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Indian Journal of Forensic Medicine & Toxicology, July-September 2021, Vol. 15, No. 3 4309 Relation between Workload and Level of Complaints in the Musculoskeletal System through Nordic Body Map (NBM) on E.R. Nurses Su'udi1, Aby Yazid Al Busthomy Ro i'i1, Titik Sumiatin1, Wahyu Tri

Ningsih1, Teresia Retna Puspita Dewi1, Wahyuningsih Triana Nugraheni1 Lecturer, Nursing Associate Program, Tuban Campus, Nursing Study ProgramHealth Polytechnic of the Ministry of Health, Surabaya, Indonesia Abstract Nurse workload is defined as all of the activities performed by a nurse while working in a nursing service unit. Work-related musculoskeletal disorder (WMSD) is a Musculoskeletal disorder (MSD) that becomes more severe or lasts for a long time due to work-related activities. HASH(0x7fc878d22898) the musculoskeletal system through the Nordic Body Map (NBM) method approach in every regional hospital in Tuban City. This study was carried out HASH(0x7fc878d19940) number of respondents that participated in this study were 63 E.R. nurses who worked in regional hospitals in Tuban City. HASH(0x7fc878d26ca0) (NBM) method to determine the level of complaints of the musculoskeletal system. HASH(0x7fc878d26f10) that 54% of the respondents had moderate workload and no emergency nurses at hospitals in Tuban City had light workload. 44.4% of emergency nurses at hospitals in Tuban City had severe musculoskeletal complaints. According to this data, there is a relationship between the workload of emergency room nurses and the level of complaints in the musculoskeletal system (P = 0.028). In conclusion, emergency nurses should keep an eye on their workload so that musculoskeletal problems do not occur. Keywords: Workload, Musculoskeletal Complaints, Nurse. Introduction In the current era of globalization, health services are growing rapidly, one of which is health services in hospitals. Emergency Rooms (ER) have an HASH(0x7fc878d26ce8) emergency department is known as the most challenging department in a hospital which is proven to be related to the quality and quantity of sleep of doctors and nurses, which in turn has the potential to significantly increase medical errors[2]. Furthermore, a combination of the aforementioned conditions of work fatigue and physical Corresponding author: Su'udi* Email: suudiners@gmail.com exhaustion in ER nurses contribute to the increased risk of musculoskeletal disorders[2][3][4][5][6]. Musculoskeletal disorder (MSDs) is a disorder that is very common in today's society. HASH(0x7fc878d26aa8) most frequent reasons submitted by patients when seeking medical help[7]. Meanwhile, work-related musculoskeletal disorder (WMSD) is an MSD that deteriorates or persists for a long time due to work-related activities. WMSD is common among workers in the health sector, and nurses are a profession with a high risk of experiencing WMSD. 60% of injury reports due to work in hospitals are from nurses[8]. Health care facilities, especially hospitals, are HASH(0x7fc878d037a0). Health workers, especially those responsible for patient care, are more susceptible to hazards that may cause musculoskeletal disorders compared to workers in other fields[9]. If health workers are not careful in carrying out these activities, they may suffer from muscle, bone, tendon and nervous systems disorders called musculoskeletal disorders. A research by Yan et al. (2017) that involved 6674 hospital nurses in Xinjiang China revealed that 81.18% of nurses suffered from WMSD since the beginning of their work and 77.43% of nurses suffered from WMSD in the last 12 months. Meanwhile, a study on 200 hospital nurses in Ajman, United Arab Emirates showed that 39% of nurses had WMSD and more than 50% performed repetitive activities that increase the risk of WMSD[10]. Nurses are at risk of experiencing WMSD due to repetitive activities in handling patients, such as transferring and repositioning patients, working in an unfavorable position and pulling or pushing heavy objects. The risk of injury increases when nurses have to deal with patients that have increased weight or size. Patients who are overweight or obese require more assistance than patients who are not obese due to the additional health problems in obesity[11]. Furthermore, nurses who work in the ER have a higher risk in experiencing WMSD. ER nurses have to deal with a wide variety of critical cases and deal with patients with severe injuries. Nurses must perform physical tasks, such as transferring

patients to hospital beds, lifting patients and maintaining a bent or twisted position or posture. These risky activities often cause WMSD[12]. For this reason, HASH(0x7fc878d04268) the musculoskeletal system through the Nordic Body Map (NBM) method approach in every regional hospital in Tuban City. Methods Research Design This study used descriptive correlative study method with a cross sectional approach. Research Sample The population in this study were ER nurses in every regional hospital in Tuban City in 2019, HASH(0x7fc878d087a8) participants of this study were all emergency nurses in every regional hospital in Tuban City, with a total of 63 people. Research HASH(0x7fc878d08d60) written/ structured interview in the form of a questionnaire, consisting of a questionnaire on workload and the level of complaints of the musculoskeletal system. The Nordic Body Map (NBM) method was used for the questionnaire on the level of complaints of the musculoskeletal system. Nordic Body Map (NBM) is a system for measuring complaints of pain in the body known as the musculoskeletal system. This instrument was issued by the Occupational Safety and Health Administration (OSHA, 2004) and is under occupational safety law. The categorization was done by comparing the obtained score with the maximum score then multiplying the value by 100%, with results in the form of percentage[13]. The percentage results were used to provide an assessment and the level of musculoskeletal complaints were interpreted using the criteria of mild (score 0 - 20), moderate (score 21 - 41), severe (score 42 - 62) and very severe (score 63 - 84). Data Analysis The HASH(0x7fc878d0a9d8) due to the nominal measuring scale variable and the two unpaired groups. Significance level with value of $p<0.05$ indicates that there is a significant correlation between workload and level of complaints of the musculoskeletal system through the Nordic Body Map (NBM) method approach. Results The collection of research data was carried out from September 1st to September 20th, 2019. Indian Journal of Forensic Medicine & Toxicology, July-September 2021, Vol. 15, No. 3 4311 Table 1. Workload of ER Nurses. Variable n % Workload Moderate 34 54 Heavy 29 46 Total 63 100 HASH(0x7fc878d0ac00) ER nurses at regional hospitals in Tuban City have moderate workload and there are no ER nurses at regional hospitals in Tuban City who have low workload. Table 2. Level of Complaints of ER Nurses' Musculoskeletal System. Variabel n % Mild 13 20,6 Musculoskeletal Complaint Moderate 22 34,9 Severe 28 44,4 Total 63 HASH(0x7fc878d0f188) ER nurses at regional hospitals in Tuban City have severe musculoskeletal complaints and only 20.6% have mild musculoskeletal complaints. Table 3. Distribution of Musculoskeletal Complaints for ER Nurses according to the Nordic Body Map (NBM). Musculoskeletal System n % Upper neck 33 52 Lower neck/nape 39 62 Left shoulder 30 48 Right shoulder 34 54 Left upper arm 29 46 Back 40 63 Right upper arm 31 49 Waist 37 59 Hip 32 51 Gluteal/buttocks 27 43 Left elbow 23 37 Right elbow 21 33 Left lower arm 26 41 4312 Indian Journal of Forensic Medicine & Toxicology, July-September 2021, Vol. 15, No. 3 Cont... Table 3. Distribution of Musculoskeletal Complaints for ER Nurses according to the Nordic Body Map (NBM). Right lower arm 28 44 Left wrist 23 37 Right wrist 24 38 Left hand 26 41 Right hand 30 48 Left thigh 29 46 Right hand 28 44 Left knee 28 44 Right knee 26 41 Left calf 33 52 Right calf 31 49 Left ankle 28 44 Right ankle 29 46 Left foot 35 56 Right foot 37 59 Based on Table 3, it is known that ER nurses at regional hospitals in Tuban City generally have complaints in HASH(0x7fc878d0ee70), which 63% of respondents complained about, followed by complaints on the lower neck (62%), waist (59%), right leg (59%) and left leg (56%). Meanwhile, the right elbow is only complained by 33% of ER nurses in all regional hospitals in Tuban City. Table 4. Relation between Workload and Complaint Level of the Musculoskeletal System for ER Nurses. Variable Mild Musculoskeletal Complaint Moderate Severe Total p n % n % n % n % Workload Moderate 8 12,7 16 25,4 10 15,9 34 54 0,028 Heavy 5 7,9 6 9,5 18 28,5 29 46

Total 13 20,6 22 34,9 28 44,4 63 100 Based on Table 4, it shows that as many as 28.5% of ER nurses with heavy workload have severe complaints of the musculoskeletal system, while only 7.9% of ER nurses with heavy workloads have mild complaints of the musculoskeletal system. The result of the HASH(0x7fc878d118b0) complaints in the musculoskeletal system. Indian Journal of Forensic Medicine & Toxicology, July-September 2021, Vol. 15, No. 3 4313 Discussion Workload of Emergency Room Nurses The results of this study revealed that 54% of emergency room nurses at regional hospitals in Tuban City have moderate workload and there are no ER nurses at regional hospitals in Tuban City who have low workload. Results from a study by Haryanti et al. (2013) showed that almost all nurses (93.1%) had heavy workload[14]. According to Marquis and Huston (2010), a nurse's workload is defined as all activities performed by a nurse while working in a nursing service unit[15]. Workload is defined as 'patient days' which refers to the number of procedures, examinations and patient visits. The calculation of workload is based on the level of dependency or classification of patients. Workload can also be calculated based on nursing activities while providing nursing care. Nursing activities include direct nursing activities and indirect nursing activities[16]. Nurses in the ER face situations between life and death daily and must show skilled and high quality nursing care to patients every day[17]. Furthermore, nurses in the emergency room also have to face a high number of patients, long shifts, high-speed environments, along with emotional and physical challenges, which can negatively impact them[18]. Nurses' Complaint Levels of the Musculoskeletal System Results showed that 44.4% of emergency room nurses at regional hospitals in Tuban City have severe musculoskeletal complaints and only 20.6% have mild musculoskeletal complaints. According to HASH(0x7fc878d122e8) complaints come from the back, namely 63%. While the least complaints come from the right elbow, namely 33%. Nurses are hospital staffs who have the most musculoskeletal complaints, together with doctors[19]. HASH(0x7fc878d151c0). This damage is known as Musculoskeletal Disorders (MSDs) or injuries to the musculoskeletal system[20]. One of the pain measurement systems that can be used is the Nordic Body Map (NBM) instrument, this instrument is issued by the Occupational Safety and Health Administration[21]. Musculoskeletal disorders include sprains, strains, tears, pain and herniation, along with connective tissue injury of muscle structures, bones, nerves, tendons, ligaments, cartilages and spinal discs. HASH(0x7fc878d15af0) that are most frequently reported to be associated with musculoskeletal disorders are the repetition of excessive activity, abnormal posture and heavy lifting[22]. The Relation between Nurses' Workload and Complaint Levels of the Musculoskeletal System Results revealed that as many as 28.5% of ER nurses with heavy workloads have severe complaints on the musculoskeletal system, while only 7.9% of ER nurses with heavy workloads have mild complaints on the musculoskeletal system. HASH(0x7fc878d19760) complaints in the musculoskeletal system. Research by Heiden et al. (2013) reported that the high physical workload of nurses is significantly associated with musculoskeletal complaints[23]. Meanwhile, a research on emergency nurses and studied the relation between HASH(0x7fc878d03db8). However, the research did not study the relationship between musculoskeletal disorders and workload. The research showed that the prevalence of musculoskeletal disorders is high in nurses who work night shifts and the level of job satisfaction is low[24,25]. Conclusion The majority of ER nurses had moderate workload, while the level of complaints of the musculoskeletal system was mostly severe. Based on the NBM 4314 Indian Journal of Forensic Medicine & Toxicology, July-September 2021, Vol. 15, No. 3 instrument, it is known that the majority of complaints come from the back, while the least complaints come from the right elbow. One of the conditions that causes this is the intensity of treatment required for patients which can change at any time. Various

competencies and procedures are additional factors that cause high workload for emergency nurses. This condition increases the risk for emergency room nurses to experience musculoskeletal disorders. Conflict of Interest : The authors declare that they have no conflict of interest. Source of Funding : This study supported by the Ministry of Education and Culture of the Republic of Indonesia. Acknowledgements : We thank Rr. Putri Amaristya Purwono and Arif Nur Muhammad Ansori for editing the manuscript. Ethical Approval: This study approved by the Health Polytechnic of the Ministry of Health, Surabaya, Indonesia. References 1. Crilly J, Greenslade J, Lincoln C, Timms J, Fisher A. Measuring the impact of the working environment on emergency department nurses: A cross-sectional pilot study. International Emergency Nursing. 2017; 31: 9–14. 2. Weaver AL, Stutzman SE, Supnet C, Olson DWM. Sleep quality, but not quantity, is associated with self-perceived minor error rates among emergency department nurses. International Emergency Nursing. 2016; 25(2016): 48–52. 3. Bazazan A, Dianat I, Mombeini Z, Aynehchi A, Asghari JM. Fatigue as a mediator of the relationship between quality of life and mental health problems in hospital nurses. Accident Analysis and Prevention. 2019; 126(2017): 31–36. 4. Dominguez-Gomez E, Rutledge DN. Prevalence of secondary traumatic stress among emergency nurses. Journal of Emergency Nursing. 2009; 35(3): 199–204. 5. Hooper C, Craig J, Janvrin DR, Wetsel MA, Reimels E. Compassion satisfaction, burnout, and compassion fatigue among emergency nurses 6. 7. 8. 9. compared with nurses in other selected inpatient specialties. Journal of Emergency Nursing. 2010; 36(5): 420–427. Li H, Cheng B, Zhu XP. Quantification of burnout in emergency nurses: A systematic review and meta-analysis. International Emergency Nursing. 2018; 39: 46–54. LeBlanc KE, LeBlanc LL. Musculoskeletal disorders. Prim Care. 2010; 37(2): 389–406. Anap D, Iyer C, Rao K. Work related musculoskeletal disorders among hospital nurses in rural Maharashtra, India: a multi centre survey. International Journal of Research in Medical Sciences. 2013; 1(2): 101. Occupational Safety & Health Administration. Transitioning to Safer Chemicals: A Toolkit for Employers and Workers. Occupational Safety & Health Administration; 2013. 10. Yan P, Li F, Zhang L, Yang Y, Huang A, Wang Y, Yao H. Prevalence of work-related musculoskeletal disorders in the nurses working in hospitals of Xinjiang Uygur autonomous region. Pain Research and Management. 2017; 2017: 1–7. 11. Rogers B, Buckheit K, Ostendorf J. Ergonomics and nursing in hospital environments. Workplace Health & Safety. 2017; 61(10): 429–439. 12. Sorour AS, El-Maksoud MMA. Relationship between musculoskeletal disorders, job demands, and burnout among emergency nurses. Advanced Emergency Nursing Journal. 2012; 34(3): 272–282. 13. Arikunto S. Metodologi penelitian suatu pendekatan praktek. Jakarta: Rineka Cipta; 1998. 14. Haryanti, Aini F, Purwaningsih P. Hubungan antara beban kerja dengan stres kerja perawat di instalasi gawat darurat rsud kabupaten semarang. Jurnal Managemen Keperawatan. 2013; 1(1): 48–56. 15. Marquis BL, Huston CJ. Kepemimpinan dan Manajemen Keperawatan. EGC; 2012. 16. Swansburg RC, Swansburg RJ. Legal Principles of Nursing: Introduction to Management and Leadership for Nurse Managers (3rd ed.). Burlington: Jones and Barlett; 2002. 17. Jonsson A, Halabi J. Work related post-traumatic stress as described by Jordanian emergency nurses. Accident and Emergency Nursing. 2006; 14(2): 89–96. Indian Journal of Forensic Medicine & Toxicology, July-September 2021, Vol. 15, No. 3 4315 18. Healy S, Tyrrell M. Stress in emergency departments: experiences of nurses and doctors. Emergency Nurse. 2011; 19(4): 31–37. 19. Koyuncu N, Karcioglu Ö. Musculoskeletal complaints in healthcare personnel in hospital. Medicine2. 2018; 97(40): e12597. 20. Tarwaka, Bakri SHA, Sudiajeng L. Ergonomi untuk Keselamatan, Kesehatan Kerja dan Produktivitas. Surakarta: UNIBA PRESS; 2004. 21. Occupational Safety & Health Administration. Transitioning to Safer Chemicals: A Toolkit for Employers and Workers. Occupational Safety & Health Administration;

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