

The Association of Nurse Personal Factor and Low Back Pain Among Nurses (a study at ICU and ICCU of 3 hospital)

Gandu Eko Julianto Suyoso¹, Tri Martiana¹, Linda Dewanti²

Department of Occupational Health and Safety, Faculty of Public Health Airlangga University¹

Department of Public Health, Faculty of Medicine, Airlangga University²

Email: gandu.eko.js@gmail.com

Abstract- Musculoskeletal disorder also suffered by the hospital worker, including nurses. The highest prevalence of musculoskeletal disorder that suffered by nurses are low back pain, shoulder pain, and low extremity pain. Low back pain is a musculoskeletal disorder which caused by multifactorial, one of this multifactor is personal factor. The aim of this study is to analyze the association of personal factor (age, years of work, body mass index and sport activity) and low back pain among ICU and ICCU nurses at XYZ hospital. This quantitative study applied cross sectional design. All 46 nurses at XYZ ICU and ICCU hospital were taken as respondent. Data was collected through questionnaires and also weight and height measurement. Bivariate analysis showed that nurse low back pain have: a quite strong association with body mass index ($r = 0,424$); a weak association age of nurse ($r = 0,310$), years of work ($r = 0,378$); a very weak association with nurse sport activity ($r = 0,149$).

Index Terms- Low back pain, nurse, intensive care unit

1. INTRODUCTION

Every year low back pain's incidence number were predicted by many studies as much 1,5 until 36 percent (Hoy et al, 2010). Musculoskeletal disorder also suffered by the hospital worker, including nurses. The highest prevalence of musculoskeletal disorder that suffered by nurses are low back pain, shoulder pain, and low extremity pain (Karahana *et al*, 2009; Daraiseh *et al*, 2010). Nurses in many country have a high prevalence number of low back pain, between 60 until 84 percent (Karahana *et al*, 2009; Sopajareeya *et al*, 2009; Sikiru dan Hanifa, 2010).

Low back pain is one of many musculoskeletal disorder which is marked by pain symptom located between 12th rib and inferior gulteal fold with or without pain on one of the leg, it caused by many factor singularly or simultaneously (Krismer M. dan Van Tulder M. 2007; Leighton dan Beynon, 2002). One of those factor is personal factor, it consist of age, years of work, body mass index and sport activity (Minematsu, 2012; Marras, 2008; Tarwaka 2010).

Intensive Care Unit is one of many hospital services which is has different patient characteristic from another services. ICU patients have high severity level, it cause nurses tend to do more patient handling activity such as patient lifting, patient repositioning, patient transferring and staying on the

awkward posture longer than another nurses in another hospital services (June dan Cho, 2009).

Nurse low back pain have multidimensional impact. At the individual level, low back pain will cause dissability (Wai et al, 2009). At the higher organizational level, low back pain will cause many impact on economic aspect, labor force aspect and nursing care quality (Sopajareeya et al, 2009). The aims of this study is to analyze the association of personal factor and low back pain among ICU and ICCU nurse at XYZ hospital.

2. METHOD

This study held at XYZ hospital, Jember, East Java province on February 2015 until March 2015. This quantitative study applied cross sectional design to analyze the relationship of personal factor, psychosocial factor, occupational physical activity factor, and nurse's low back pain at ICU and ICCU. The population of this study were all 46 nurses of ICCU and ICU at XYZ hospital. It consist 11 nurses at X hospital, 11 nurses at Y hospital, and 24 nurses at Z hospital. The samples of this study were 41 nurses, because of 5 nurses were pregnant.

Primary data were gained from questionnaire, weight and height measurement. Contingency

Coefficient test were used as bivariat analysis for analyzing the relationship between each independent variables and dependent variable.

3. RESULT

The frequency of nurse personal factor can be seen on Table 1.

Table. 1 Personal Factor of ICU and ICCU nurse

Personal factor of respondent	Frequency	Percentage (%)
Age		
≥ 30 years	33	80
< 30 years	8	19,5
Years of work		
≥ 6 years	15	36,6
< 6 years	26	63,4
Body mass index		
Overweight	14	34,1
Normal	24	58,5
Underweight	3	7,3
Sport activity		
Sedentary	10	24,2
Under active	18	43,9
Active	13	31,7

Based on table 1, most of the respondents are more than 30 years old, have been working more than 6 years, have a normal body mass index, and have active sport activity.

Table. 2 Comparative Analysis of Personal factor of ICU and ICCU nurse and low back pain

Variable	p
Age	0,011
Years of work	0,044
Body mass index	0,038
Sport activity	0,998

To ensure the association between each personal factor and nurse with/without low back pain, the author did comparative analysis for each of them using independent t test (for age, years of work and body mass index) and Kolmogorov Smirnov test (for sport activity). Based on table 2, all variables have a significant less than 0,05 except sport activity variable. Sport activity significancy are more than 0,05, it means there is no significant difference on

sport activity in nurse with low back pain and nurse without low back pain.

Table. 3 Association Between Low Back Pain and Personal factor of ICU and ICCU nurse

Variable	r
Age	0,310
Years of work	0,378
Body mass index	0,424
Sport activity	0,149

By using coefficient contingency test, based on table 2, between all the variable, body mass index has the strongest association with low back pain, and sport activity has the weakest association with low back pain among nurses.

4. DISCUSSION

In this study, it was obtained that there was a weak relationship between nurses age and low back pain. According to Morewitz and Goldstein (2007) also Bridger (2003), it was possible because adults had a risk for spinal stenosis or narrowing of spinal canal lower part. Development of bone tissue would obstruct that part. Bone tissue development occurred because of chronicity, protrude discus or thickening process of ligamen through out the spine. So that individual would feel pain on his or her back or feet. After age 30, intervertebrae discus degeneration process started, it would cause micro tear and scar tissue, many fluid loss and narrowing of disc space permanently. At this stage, spinal motion segment became instable. This instability could push vertebrae dome forward, clip the spinal nerve and produce back pain.

Hasyim in Tarwaka (2004) stated that years of work would cause static load continuously, if worker didn't pay attention about it and another ergonomic factors, it would be easier for them for suffering low back pain complaint. This study obtained a weak relationship between nurses years of work and low back pain. Burdorf and Saddock in Minematsu (2012) told that generally, years of work and age had a correlation, years of work increase as the age increment of worker. More years of work means greater exposure of occupational factors. If soft tissue in spine exposed to heavier load together along with the expose time increment, it would cause a sequence of problems, the damage of blood vessel because disc degeneration that later will create nerve damage and lead to chronic pain syndrome (Bridger R.S, 2003).

This study obtained moderately strong relationship of nurse's years of work and low back pain. This result is analogously with another study by Daraiseh *et al* (2010) and Rodacki *et al* (2005). In this study, 14 nurses had overweight body mass index. Meta-analysis by Shiri *et al* (2009) found that overweight and obesity increased low back pain risk. There was a causal relationship between obesity or overweight and low back pain. There were many mechanism which could explain this relationship. First, obesity increased mechanic load in spine so that would increase compression or tear force on lumbar spine structure when he or she was working. Second, obesity would cause low back pain through systemic chronic inflammation. Third, metabolic syndrome such as abdominal obesity, hypertension and dyslipidemia could cause low back pain through pathomechanical way. Fourth, obesity was related to disc degeneration and end plate vertebrae alteration.

One of many factors that develop low back pain is the absence of sport for strengthening back muscle. Nurses may not realize about low back pain risk, they started to do sport activity when they already had suffered low back pain or have just got relaps episode of low back pain. In public perspective, nurses optimum physical condition is not directly relate to the aim of nursing care, which is providing help and treatment physicaly and psychosocially for weak and sick people. Generally, people tend to connect nursing care with matters which is more about calmness, attention, emphaty, and else, but not with nurse's physical ability (Burton *et al*, 2005; Byrne *et al*, 2006 dalam Stricevic, 2012).

In this study, nurses sport activity had a weak relationship with low back pain. This result was analogously with systematic review by Hoogendorn (1999) which described that there were no proof that show significant relationship between sport activity and low back pain. A review of 39 studies about preventive effect af sport activity toward back pain and other musculoskeletal complaint by hildebrandt *et al* (2000) stated that all those studies had inconsistent result. Most of it were not show any effect. Some indicated positive effect of sport activity toward neck and back pain, while excessive sport activity were related to unfavorable effect. Empirical data showed no relationship between sport participation and musculoskeletal complaint.

5. CONCLUSSION

Nurse low back pain have: a quite strong association with body mass index; a weak association age of nurse, and years of work; a very weak association with nurse sport activity.

SUGGESTION

Employer need a further research about nurse low back pain to ensure the risk factor so that they can prevent bad impact of low back pain. Supervisor need to make monthly evaluation about low back pain incidence among nurse toward health and safety departement, so that they can determine the appropriate action to prevent low back pain among nurses.

REFERENCES

- [1] Bharat, K.; Broder, A. (1998): A technique for measuring the relative size and overlap of public Web search engines. *Computer Networks*, **30**(1–7), pp. 107–117.
- [2] Hoy D., Brooks P., Blyth F., Buchbinder R., (2010). Epidemiology of low backpain. *Best Pract Res Clin Rheumatolog*, Desember 2010. vol 24, issue 6. p. 769-781. doi:10.1016/j.berh.2010.10.002
- [3] Balagué F., Mannion A.F., Pellisé F., Cedraschi C., (2012). Non-specific low back pain. *Lancet* 2012, vol. 379. p. 482–9. doi:10.1016/S0140-6736(11)60610-7)
- [4] Karahan A., Kav S., Abbasoglu A., Dogan N., (2009) Low back pain: prevalence and associated risk factors among hospital staff. *Journal of Advanced Nursing*, vol 65, no. 3. p. 516–524. doi: 10.1111/j.1365-2648.2008.04905.x
- [5] Daraiseh N.M., Cronin, SN., Davis, LS., Shell, RL., Karwowski W., (2010) . Low back symptoms among hospital nurses, associations to individual factors and pain in multiple body regions. *International Journal of Industrial Ergonomics*, vol. 40, Issue 1, January 2010. p. 19–24 DOI: 10.1016/j.ergon.2009.11.004)
- [6] Sopajareeya C., Viwatwongkasem C., Lapvongwatana P., Hong O., Kalampakorn, S., (2009). Prevalence and risk factors of low back pain among nurses in thai public hospital. *J Med Assoc Thai*, 2009, vol 92, suppl. 7. p. 93-97.
- [7] Sikiru L., Hanifa, S. (2010). Prevalence and risk factors of low back pain among nurses in a typical Nigerian hospital. *African Health Sciences*, 2010, vol. 10, no. 1, p. 26 – 30.
- [8] Krismer M., Van Tulder M., (2007). Low back pain (non-specific). *Best Practice & Research Clinical Rheumatology*, February 2007, vol. 21, Issue 1. p. 77–91. DOI: http://dx.doi.org/10.1016/j.berh.2006.08.004

- [9] Leighton & Beynon, (2002). Identification and measurement of risk, Musculoskeletal disorders in health related occupation (ed. Rilley). IOS press
- [10] Minematsu, Akira., (2012). *Epidemiology In : Low back Pain*. (Ed. Norasteh A.G). Croatia: Intech. ISBN 978-953-51-0599-2
- [11] Marras W.S., (2008). *The Working Back: A System View*. New Jersey: John wiley & Sons Inc.
- [12] Tarwaka. (2010). *Ergonomi Industri*. Surakarta: Harapan press
- [13] June K.J., Cho S.H., (2011). Low back pain and work-related factors among nurses in intensive care units. *Journal of Clinical Nursing*, vol 20. p. 479–487. doi: 10.1111/j.1365-2702.2010.03210.x
- [14] Wai E.K., Roffey D.M., Kwon B.K., Dagenais, S., (2010). Causal assessment of occupational lifting and low back pain: results of a systematic review. *The Spine Journal*, 2010, vol. 10. p. 554–566.
- [15] Morewitz S.J., Goldstein, M.L., (2007). *Aging and Chronic Disorders*. New York: Springer Science + Business Media.
- [16] Bridger R.S., (2003). *Introduction to Ergonomics*. CRC Press
- [17] Rodacki A.L.F., Fowler N.E., Provensi C.L.G., Rodacki C.L.N., Dezan, V.H., (2005). Body mass as a factor in stature change. *Clinical Biomechanics*, 2005, vol. 20, p. 799–805. DOI:10.1016/j.clinbiomech.2005.04.005
- [18] Caplan R.D., Cobb S., French J. R. P., Jr., Van harrison R., Pinneau, S. R., Jr. (1975). *Job demands and Worker health*. Washington, DC: National Institute of occupational Safety and Health.
- [19] Almendra, C.A., (2010). Relationship among job demand, job control, social support and job stress in registered nurse working in skilled nursing facilities, *Disertasi*. University of New Jersey. <https://rucore.libraries.rutgers.edu/rutgers-lib/27158/PDF/1/>
- [20] Way, Mary. (2008). Job Demand, Job Control, and Support: A Comparison of Three Nursing Work Environments. *Proquest*.
- [21] Lang J., Ochsmann E., Kraus T., Lang, J.W.B., (2012). A systematic review and meta-analysis of stability-adjusted longitudinal studies. *Social Science & Medicine*, 2012, vol. 75. p. 1163–1174.
- [22] Erez A.B., (2008). *Psychosocial Factors in Work Related Musculoskeletal Disorders*. Ergonomics for Therapists (Third Edition). p. 123–136
- [23] Kanter, R.M., (1993). *Men and women of the corporation*. New York, NY: Basic Books, Inc.
- [24] Karasek R.A., (1979). Job demands, job decision latitude and mental strain: Implications for job redesign. *Administrative Science Quarterly* Vol. 24, No. 2 (Jun., 1979), pp. 285-308
- [25] Karasek R.A., Theorell T., (1990). *Healthy work*. New York: Basic Books.
- [26] Eatough E.M., Way J.D., Chang C., (2012). Understanding the link between psychosocial work stressors and work-related musculoskeletal complaints. *Applied Ergonomics*, 2012, vol. 43. p. 554-563. DOI:10.1016/j.apergo.2011.08.009
- [27] Kossek E.E., Pichler S., Bodner T., Hammer L.B., (2012). Workplace social support and work-family conflict: A Meta-analysis clarifying the influence of general and work-family-specific supervisor and organizational support. *Pers Psychol*, 2011, vol. 64, no. 2. p. 289–313. doi:10.1111/j.1744-6570.2011.01211.x
- [28] Ozbay F., Johnson D.C., Dimoulas E., Morgan C.A., Charney D., Southwick ,S., (2007). Social support and resilience to stress: From neurobiology to clinical practice. *Psychiatry*, May 2007.
- [29] Bradley J.R., dan Cartwright S., (2002). Social Support, Job Stress, Health, and Job Satisfaction Among Nurses in the United Kingdom. *International journal of Stress Management*, Juli 2002, vol. 9, Issue 3. p. 163-182.
- [30] Eagley A.H., Chaiken S., (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich College Publishers.
- [31] Roffey D.M., Wai E.K., Bishop P., Kwon B.K., Dagenais, S., (2010). Causal assessment of awkward occupational postures and low back pain: results of a systematic review. *The Spine Journal*, 2010, vol. 10. p. 89–99.
- [32] Andersen L.L., Clausen T., Mortensen O.S., Burr H., Holtermann A., (2012). A prospective cohort study on musculoskeletal risk factors for long-term sickness absence among healthcare workers in eldercare. *International Archives of Occupational and Environmental Health*. Agustus 2012, vol. 85, Issue 6. p. 615-622. doi 10.1007/s00420-011-0709-5
- [33] Water T.H., Nelson A., Proctor C., (2007). Patient Handling Task with High Risk for Musculoskeletal Disorders in Critical Care. *Crit Care Nurs Clin N Am* , 2007, vol. 19. p. 131–143. doi:10.1016/j.ccell.2007.02.008
- [34] Coenen P., Gouttebarga V., Van der Burght, ASAM, Dieën J.P., Frings-Dresen M.H.W., van der Beek, A.J., Burdorf, A. (2014). The effect of lifting during work on low back pain: a health impact assessment based on a meta-analysis. *Occup Environ Med*. 2014 Dec, vol. 71, issue 12, p. 871-7. DOI: 10.1136/oemed-2014-102346
- [35] D'Arcy L.P., Sasai Y., Stearns SC., (2012). Do assistive devices, training, and workload affect injury incidence? Prevention efforts by nursing homes and back injuries among nursing assistants. *J Adv Nurs*. April 2012, vol. 68, issue 4. p. 836–845. doi: 10.1111/j.1365-2648.2011.05785.x

- [36] Hodder J.N., MacKinnon S.N., Ralhan A., Keir P.J., (2010). Effects of training and experience on patient transfer biomechanics. *International Journal of Industrial Ergonomics*, 2010, vol. 40. p. 282–288. doi:10.1016/j.ergon.2010.01.007
- [37] Broder, A.; Kumar, R.; Maghoul, F.; Raghavan, P.; Rajagopalan, S.; Stata, R.; Tomkins, A.; Wiener, J. (2000): Graph structure in the Web. *Computer Networks*, **33**(1–6), pp. 309–320.
- [38] Chakrabarti, S. (2000): Data mining for hypertext: A tutorial survey. *SIGKDD explorations*, **1**(2), pp. 1–11.