal rest time often lead to physical and mental fatigue (Djulgovic, et al., 2022). Irregular work schedules can also affect the work-life balance of medical personnel (Santiago, 2023).

4. Factors Related to Occupational Health and Safety (OHS)

Occupational safety is a crucial aspect in the medical world (Sholihah, 2012). Lack of Personal Protective Equipment (PPE) can increase the risk of exposure to infectious diseases and hazardous materials (Aengst, et al., 2022). In addition, non-compliance with safety standards can cause work accidents and endanger the safety of medical personnel (Magalhães, et al., 2022). Inadequate safety training can also increase the risk of incidents in the workplace. Unclear emergency procedures can slow down the response to critical situations (Los, et al., 2023). Ergonomic factors in medical work also need to be considered to reduce the risk of injury due to unergonomic working positions

RESEARCH PAPER

(Muthukrishnan & Ahmad, 2021). Errors in hazardous material use procedures can increase the risk of work accidents (Hutchinson, et al., 2022).

5. Economic Factors

The economic aspect also has a major impact on the work-life balance of medical personnel. Salaries that do not match the workload can lead to dissatisfaction and an increased risk of burnout (Verduzco-Gutierrez, et al., 2020). Lack of incentives and benefits can reduce the motivation of medical personnel in carrying out their duties (Afonso, et al., 2022). Economic instability can also affect the working conditions of medical personnel, especially in crisis situations such as a pandemic (Clinton, et al., 2022). Many medical personnel have to work more than one job to meet their economic needs, which can ultimately disrupt their work-life balance (Martin & Feinberg, 2023). High healthcare costs and limited access to healthcare facilities are also challenges for medical personnel (Coombs, et al., 2021).

6. Sudden Factors

Sudden factors that arise in the medical work environment often add to the work pressure of medical personnel. A sudden surge of patients, such as in a pandemic or disaster situation, can cause extreme fatigue (Shah, et al., 2021). Medical equipment disruptions can also hamper services and increase stress for medical personnel (Sahdev, et al., 2021). Sudden policy changes without adequate socialization can cause confusion and uncertainty among medical personnel (Ralph, et al., 2022). Sudden loss of staff can also increase the workload of remaining medical personnel (Palejwala, et al., 2023). Unexpected medical emergencies require high levels of preparedness so that medical personnel can respond quickly (Savioli, et al., 2022). In addition, failures in management and communication can lead to errors in decision-making that impact patient safety (Wackers, et al., 2021).

RESEARCH METHOD

This study uses a quantitative approach with a survey method through a structured questionnaire distributed to professional medical personnel in Indonesia (Rashid, et al., 2021). The questionnaire was designed to identify factors that influence the work-life balance of medical personnel, including aspects of the work environment, institutional policies, and social and economic factors that influence work stress (Fazal, et al., 2022). The analysis technique used is factor analysis with the MICMAC method to determine the key factors that have the most influence on the work-life balance of medical personnel (Hamdi & Toumi, 2024). The data obtained were analyzed using a Likert scale to measure the relationship between variables, as well as descriptive analysis to describe the main trends of respondents (South, et al., 2022). To increase the validity and reliability of the study, a reliability test was carried out with Cronbach's Alpha and content validation by experts in the health field (Amirrudin, et al., 2021). With this approach, research is expected to provide accurate and data-based insights into the factors that influence the work-life balance of medical personnel in Indonesia (Sholihah, et al., 2023).

RESULTS AND DISCUSSION

1. Questionnaire Results

		1 : P	2 : W	3 : St	4 : C	5 : H	6 : W	7 : Li	8 : S	9 : S	10 :
►	1 : Poor temperature/circulation	0	0	3	3	2	0	3	1	3	1
	2 : Workload	1	0	3	2	3	2	2	3	1	1
	3 : Stress Management Training	1	3	0	3	3	2	0	2	3	0
	4 : Coworker conflict	1	2	1	0	1	3	2	1	0	2
	5 : Hazardous materials procedure error	2	2	3	3	0	2	1	1	3	3
	6 : Working more than one job	1	2	3	3	0	0	2	1	0	3
	7 : Limited access to health facilities	3	1	3	3	3	2	0	0	1	0
	8 : Surge of patients	3	3	2	1	1	3	3	0	3	0
	9 : Sudden loss of staff	3	3	1	0	2	2	0	3	0	1
	10 : Management/communication failure	0	1	1	2	1	3	1	0	0	0

Figure 1. Mode Calculation from MICMAC Questionnaire Collection Results

Source: MICMAC Analysis (2025)

Based on the results of the analysis of the questionnaires that have been collected, several key factors were found to have the greatest influence on the work-life balance of professional medical personnel in Indonesia. These factors are categorized based on their level of influence on the work environment of medical personnel (Yusida, et al., 2016).

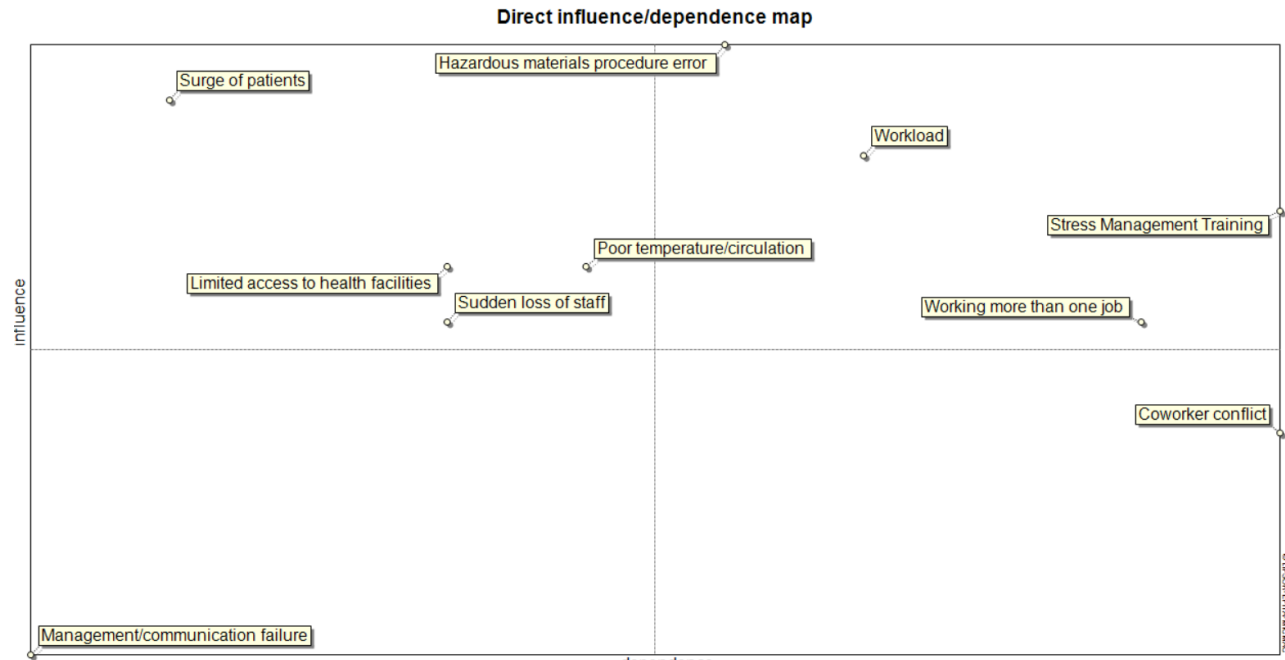


Figure 2. Map of direct influence/dependence on stress management of Islamic nurses

Source: MICMAC Analysis (2025)

1.1. Key Factors That Influence the Most

The surge in the number of patients directly affects various aspects of the work environment of medical personnel, including increased workload, risk of procedural errors, higher stress levels, and the effectiveness of resource management that can be disrupted (Shah, et al., 2021). This increasing pressure has an impact on the work-life balance of medical personnel, both physically and mentally, which can ultimately affect the quality of health services provided. Meanwhile, limited access to health facilities is also a major challenge for medical personnel, especially in remote areas or areas with inadequate infrastructure (Coombs, et al., 2021). This situation not only limits the efficiency of medical personnel in providing optimal services but also increases the potential for job dissatisfaction due to obstacles in carrying out their duties effectively.

1.2. Key Factors That Influence the Least

Poor temperature and air circulation can affect the comfort of medical personnel, especially in environments that require high concentration and rapid mobility (Wolkoff, et al., 2021). Although the impact is more physical and ergonomic, this factor is not directly related to stress management or social dynamics in the workplace (Sholihah, et al., 2016). However, an uncomfortable work environment can still reduce the productivity and well-being of medical personnel in the long term. On the other hand, sudden staff loss has a greater impact in certain situations, such as when performing critical procedures or dealing with emergencies (Palejwala, et al., 2023). Although this factor occurs less frequently than other challenges, its effects can be very significant, especially in increasing the workload for the remaining team (Sholihah & Djohan, 2013). These impacts are often localized in a certain time period or only affect a certain part of the medical staff but still require appropriate management strategies to reduce disruptions in health services (Yusida, et al., 2017).

2. Relationships Between Factors

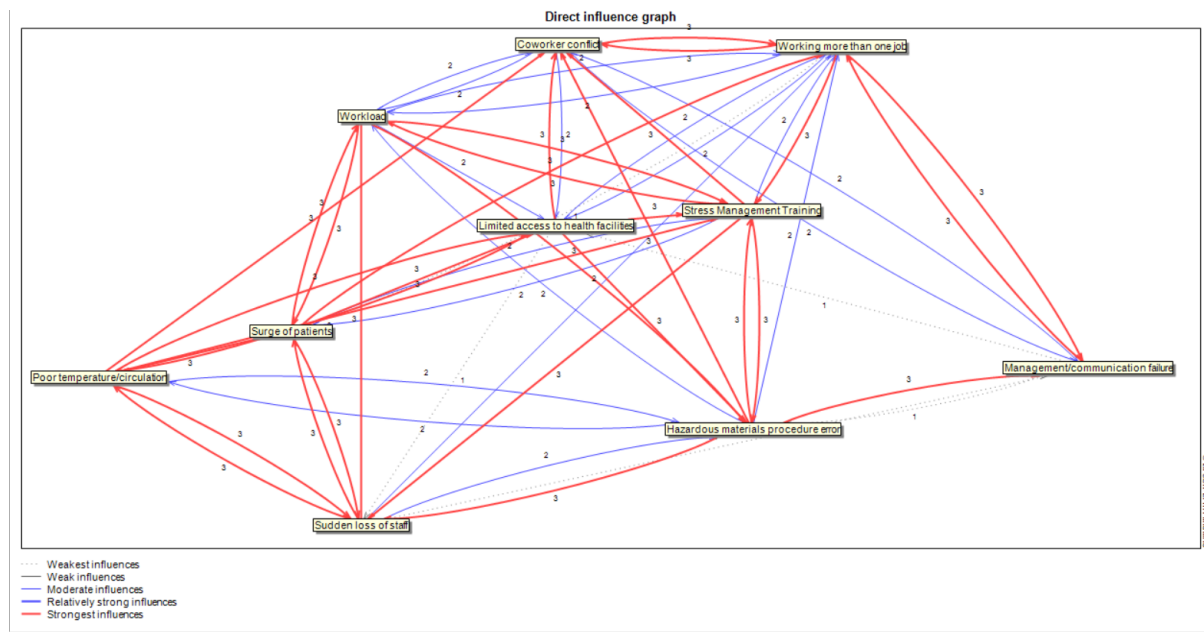


Figure 3. Direct Influence Graph on Stress Management of Islamic Nurses

Source: MICMAC Analysis (2025)

Based on the MICMAC matrix analysis, the relationship between various factors can be categorized based on the level of association and influence (Sillehu, et al., 2025). Some factors may not have a direct relationship, which is categorized as no relationship (0). An example is poor temperature or air circulation, which is not directly related to stress management training. Although both factors can affect work comfort, their impacts are not significantly related to each other in terms of stress management of medical personnel. Furthermore, there is a weak relationship (1), which is when the relationship between certain factors exists, but the influence is not significant. An example is the relationship between working more than one job and limited access to health facilities. Although these two factors can contribute to the work pressure of medical personnel, the relationship is not very strong because access to health facilities is more related to infrastructure and policies, while additional work has a more direct impact on individuals. In addition, there is also an average relationship (2), where the influence between two factors is quite significant but not dominant. An example is the relationship between the surge of patients and workload, which clearly has a relationship because the more patients will increase the workload of medical personnel, but the impact can still be managed with the right strategy. At a higher level, there is a strong relationship (3), which is when two factors have a very significant relationship and directly influence each other. One example is the relationship between working more than one job and management or communication failures. When medical personnel have to do more than one job, there is a high possibility of fatigue or lack of coordination with the main team, which can lead to errors in communication or management of health services (Sholihah, et al., 2019). This strong relationship shows that some factors have a greater impact than others, so special handling is needed to reduce their negative effects on the medical personnel's work environment (Sholihah & Fauzia, et al., 2014).

3. Implications of Research Results

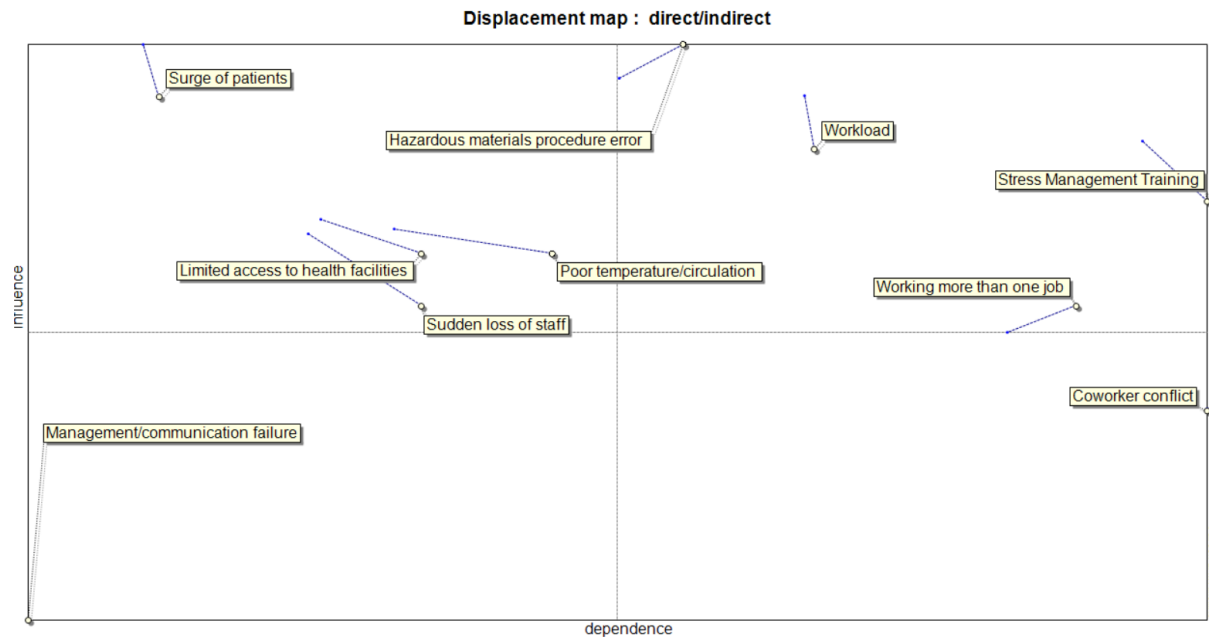


Figure 4. Displacement map: Direct/Indirect on stress management of Islamic nurses

Source: MICMAC Analysis (2025)

The results of this study indicate that policy design should consider more effective management of medical personnel workload. The high surge of patients requires a better resource allocation strategy so that health services remain optimal. In addition, a policy is needed that regulates the working hours of medical personnel so that they can maintain a balance between work and rest. With good workload management, the risk of fatigue and procedural errors can be reduced so that the quality of health services is maintained. On the other hand, increasing access to health facilities is also an important factor in policy design. Health infrastructure needs to be improved, especially in hard-to-reach areas, so that medical personnel can provide optimal services (Sholihah, et al., 2021). In addition, support for medical personnel must include aspects of logistics, facilities, and adequate incentives to increase work motivation. In addition, strengthening the HR management system also needs to be considered, especially in dealing with sudden staff losses. One solution is to implement a more flexible work rotation system and increase stress management training so that medical personnel are better prepared to face challenges in their work environment.

Discussion

Based on the results of the analysis of the questionnaires that have been collected, it was found that the surge of patients has the greatest influence on the work balance of medical personnel. The surge in the number of patients directly increases the workload, risk of procedural errors, stress, and the effectiveness of resource management (Shah, et al., 2021). The surge in patients causes an increased risk of burnout and a decrease in the quality of health services (Verduzco-Gutierrez, et al., 2020). Therefore, a more effective resource allocation strategy is needed to reduce the negative impact of high workloads. In addition, limited access to health facilities is also a factor that greatly influences the work-life balance of medical personnel (Lenggonoa, et al., 2020). This limitation has an impact on the ability of medical personnel to provide optimal services, especially in remote areas. Limited access to health facilities increases the stress level of medical personnel and decreases the quality of patient care (Coombs, et al., 2021).

Thus, improving health infrastructure is one of the main solutions to overcome this problem. Poor temperature or air circulation has the lowest effect on the work-life balance of medical personnel (Wolkoff, et al., 2021). This factor has a greater impact on work comfort than on the direct productivity of medical personnel (Hartoyo, et al., 2015). An uncomfortable work environment can also reduce comfort, but its impact on work efficiency is still limited (Imamura, et al., 2021). Therefore, although this aspect needs to be considered, its improvement is not a top priority compared to other more significant factors. Another factor that has a low impact is sudden staff loss. Although it can increase the workload for remaining medical personnel, this factor is less common than other more systemic factors.

RESEARCH PAPER

Sudden staff loss can disrupt hospital operations, but its impact can be minimized with better human resource management planning (Palejwala, et al., 2023). Therefore, a policy regarding a flexible work rotation system can be one step to reduce the impact of this factor.

CONCLUSION

The results of the study indicate that the surge in patients and limited access to health facilities have the greatest impact on the work balance of medical personnel. In contrast, factors such as poor temperature/circulation and sudden staff loss have a more limited impact. To overcome these challenges, policies are needed that focus on workload management, improving health facilities, and improving the human resource management system. With these strategic steps, it is hoped that the work-life balance of medical personnel can be improved so that the quality of health services in Indonesia will improve.

THANK-YOU NOTE

Thank you to the Faculty of Engineering, Universitas Brawijaya, the Professor Grant Funder, and all stakeholders who have supported this research. We also appreciate the participation of Muslim nurses in the hospital who took the time to complete the questionnaire. Your support and contribution are very meaningful for the success of this stress management research.

REFERENCES

- Adamopoulos, I. P. (2021). Job Satisfaction in Public Health Care Sector, Measures Scales and Theoretical Background. *European Journal of Environment and Public Health*, <https://doi.org/10.21601/ejeph/12187>.
- Aengst, J., Walker-Stevenson, G., Harrod, T., Ivankovic, J., Neilson, J., & Guise, J.-M. (2022). Uncomfortable yet necessary: The impact of PPE on communication in emergency medicine. *International Journal for Quality in Health Care*, Volume 34, Issue 4, <https://doi.org/10.1093/intqhc/mzac095>.
- Afonso, A. M., Cadwell, J. B., Staffa, S. J., Zurakowski, D., & Vinson, A. E. (2022). Burnout Rate and Risk Factors Among Anesthesiologists in the United States. *National Library of Medicine*, <https://pmc.ncbi.nlm.nih.gov/articles/PMC9430843/>.
- Alzoubi, M. M., Al-Mugheed, K., Oweidat, I., Alrahbeni, T., Alnaeem, M. M., Alabdullah, A. A., . . . Hendy, A. (2024). Moderating role of relationships between workloads, job burnout, turnover intention, and healthcare quality among nurses. *BMC Psychology*, <https://link.springer.com/article/10.1186/s40359-024-01891-7>.
- Amirrudin, M., Nasution, K., & Supahar, S. (2021). Effect of Variability on Cronbach Alpha Reliability in Research Practice. *Jurnal Matematika, Statistika Dan Komputasi*, <https://doi.org/10.20956/jmsk.v17i2.11655>.
- Azila-Gbetteor, E. M., Atsu, E., & Quarshie, A. N. (2022). Job stress and job involvement among tertiary interns: the buffering role of perceived coworker support. *Heliyon*, [https://www.cell.com/heliyon/fulltext/S2405-8440\(22\)01702-9](https://www.cell.com/heliyon/fulltext/S2405-8440(22)01702-9).
- Bahraseman, Z. G., Shahrabaki, P. M., & Nouhi, E. (2021). The impact of stress management training on stress-related coping strategies and self-efficacy in hemodialysis patients: a randomized controlled clinical trial. *BMC Psychology*, <https://link.springer.com/article/10.1186/s40359-021-00678-4>.
- Cheng, D., Chan, X. W., Amarnani, R. K., & Farivar, F. (2021). Finding humor in work–life conflict: Distinguishing the effects of individual and co-worker humor. *Journal of Vocational Behavior*, <https://doi.org/10.1016/j.jvb.2021.103538>.
- Clinton, M., Bou-Karroum, K., Doumit, M. A., Richa, N., & Alameddine, M. (2022). Determining levels of nurse burnout during the COVID-19 pandemic and Lebanon's political and financial collapse. *BMC Nursing*, <https://link.springer.com/article/10.1186/s12912-021-00789-8>.
- Coombs, N. C., Meriwether, W. E., Caringi, J., & Newcomer, S. R. (2021). Barriers to healthcare access among U.S. adults with mental health challenges: A population-based study. *SSM - Population Health*, <https://www.sciencedirect.com/science/article/pii/S2352827321001221>.

- Cruz-Ausejo, L., Copez-Lonzoy, A., Vilela-Estrada, A. L., Valverde, J. J., Bohórquez, M., & Moscoso-Porras, M. (2023). Can working at home be a hazard? Ergonomic factors associated with musculoskeletal disorders among teleworkers during the COVID-19 pandemic: a scoping review. *International Journal of Occupational Safety and Ergonomics*, <https://www.tandfonline.com/doi/abs/10.1080/10803548.2022.2127246>.
- Dawson, D., Ferguson, S. A., & Vincent, G. E. (2021). Safety implications of fatigue and sleep inertia for emergency services personnel. *Sleep Medicine Reviews*, <https://doi.org/10.1016/j.smrv.2020.101386>.
- Denning, M., Goh, E. T., Tan, B., Kanneganti, A., Almonte, M., Scott, A., . . . Tan, M. (2021). Determinants of burnout and other aspects of psychological well-being in healthcare workers during the Covid-19 pandemic: A multinational cross-sectional study. *PLOS ONE* 16(4): e0238666, <https://doi.org/10.1371/journal.pone.0238666>.
- Dierickx, M., Verschraegen, S., Wierinck, E., Willems, G., & Wieringen, A. v. (2021). Noise Disturbance and Potential Hearing Loss Due to Exposure of Dental Equipment in Flemish Dentists. *Int. J. Environ. Res. Public Health (MDPI)*, <https://www.mdpi.com/1660-4601/18/11/5617>.
- Djulgovic, M., Chen, K., Cohen, A. B., Heacock, D., Canavan, M., Cushing, W., . . . Chaudhry, S. I. (2022). Associations between hospitalist physician workload, length of stay, and return to the hospital. *Journal of Hospital Medicine*, <https://doi.org/10.1002/jhm.12847>.
- Dullah, M., Limgiani, L., & Suwardi, L. A. (2023). Work environment analysis to improve employee performance. *Revenue Journal: Management and Entrepreneurship*, <https://journal.assysfa.com/index.php/tjme/article/view/328>.
- Fazal, S., Masood, S., Nazir, F., & Majoka, M. I. (2022). Individual and Organizational Strategies for Promoting Work–Life Balance for Sustainable Workforce: A Systematic Literature Review from Pakistan. *Sustainability*, <https://www.mdpi.com/2071-1050/14/18/11552>.
- Hamdi, I., & Toumi, S. (2024). An ISM-MICMAC approach for analyzing the relationship between blockchain adoption criteria in a pharmaceutical supply chain: Tunisian case. *Journal of Modelling in Management (Emerald Insight)*, https://www.emerald.com/insight/content/doi/10.1108/jm2-01-2024-0020/full/html?casa_token=BG9yGCr6VEkAAAAA:jfs7yLHhBOYxidcLZCq5SFlrz-DKb6raiHZkdd0se7edGl-fC5XBDzgAxSdATYmolLaDK9-T0wg7pmcTx1eNkTwle6Q9QhcEQeSU8Rj7ZmtX1xcjH0-mKQ.
- Hartoyo, E., Sholihah, Q., Fauzia, R., & Rachmah, D. N. (2015). *Sarapan pagi & produktivitas*. Malang: Universitas Brawijaya Press.
- Hoshi, H., Iwasa, H., Goto, A., & Yasumura, S. (2022). Effects of working environments with minimum night lighting on night-shift nurses' fatigue and sleep, and patient safety. *BMJ Open Quality*, <https://bmjopenquality.bmj.com/content/11/1/e001638>.
- Hutchinson, K., Li, Z., Cantrell, L. A., Schenkman, N. S., & Alemzadeh, H. (2022). Analysis of executional and procedural errors in dry-lab robotic surgery experiments. *The International Journal of Medical Robotics and Computer Assisted Surgery*, <https://doi.org/10.1002/rcs.2375>.
- Imamura, K., Tran, T. T., Nguyen, H. T., Sasaki, N., Kuribayashi, K., Sakuraya, A., . . . Truong, T. Q. (2021). Effect of smartphone-based stress management programs on depression and anxiety of hospital nurses in Vietnam: a three-arm randomized controlled trial. *scientific reports*, <https://www.nature.com/articles/s41598-021-90320-5>.
- Keerthi, H. K., Yapanto, L. M., Aradhya, G. B., Sreekanthaswamy, N., Sajiv, G., & Nagaraj, P. (2026, February). Corporate Sustainability Monitoring Using Hybrid Neuro-Fuzzy Systems with Unsupervised Clustering for Decision Support. In *2026 2nd International Conference on Cognitive Computing in Engineering, Communications, Sciences and Biomedical Health Informatics (IC3ECSBHI)* (pp. 1240-1246). IEEE.
- Lee, S. E., & Shin, G. (2023). The Effect of Perceived Organizational and Supervisory Support on Employee Engagement During COVID-19 Crises: Mediating Effect of Work-Life Balance Policy. *Public Personnel Management*, <https://journals.sagepub.com/doi/abs/10.1177/00910260231171395>.

- Lenggonoa, K. A., Sholihah, Q., Djati, M., Putrantod, N., Tangkas, T., Hastuti, A. P., . . . Aminah, T. (2020). quality audit analisis of the implementation of hard washing 5 moment 6 step fot doctors and nurses with the incidence of plebitis in the hospital. *International Journal of Innovation, Creativity and Change*, 788-798.
- Los, F. S., Hulshof, C. T., Boer, A. G., & Molen, H. F. (2023). A workers' health surveillance online training programme for occupational physicians. *Occupational Medicine, Volume 73, Issue 3*, <https://doi.org/10.1093/occmed/kqad024>.
- Gai, A. M., Pontan, D., Syamsidar, Yapanto, L. M., Widyastuti, T. V., & Sapulette, R. O. (2026). Sustainability and Technological Innovation in Society 5.0: Managing Carbon Footprint and Environmental Impact in Indonesia. In *Sustainable Responsible Practices in Technology and Business for Society 5.0: Guideline for Next Generation, Volume 1* (pp. 20-31). Cham: Springer Nature Switzerland.
- Magalhães, L. M., Costa, K. T., Capistrano, G. N., Leal, M. D., & Andrade, F. B. (2022). A study on occupational health and safety. *BMC Public Health* , <https://link.springer.com/article/10.1186/s12889-022-14584-w>.
- Mahesh, M., A. J., & Mettler, F. A. (2022). Patient Exposure from Radiologic and Nuclear Medicine Procedures in the United States and Worldwide: 2009–2018. *Radiology*, <https://pubs.rsna.org/doi/full/10.1148/radiol.221263>.
- Mail, E. D., Adam, M., Zulkarnain, Z., & Mawarpury, M. (2024). What do we know about mental health of medical personnel? A systematic review. *Journal of Psychological Perspective*, <https://ukinstitute.org/journals/jopp/article/view/911>.
- Martin, S., & Feinberg, B. (2023). THE EFFECT OF WORK DISCIPLINE ON MEDICAL MEDICAL EMPLOYEE PERFORMANCE WITH WORK COMMUNICATION AS AN INTERVENING VARIABLE (Case Study of Serdang Bedagai Hospital Centre Sultan Sulaiman Hospital). *MEDALION JOURNAL: Medical Research, Nursing, Health and Midwife Participation*, <https://doi.org/10.59733/medalion.v4i1.69>.
- Min, A., Kim, Y. M., Yoon, Y. S., Hong, H. C., Kang, M., & Scott, L. D. (2020). Effects of Work Environments and Occupational Fatigue on Care Left Undone in Rotating Shift Nurses. *Journal of Nursing Scholarship*, 126-136. <https://sigmapubs.onlinelibrary.wiley.com/doi/abs/10.1111/jnu.12604>.
- Muthukrishnan, R., & Ahmad, J. M. (2021). Ergonomic risk factors and risk exposure level of nursing tasks: association with work-related musculoskeletal disorders in nurses. *European Journal of Physiotherapy*, <https://www.tandfonline.com/doi/abs/10.1080/21679169.2020.1715473>.
- Palejwala, Z., Wallman, K. E., Maloney, S., Landers, G. J., Ecker, U. K., Fear, M. W., & Wood, F. M. (2023). Higher operating theatre temperature during burn surgery increases physiological heat strain, subjective workload, and fatigue of surgical staff. *PLoS ONE* 18(6), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0286746>.
- Ralph, J., Freeman, L. A., Ménard, A. D., & Soucie, K. (2022). Practical strategies and the need for psychological support: recommendations from nurses working in hospitals during the COVID-19 pandemic. *Journal of Health Organization and Management*, <https://www.emerald.com/insight/content/doi/10.1108/jhom-02-2021-0051/full/html>.
- Rashid, A., Rasheed, R., Amirah, N. A., Yusof, Y., Khan, S., & Agha, A. A. (2021). A Quantitative Perspective of Systematic Research: Easy and Step-by-Step Initial Guidelines. *Turkish Online Journal of Qualitative Inquiry*, https://openurl.ebsco.com/EPDB%3Agcd%3A6%3A18722982/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A160604656&crl=c&link_origin=scholar.google.com.
- Roth, C., Berger, S., Krug, K., Mahler, C., & Wensing, M. (2021). Internationally trained nurses and host nurses' perceptions of safety culture, work-life-balance, burnout, and job demand during workplace integration: a cross-sectional study. *BMC Nursing (Springer Nature)*, <https://link.springer.com/article/10.1186/s12912-021-00581-8>.
- Sahdev, N. K., Ahluwalia, G., & Durrie, M. (2021). The Antifragility Effect: Deploying Emerging Tech in Medical Device Supply Networks to Rebuild Better. *University College London Centre for Blockchain Technologies* , https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3920490.

- Sahu, P. K., Dalcik, H., Dalcik, C., Gupta, M. M., Chattu, V. K., & Umakanthan, S. (2022). Best practices for effective implementation of online teaching and learning in medical and health professions education: during COVID-19 and beyond. *National Library of Medicine*, <https://pmc.ncbi.nlm.nih.gov/articles/PMC9114788/>.
- Santiago, C. R. (2023). Sustaining Work-Life Balance of Teachers During the New Normal. *American Journal of Interdisciplinary Research and Innovation*, <https://doi.org/10.54536/ajiri.v2i2.1257>.
- Savioli, G., Alfano, C., Zanza, C., Piccini, G. B., Varesi, A., Esposito, C., . . . Ceresa, I. F. (2022). Dysbarism: An Overview of an Unusual Medical Emergency. *Medicina*, <https://www.mdpi.com/1648-9144/58/1/104>.
- Shah, M. K., Gandrakota, N., & Cimiotti, J. P. (2021). Prevalence of and Factors Associated With Nurse Burnout in the US. *JAMA network open*, 4(2), https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2775923#google_vignette.
- Sholihah, Q. (2012). *Dasar-Dasar Kesehatan dan Keselamatan Kerja (Penerapan dan Implementasi)*. Jakarta: AVICENA Pustaka.
- Sholihah, Q., & Djohan, A. J. (2013). *Keselamatan dan kesehatan kerja rumah sakit, K3RS: meminimalisasi kecelakaan dan penyakit akibat kerja di rumah sakit*. Malang: Universitas brawijaya press.
- Sholihah, Q., & Fauzia, R. (2014). Relationship work fatigue related to work stress on circadian rythm night shift operator employee PT. Indonesia Bulk Terminal Kotabaru, South Kalimantan, Indonesia. *The European Journal of Social & Behavioural Sciences*, <https://www.europeanpublisher.com/ru/article/10.15405/ejsbs.127>.
- Sholihah, Q., & Kuncoro, W. (2014). Keselamatan Kesehatan Kerja: Konsep Perkembangan dan Implementasi Budaya Keselamatan. *Jakarta. EGC*.
- Sholihah, Q., Hanafi, A. S., Bachri, A. A., & Fauzia, R. (2016). Ergonomics awareness as efforts to increase knowledge and prevention of musculoskeletal disorders on fishermen. *Aquatic Procedia*, 187-194.
- Sholihah, Q., Hanafi, A. S., Wanti, W., Bachri, A. A., & Hadi, S. (2015). Analisis Sif Kerja, Masa Kerja, dan Budaya K3 dengan Fungsi Paru Pekerja Tambang Batu Bara. *Kesmas*, 24-28.
- Sholihah, Q., Kuncoro, W., Luthfansa, I., & Suwandi, S. P. (2021). Safety and Health Analysis of Work Operator Racket Production Process using the Method Hierarchy of Control. *The 2nd International Conference on Mechanical Engineering Research and Application*, <https://proicomera.ub.ac.id/index.php/icomera/2/paper/view/304>.
- Sholihah, Q., Kuncoro, W., Sari, R. A., Lukodono, R. P., & Swara, S. E. (2019). Risk management of the implementation of work health safety in radiology. *Utopía y praxis latinoamericana: revista internacional de filosofía iberoamericana y teoría social*, 142-152.
- Sholihah, Q., Novareza, O., Wibowo, A., & Setyanto, N. W. (2023). Analysis of ISO 45001 Implementation and an IT-Based SMK3 Measurement System (Information Technology). *Seminar Nasional Program Profesi Insinyur - Universitas Andalas*, <http://semmasppi.pasca.unand.ac.id/index.php/semmasppi/article/view/16>.
- Sillehu, S., Lilipory, M., Yusuf, B., Tubalawony, S. L., Wakanno, G. J., Fauzia, W., . . . Lameky, V. Y. (2025). Analysis of Key Factors in SMK3 Development: Malaria Elimination Policy in South Buru, Maluku. *Multidisciplinary Science Journal*, <https://www.malque.pub/ojs/index.php/msj/article/view/6617>.
- Sitopu, Y. B., Sitinjak, K. A., & Marpaung, F. K. (2021). The Influence of Motivation, Work Discipline, and Compensation on Employee Performance. *Golden Ratio of Human Resource Management*, 1(2), <https://www.goldenratio.id/index.php/grhrm/article/view/79>.
- South, L., Saffo, D., Vitek, O., Dunne, C., & Borkin, M. A. (2022). Effective Use of Likert Scales in Visualization Evaluations: A Systematic Review. *Computer Graphics Forum*, <https://doi.org/10.1111/cgf.14521>.
- Stojanov, J., Malobabic, M., Stanojevic, G., Stevic, M., Milosevic, V., & Stojanov, A. (2020). Quality of sleep and health-related quality of life among health care professionals treating patients with coronavirus disease-19. *International Journal of Social Psychiatry*, <http://journals.sagepub.com/doi/full/10.1177/0020764020942800>.
- Verduzco-Gutierrez, M., Larson, A. R., Capizzi, A. N., Bean, A. C., Zafonte, R. D., Odonkor, C. A., . . . Silver, J. K. (2020). How Physician Compensation and Education Debt Affects Financial Stress and Burnout: A Survey

- Study of Women in Physical Medicine and Rehabilitation. *Physical Medicine and Rehabilitation*, <https://doi.org/10.1002/pmrj.12534>.
- Wackers, E., Stadhouders, N., Heil, A., Westert, G., Dulmen, S. v., & Jeurissen, P. (2021). Hospitals Bending the Cost Curve With Increased Quality: A Scoping Review Into Integrated Hospital Strategies. *National Library of Medicine*, <https://pmc.ncbi.nlm.nih.gov/articles/PMC9818083/>.
- Wolok, E., Yapanto, L. M., Lopian, A. L. C. P., Wolok, T., & Aneta, A. (2023). Manufacturing industry strategy in increasing the acceleration of economic growth in Indonesia. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, 8(4), 3.
- Wolkoff, P., Azuma, K., & Carrer, P. (2021). Health, work performance, and risk of infection in office-like environments: The role of indoor temperature, air humidity, and ventilation. *International Journal of Hygiene and Environmental Health*, <https://doi.org/10.1016/j.ijheh.2021.113709>.
- Yusida, H., Suwandi, T., Yusuf, A., & Sholihah, Q. (2016). Relationship individual factors with occupational health literacy. *International Journal of Scientific and Research Publications*, 481-484.
- Yapanto, L. M., Fadhli, A., Tamod, Z. E., Warouw, F. F., Musa, D. T., & Tenda, M. P. (2023). Community Participation in the Management of Tourist Areas (Case Study in the Tourist Area of Bongo, Gorontalo District) Indonesia. *Revista de Gestão Social e Ambiental*, 17(5), e03460.
- Yusida, H., Suwandi, T., Yusuf, A., & Solihah, Q. (2017). *Kepedulian Aktif untuk K3 Sektor Informal*. Banjarmasin: ULM Press.