

# The Association Between Working Position and Musculoskeletal Disorders Complaints Using Nordic Body Map Questionnaire among Emergency Nurses

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## ABSTRACT

**Background:** The lack of ergonomic aspects during working might cause health problems, including fatigue, muscle pain, and vascular disorders. Nurses are included in the category due to the activities that involve patient caring, which be conducted repeatedly, namely patients' transfer and reposition, working in an awkward position, and pushing and pulling the heavy load. The study aims to understand the association between a working position and musculoskeletal complaints among emergency nurses. **Methods:** The research was using a correlative descriptive method with the cross-sectional approach. The study involves 63 emergency nurses working at hospitals in Tuban, East Java. The data was collected using the Nordic Body Map Questionnaire to know the musculoskeletal complaints. The data were analyzed using the Chi-Square test. **Results:** 50.8 % of respondents have a high risk of work in an unergonomic position. 44.4 % of the respondents have high musculoskeletal complaints. There is an association between emergency nurses' workload and the musculoskeletal complaints ( $P=0.000$ ). **Conclusion:** Emergency nurses are needed to improve their knowledge about the ergonomic working position to avoid musculoskeletal issues.

**Keywords:** *Workload, Musculoskeletal Disorders, Nurses*

## 1. Introduction

One of the effects of globalization in developed health care, namely, developed hospital health care. The hospital offers various health care integrating into one system. The health care conducted by the nurses is among them. Nurses are demanded to do their job well. Therefore, nurses do not become aware of their job, causing occupational diseases, such as Musculoskeletal Disorders (MSDS) (Gowi, 2018).

The average working position can be defined as a position that adjusts to the body's anatomy, so there is no excessive pressure at the body organ, nerve, tendon, and the bone so the musculoskeletal disorders can be avoided (Merulalia, 2010). The lack of ergonomic aspects in the work process might cause health problems, such as fatigue, muscle pain, and vascular problems. The awkward position can be seen as the position that might cause excessive energy

transfer from the muscles to the skeleton, leading to fatigue. In a prolonged time, repeated working process, twisting position, leaning over, bending, squatting, static working position, and hand pinching are categorized as an awkward position. These postures involve body areas most easily injured, such as shoulder, back, and knee (Fuady, 2013).

A study conducted by Yan et al. (2017) to 6674 nurses at Xinjiang China hospitals shows that 81.18 % of nurses experienced Work Musculoskeletal Disorders (WMSD) during their working period 77.43 % of them having WMSD in the last 12 months. A similar study conducted at 200 nurses in Ajman, Uni Emirat Arab, resulted in 39 % of the respondents have the WMSD, and more than 50 % of the nurses conduct repeated working processes that might cause WMSD. The known activities that might cause the issues are patients' transfer and reposition, working in an awkward position, and pushing and pulling the heavy load. The risks might increase due to the bigger size of the patients. The patients with obesity are needed more help due to the health problems they have compared to non-obesity patients (Rogers et al., 2017).

Government Health Regulation No. 36, the Year 2009, obligates the hospital to implement Occupational Health and Safety program to ensure that the health workers can work safely. Besides, the OHS program is included in the hospital accreditation program. The working position, which considers the ergonomic aspect, can be implemented. This research aims to

understand the association between a working position and musculoskeletal complaints among emergency nurses.

**2. METHODS**

The study used descriptive with cross sectional approach. The study population is all of the emergency nurses in a hospital in Tuban, which involve 63 persons. The study was conducted in 2019. The total sampling was used in this study.

**2.1 The Instrument of the Study**

We used a structured interview written in a standardized questionnaire (Nordic Body Map) issued by the Occupational Safety and Health Administration (OSHA, 2004). The questionnaire assessed the workload and musculoskeletal disorders complaints. The data were analyzed by comparing the total score and the maximal score, which resulted in a percentage (Arikunto, 1998). The percentage than was categorized as low (score 0-20), medium (score 21-41), high (score 42-62), and very high (63-84).

**2.2 Data Analysis**

The data were analyzed using the Chi-Square test. The test was used because the variables are nominal, and the hypothesis can be categorized as two impaired groups. P-Value < 0.05 shows a significant correlation between working position and musculoskeletal disorders using Nordic Body Map (NBM).

**3. RESULTS**

The data was collected at 1-20 September 2019.

Table 1. The Emergency Nurses Working Position

Variables	n	%	
Medium	16	25,4	
Working Position	High	32	50,8
	Very High	15	23,8
Total	63	100	

Table 1 shows that 50.8 % of the respondents have the high risk of the working position and

no nurses has the low risk of the working position.

Table 2. The Emergency Nurses' Musculoskeletal Disorders Complaints Level

Variables		n	%
Musculoskeletal Complaints	Low	13	20,6
	Medium	22	34,9
	High	28	44,4
Jumlah		63	100

Table 2 shows that 44.4 % of emergency nurses at hospitals in Tuban, East Java has a high level of musculoskeletal disorders

complaints, and 20.6 % have a low musculoskeletal disorder level.

Table 3. The Association of Working Position and Musculoskeletal Disorders Complaints among Emergency Nurses

Variables		Musculoskeletal Complaints						Total	p	
		Low		Moderate		High				
		n	%	n	%	n	%			
Working Position	Moderate	9	14,4	5	7,9	2	3,2	16	25,4	0,001
	High	3	4,7	9	14,4	20	31,7	32	50,8	
	Very High	1	1,5	8	12,6	6	9,5	15	23,8	
Total		13	20,6	22	34,9	28	44,4	63	100	

Table 3 shows that 31.7 % of emergency nurses with an awkward high-risk position have high musculoskeletal disorders complaints. Meanwhile, only 4.7 % of emergency nurses with an awkward high-risk

position have low musculoskeletal disorders complaints. Chi-Square Test result ( $p = 0,000$ ) shows that there is an association between emergency nurses' working position and musculoskeletal disorders complaints.

**4. DISCUSSION**

**4.1 Emergency Nurses' Workload**

This study shows that 50.8 % of emergency nurses in Tuban's hospitals have a working position that can be categorized at high risk, and no respondents have a low risk of working position. We found that 58.7 % of the respondents have the bending working position (towards and backward). 65.1 % of respondents have the working position using both hands under the shoulder height level and

61.9 % of respondents often stand with straight feet.

It is needed to use the neutral position while avoiding musculoskeletal complaints (Merulalia, 2010). The lack of an ergonomic position might lead to fatigue, muscle pain, and vascular disorders. The awkward position can be seen as the position that might cause excessive energy transfer from the muscles to the skeleton, leading to fatigue. In a prolonged time, repeated working process, twisting position, leaning over, bending, squatting, static working position, and hand pinching are

categorized as an awkward position. These postures involve body areas most easily injured, such as shoulder, back, and knee (Fuady, 2013). Nurses often at risk of awkward working positions. A study found

#### **4.2 The Association of Workload and Musculoskeletal Complaints among Emergency Nurses**

We found that 31.7 % of emergency nurses with a high risk of awkward positions have high musculoskeletal complaints. Meanwhile, only 4.7 % of respondents with a high risk of awkward position have common musculoskeletal complaints. The chi-square result ( $p = 0,000$ ) shows an association between emergency nurses' working position and musculoskeletal complaints.

A study found that nurses spend little time conducting extreme positions, moving with fast speed, and conducting moderate and higher physical activities (Schall, Fethke dan Chen, 2016). However, the study also found that nurses have a limited time to rest. Some studies found that some activities contribute to musculoskeletal complaints among nurses are transferring the patients, the awkward position, prolonged standing, excessive rotation, excessive working hours, excessive materials handling, and the age factor (Arsalani et al., 2014; Eftekhar Sadat et al., 2013; Harcombe et al., 2014; Rokni M, Abadi MH, Saremi M, 2016; Saberipour et al., 2019).

Emergency nurses were helping patients with various needs that might lead to awkward activities. Moreover, it can be said that emergency nurses have an extreme working posture and have limited time to rest. Nurses are demanded to care for patients with various nursing care. A study found that there is 199 nursing care procedure conducted by emergency nurses (Mccarthy et al., 2013). Therefore, nurses must do their job well to care and help patients with various physical and mental health problems (Solheim, 2016).

#### **5. CONCLUSION**

We found that there is an association between working position and musculoskeletal complaints among

that nurses on the operation room are having a high risk of work with an awkward position and the immediate change is needed (Abdollahzade et al., 2016)

emergency nurses at hospitals in Tuban, East Java, Indonesia.

#### **REFERENCES**

- Arikunto, S. (1998). *Metodologi Penelitian Suatu Pendekatan Praktek*. Rineka Cipta.
- Arsalani, N., Fallahi-khoshknab, M., & Josephson, M. (2014). Musculoskeletal disorders and working conditions among Iranian nursing personnel. *International Journal of Occupational Safety and Ergonomics*, 20(4), 671–680. <https://doi.org/10.1080/10803548.2014.11077073>
- Eftekhar Sadat, B., Babaei, A., Amidfar, N., & Jedari Eslami, M. R. (2013). Prevalence and risk factors for low back pain in nursing staffs of Tabriz hospitals in 1387. *UNMF*, 11(9).
- Fuady, A. R. (2013). *Faktor – faktor yang Berhubungan dengan Musculoskeletal Disorders (MSDs) pada Pengrajin sepatu di Perkampungan Industri Kecil (PIK) Penggilingan Kecamatan Cakung Tahun 2013*. Universitas Islam Negeri Syarif Hidayatullah.
- Gowi, A. (2018). Faktor-Faktor yang Berhubungan dengan Kejadian Muskuloskeletal Disorders (MSDs) Pada Perawat IGD Tahun 2018. In *Jurnal Keperawatan dan Kebidanan* (Vol. 8). <https://doi.org/10.33123/jkk.v8i1.13>
- Harcombe, H., Herbison, G. P., McBride, D., & Derrett, S. (2014). Musculoskeletal disorders among nurses compared with two other occupational groups. *Occupational Medicine*, 64, 601–607. <https://doi.org/10.1093/occmed/kqu117>
- Mccarthy, G., Dean, R. G. N., Cornally, N., Dip, P., Hons, R. G. N., & Student, M. (2013). Emergency nurses : Procedures performed and competence in practice. *International Emergency Nursing*, 21,

- 50–57.  
<https://doi.org/10.1016/j.ienj.2012.01.003>
- Merulalia. (2010). *Postur Tubuh yang Ergonomis Saat Bekerja* (Skripsi Tidak Diterbitkan (Ed.)). Universitas Sumatera Utara.
- Rogers, B., Buckheit, K., & Ostendorf, J. (2017). Ergonomics and nursing in hospital environments. *Workplace Health & Safety*, *61*(10), 429–439.  
<https://doi.org/10.1177/216507991306101003>
- Rokni M, Abadi MH, Saremi M, M. M. M. (2016). Prevalence of musculoskeletal disorders in nurses and its relationship with the knowledge of ergonomic and environmental factors. *J Gorgan Univ Med Sci*, *18*(1), 128–132.  
<http://goums.ac.ir/journal/article-1-2665-en.html>
- Saberipour, B., Ghanbari, S., Zarea, K., Gheibizadeh, M., & Zahedian, M. (2019). Investigating prevalence of musculoskeletal disorders among Iranian nurses : A systematic review and meta-analysis. *Clinical Epidemiology and Global Health*, *7*(3), 513–518.  
<https://doi.org/10.1016/j.cegh.2018.06.007>
- Schall, M. C., Fethke, N. B., & Chen, H. (2016). Working postures and physical activity among registered nurses. *Applied Ergonomics*, *54*, 243–250.  
<https://doi.org/10.1016/j.apergo.2016.01.008>
- Solheim, J. (Ed.). (2016). *Emergency nursing : the profession, the pathway, the practice*. Sigma Theta Tau International.
- Yan, P., Li, F., Zhang, L., Yang, Y., Huang, A., Wang, Y., & Yao, H. (2017). Prevalence of Work-Related Musculoskeletal Disorders in the Nurses Working in Hospitals of Xinjiang Uygur Autonomous Region. *Pain Research and Management*, *2017*, 1–7.  
<https://doi.org/10.1155/2017/5757108>