Complaints of Nurses' Low Back Pain Assessed from Individual Characteristics and Workloads

Dameria, Frans Judea Samosir, Putri Yunita Pane, Pahala M. J. Simangunsong, Putranto Manalu, Perry Boy Chandra Siahaan, and Ulina Tarigan
Public Health Department, Universitas Prima Indonesia, Jl. Sekip, Medan, Indonesia

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Abstract: Complaints of low back pain often occur in health workers, especially among nurses who work in the Emergency Room since they have a high work intensity. The purpose of this study was to determine the relationship between individual characteristics and workload on complaints of low back pain among nurses in the Emergency Room at the RSUP H. Adam Malik Medan. The research design used was an analytic survey with a cross-sectional approach. The sample size of 30 respondents was obtained through purposive sampling. The results of statistical tests using the chi-square showed that there was no relationship of individual characteristics (body mass index 0,372; age 0,367; years of service 0,611) and the complaints of low back pain. On the contrary, the workload had a significant relationship on the complaints of low back pain (p-value of 0,001) among nurses at the RSUP H. Adam Malik Medan.

1 INTRODUCTION

Nurses are one of the human resources in the hospital who have a large enough number and role in determining hospital services. Nurses are classified as a workgroup with a high risk of experiencing Low Back Pain (LBP) or what is often described as lower back pain due to daily activities in the hospital to provide health services (Amila et al, 2015).

LBP is pain that is felt in the lower back where the pain originates from the muscle, spinal (lower back) area, nerves, or other structures around the area. LBP can be caused by disease or abnormalities in the testicles or ovaries. LBP can also be caused by work factors; namely, work time, work mass, workload, and a person's work environment factors in the form of vibration and work climate (Suma' mur, 2009).

Until now, LBP is the biggest medical expense in several countries. LBP not only causes physical problems but can also be psychological problems such as depression due to the very high pain felt by the patient (Shin, 2020). In Switzerland, musculoskeletal disorders caused an economic loss of 3.3 billion due to lost productivity and absenteeism from workers. LBP health care for direct medical costs account for 6.1% of total health care spending in Switzerland (Nützi et al., 2017).

In carrying out their duties to provide services to patients, nurses are required to have time and energy to meet each patient's basic needs. Nurses have very diverse activities, including doing medication, lifting, moving patients, and helping patients to mobilize (Sarwili, 2015). For a long time, nurses often perform activities in a standing or walking position. The rotation of the spine when the body is bending is a factor in causing LBP disorders. This work activity will indirectly endanger the health of the nurses themselves, especially female nurses. The risk of muscle complaints in women is more significant than men. This is because physiologically, women's muscle ability is indeed lower than that of men (Rizka, 2012).

WHO (World Health Organization) states that LBP is a work-related disease in the form of musculoskeletal disorders that can reduce workers' productivity due to insufficient body activity so that low back pain is the leading cause of disability that affects work and general welfare (WHO, 2013). Several factors can cause LBP risk in nurses, namely over 35 years of age, smokers, 5-10 years of work, work position, obesity, and a family history of musculoskeletal disorders (Astuti, 2007). Other factors that can affect the onset of LBP disorders

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include individual characteristics, namely body mass index, height, exercise habits, years of work, work position, and workload weight (Harrionto, 2007). The weight of the load lifted, the frequency of lifting, and the method or technique of lifting weights can affect workers' health in the form of work accidents or the emergence of pain or injury to the back (Effendi, 2007).

Occupational Safety and Health Administration (OSHA, 2013) explains that occupational diseases are the result of injuries or illnesses that occur in the workplace as a result of material pressure or working conditions while doing work. The prevalence of spinal complaints reaches almost 60% of all occupational diseases in nurses. In the United States, 85% of the population is in second place when it comes to doctor visits because of symptoms of musculoskeletal complaints in risky occupations. Fortunately, complaints of back pain resolve for the most part in 2-4 weeks (Hills, 2020).

Many workers from various countries were reported by The ILO Report for World Day Safety and Health at Work in 2005 about the issue that 30% of these workers felt complaints of disease and discomfort in the back area and experienced musculoskeletal events. Data reported by the National Safety Council (NSC) in the state of Israel has a prevalence rate of back pain in nurses of around 16.8%. In Australia, there are 87% or 813 nurses experiencing LBP. The cases in the United States regarding the incidence of musculoskeletal injury are 4.62 per 100 nurses per year (Kepmenkes RI, 2010).

Based on data obtained from Health and Safety Excutive (2014), the prevalence of LBP during the last 12 months in 2013/2014 in Great Britain, there were 310 cases of LBP, and an estimated prevalence of new cases was 150 cases. According to the Center for Control and Prevention (CDC) in the The American Academy of Pain Medicine (2011), at least 100 million American adults report pain complaints. The highest cause is low back pain at 28.1%. Expensive LBP treatment depends on geography and facilities. Lumbar MRI (Magnetic Resonance Imaging) prices vary between $ 300 and $ 2,500 with a national average of $ 894 (Reilly jacob et al, 2019)

Riskesdas 2018 data shows that 6.5% of workers have back injuries, 32.7% have injuries to the upper limbs, and 67.9% have injuries to the lower limbs (Kementerian kesehatan, 2018). The results of data from the Directorate General of Medical Services of the Republic of Indonesia (2006-2008) regarding occupational diseases in 2005, 2006, and 2007, of the ten occupational diseases, LBP complaints rank first with the highest number of cases. Workers with a work posture of carrying, pulling, and pushing (manual handling) and lifting (lifting) are the leading causes of LBP. About 25% of work accidents occur due to manual material handling work, and about 74% of spinal injuries are caused by lifting activities (Hastono, 2006).

Nutritional status is one of the causes of fatigue. A person's nutritional status can be measured by BMI. A workforce with good nutritional status will have better work capacity and endurance, and vice versa. In a state of malnutrition with a non-ergonomic work position, it will interfere with work, reduce productivity and body endurance so that it is easy to catch diseases and accelerate the onset of fatigue (Budiono, 2003). A person with excess weight and body fat will put pressure on the spine when holding loads so that it is easy to damage the bone structure and a danger to the spine. This statement is supported by Setyanigrum (2014) research that shows there is an influence between BMI and LBP with a p-value of 0.000.

Research conducted by Sakinah (2013) states that the percentage of LBP in the age group less than 35 years who experience complaints is seven people (26.9%) and those who do not experience LBP are 19 people (73.1%). The age group over 35 years who share LBP complaints are 17 people (60.7%) and 11 people who do not experience complaints (39.3%). This is in line with research conducted by Shieh et al (2017) where the complaints of LBP increase with age. The majority of nurses in the 35 year age group experienced LBP as much as 75.5% (37/49) and the 20-24 year age group as much as 65.2% (214/328) nurses. The results of statistical tests from this study indicate that there is a significant relationship between age and LBP complaints on brick workers in the Lawawoi Village, Sidrap Regency. As you get older, the muscles' flexibility also decreases, making it easier for muscle and joint stiffness to occur. In addition, there is also a narrowing of the space between the vertebrae, which causes the spine to become inflexible like it was at a young age. This can cause pain in the spine to the waist (Idyan, 2008). In fact, 80% of back pain affects people aged 20-55 years. However, this complaint is not specific to this age group, which means that back pain can occur due to infection, trauma, or other specific reasons (Movahedi et al., 2020).

The excessive workload can lead to over-stretching of the muscles to reduce the immune elements that are between the spinal segments.

Workload and LBP incidence have a significant relationship, where nurses with heavy workloads are at 5.6 times greater risk of experiencing LBP than nurses with moderate workloads (Karyati et al, 2019). Research conducted by Indriasari et al. (2017) also stated the same thing where there is a p-value of 0.032 <0.05, which means that there is a relationship between workload and LBP of nurses in the operation room of the RSUD Kota Yogyakarta.

Working for long periods of time has a greater risk of experiencing LBP. This period of work is closely related to physical abilities. The longer a person works, the lower their physical abilities will be. Physical ability will gradually decrease as a result of work fatigue, and indirectly, the working period will result in the contraction of muscles that strengthen and support muscles continuously for a long time. This is supported by Kurnia PD (2015), showing that workers with a service period of ≥ 5 years are at a higher risk than workers with a service life of ≤ 5 years, as evidenced by the p-value obtained of 0.038 and research conducted by Shieh et al (2017) showing as much as 78.8% prevalence rate of nurses who experience LBP have a work history of eight years or more.

Having excess body weight is the most significant factor in health problems. As a result of being overweight, it will also put too much weight so that it is at risk of causing damage to the spine and joints, which is a factor in LBP incidence. Based on the statistical analysis test results by Widjaya and Aswar (2012), there is a p-value of 0.011, where there is a significant relationship between overweight and complaints of LBP. Research by Rochman *et al* (2017) states the same thing that obese nurses have a 7.09 times risk of experiencing LBP compared to nurses who have ideal body weight.

RSUP H. Adam Malik Medan is a type a hospital where in 2014, it was designated as a hospital with a national referral system. Therefore, the number of patient visits every day is very high, especially in the Emergency Room (IGD) which is a department dedicated to the care of seriously ill patients. Nurses are required to be alert in carrying out their work to handle patients, do multiple procedures and often do night shifts which are part of the pressure of the work environment. Emergency nurses are also required to have physical strength and no mental disabilities (Yang et al., 2020). Based on the initial survey conducted on emergency room nurses through interviews, it was obtained that nine out of 11 morning shift nurses often experience pain due to the high workload. Even some nurses use corsets while working because of the back pain they experience. In one work shift, nurses can lift, move patients, and assist patients in mobilizing more than five patients, with the average patient being adults with different body weights. Moreover, nurses must be up and running for a long time to provide emergency services.

Based on the above background, the formulation of the problem in this study is how big the relationship between individual characteristics and workload on complaints of Low Back Pain in nurses of RSUP H. Adam Malik Medan. This study aims to determine the relationship between individual characteristics and workload on complaints of Low Back Pain in nurses of RSUP H. Adam Malik Medan.

2 METHOD

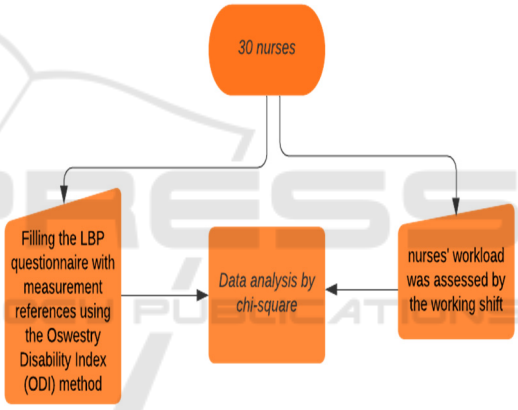

Figure 1: Research process.

The type of research carried out in this study was an analytical survey using a cross-sectional design in which the independent and dependent variables were directly examined at the same time. The population in this study were 84 nurses at RSUP H. Adam Malik Medan, consisting of 54 nurses in the emergency room triage section of the first floor, 13 nurse workers on the second floor of the Verlos Kamer emergency room, and 17 nurse workers in the Intensive Care Unit section on the third floor.

The sampling technique was purposive sampling, in which the research sample consisted of 30 nurses who worked at the IGD RSUP H. Adam Malik Medan. In this study, the inclusion criteria were male / female 25-60 years old, working as a nurse, and willing to be the research sample. The exclusion criteria were nurses who were absent/sick and who did not complete the questionnaire.

This research was conducted by directly visiting nurses in the ER and providing a questionnaire equipped with a letter of approval that was signed by the respondent and then filled in directly by the respondent himself. Data collection was done by filling out the LBP questionnaire with measurement references using the Oswestry Disability Index (ODI) method. The workload was seen from how many times nurses mobilize/lift patients in one working shift. It was said to be a heavy burden if serving more than five patients, and less than five patients said to be a light burden. The research data were then tested using descriptive univariate analysis and bivariate (chi-square) test with a confidence level of 95% ($\propto$ = 0.05) (Hulu and Sinaga, 2019).

3 RESULTS AND DISCUSSION

Based on the gender frequency distribution of 30 respondents, the majority of respondents were female, as many as 27 people (90%), and a minority of male gender as many as three people (10%). The frequency distribution of the respondents' Body Mass Index (BMI) varies. The majority of respondents had an abnormal BMI, namely <18.5 or > 25, as many as 22 people (73.3%), and the minority BMI with an average of 18.5-25 was as many as eight people (26.7%). The frequency distribution of the respondent's age group is as follows: the majority of respondents are the group with age more than 30 years, as many as 29 people (96.7%), and the minority is the group aged less than 30 years, as many as one person (3.3%)

Based on the respondents' tenure, the majority who have worked for more than ten years is 26 people (86.7), and the minority who have worked less than ten years are four (13.3%). The frequency distribution of the respondents' workload was: the majority of those with a heavy workload of more than five patients were 16 people (53.3%), and the minority of respondents who had a low workload were 14 people (46.7%). Based on the LBP of respondents, the majority who experienced LBP were 19 people (63%), and the minority who did not experience LBP were 11 people (37%).

Table 1: The relationship of BMI and Low Back Pain complaints.

BMI	Low Back Pain						P-Value
	Not experiencing		Experiencing		Total		
	N	%	N	%	N	%	
Normal	4	57,1%	3	42,9%	7	100%	0,372
Not Normal	7	30,4%	16	69,6%	23	100%	

Table 2: The relationship of age and Low Back Pain complaints

Age	Low Back Pain						P-Valu
	Not Experiencing		Experiencing		Total		
	N	%	N	%	N	%	
Young	1	100%	0	0%	1	100%	0,367
Old	10	34,5%	19	65,5%	29	100%	

Table 3: The relationship of the working period and Low Back Pain complaints

Working Period	Low Back Pain						P-Value
	Not Experiencing		Experiencing		Total		
	N	%	N	%	N	%	
< 10 years	2	50%	2	50%	4	100%	0,611
> 10 years	9	34,6%	17	65,4%	26	100%	

Table 4: The relationship of workloads and Low Back Pain complaints

Workloads	Low Back Pain						P-Value
	Not Experiencing		Experiencing		Total		
	N	%	N	%	N	%	
Low	6	100%	0	0%	6	100%	0,001
High	5	20,8%	19	79,2%	24	100%	

3.1 The Relationship of BMI and Low Back Pain Complaints

Based on table 1 above, the value of p = 0.372 (p value> 0.005) is obtained, so Ho is accepted so that it can be concluded that there is no relationship between BMI and LBP complaints among the emergency room nurses at H. Adam Malik Medan. The reason why BMI is not related to LBP complaints is because the majority of respondents are classified as BMI obese I where respondents do not have excessive fat. It is precisely muscle size large enough to increase metabolism to produce energy. If the energy produced is high, muscle fatigue will be challenging to occur (Tarwaka, 2015).

This finding is not in line with previous studies' results, which stated that excess body weight is the most significant factor in health problems, one of which is LBP. Excess body weight will put excessive weight on the spine and put a lot of pressure on the spine, which can lead to joint damage (Widjaya & Aswar, 2012; Rochman *et al.,* 2017).

The results of this study are in accordance with Amila *et all* (2015), which showed that there was no significant relationship between BMI and LBP in nurses with p-value = 0.294. The analysis of the Spearman Rank statistical test conducted by Astuti *et all* (2015) in their research obtained a p-value = 0.220 so that Ha was rejected. It can be said that there is no significant relationship between workers' tenure and complaints of low back pain.

According to Munir (2012), in line with the increase in BMI, it is directly proportional to a person's strength in doing work. People with larger body proportions tend to lift large weights more easily. If this is done correctly, it is not expected that excessive muscle stretching will occur, which causes LBP complaints.

Nurses tend not to pay attention to how their procedures work in lifting weights. Respondents who do not experience LBP have maintained an excellent diet to fit their BMI in the normal category. In contrast to respondents who experience LBP, they do not maintain a proper diet, so they are included in the abnormal category.

According to researchers' assumptions, in order not to experience LBP, respondents need to maintain a healthy lifestyle such as maintaining a diet and exercising regularly so that the fat they have does not press on the spinal ligaments. Therefore, it is necessary to increase knowledge about the consumption of nutritious food under the workload and calorie needs of each respondent's body every day.

3.2 The Relationship of Age and Low Back Pain Complaints

Based on table 2, it is obtained that the p-value = 0.367 (p value> 0.05), meaning that Ha is accepted. This shows that there is no significant relationship between age and Low Back Pain in nurses at the IGD of the RSUD H. Adam Malik Medan. This is because the majority of nurses are still productive in their activities. Productive age has strong muscle strength to lift heavy loads so that the level of LBP complaints experienced by nurses is still relatively mild or can still be resolved.

This study's results are in line with research conducted by Harahap *et all* (2018), which states that there is no significant relationship between age and complaints of LBP with a p-value = 0.593. This is because the age at risk of LBP complaints and those who are not at risk of LBP are not far apart, where respondents at-risk age are 91.7% and age are not at risk as much as 8.3%.

As a person gets older, bone density decreases so that it is easy to experience skeletal muscle complaints and cause pain. Maximum muscle strength occurs between the ages of 20 - 49 years, and at the age of 60, the average muscle strength decreases by 20%. Another factor that causes low back pain is the non-ergonomic work attitude (Tarkawa, 2004). However, disorders of the spine do not only occur in the old age group but can also occur in the younger age group. In a European study, 25% of LBP incidence was found in workers who had not reached the age of 25 years and 35% at the age of more than 55 years (Paoli, 1997: Beeck and Hermans, 2000).

From the results of research conducted on 30 respondents, the most LBP complaints were experienced by respondents aged > 30 years, as many as 19 respondents (65.5%). Then, ten respondents with the age group > 30 years who did not experience LBP (34.5%), and 1 of them was in the young age category, that is, <30 years old and not experiencing LBP. This is following the theory of Tarwaka (2004), where the first complaint is usually felt at the age of 35, and the level of these complaints will increase with age. Good muscle strength, even though the age is more than 35 years, is influenced by the nutrition of the food consumed, adequate resting time, and endurance. Therefore, a large enough muscle increases the metabolism to produce energy. If the energy produced is high, it

will be difficult for muscle fatigue to occur, thereby reducing the risk of LBP complaints. When they have free time while working, nurses should be able to do simple muscle stretching so that the body muscles are not stiff due to work.

3.3 The Relationship of Working Period and Low Back Pain Complaints

Based on table 3 above, the p-value = 0.611 (p value> 0.05) is obtained, meaning that Ha is accepted. This shows that there is no significant relationship between tenure and Low Back Pain in nurses at the IGD of the RSUD H. Adam Malik Medan. The reason why the tenure has no relationship is because the majority of nurses have a working period of more than ten years, which means that they have a lot of experience and are skilled in nursing. Skilled people tend to make mistakes rarely so that the possible work risks of experiencing LBP can be avoided, but this factor contributes to LBP complaints. Therefore a work rotation system is needed.

In line with research conducted by Yacob *et all* (2018) that there is no relationship between tenure and LBP complaints, it is evident from the Spearman rank test, which shows a p-value = 0.403 (> 0.05). In this study. This can be due to the nurses in the inpatient room of Bhayangkara Tk II Hospital in Manado were classified as a new working period where nurses with a working period of fewer than five years did not have as much experience as manual handling in lifting a patient, encouraging patients, and moving the patient repeatedly, which eventually bring out the risk of causing complaints of LBP. On the research conducted by Manengkey (2016), the results of the Chi-Square test analysis showed p-value = 0.057 > 0.05, which indicates that there is no significant relationship between work tenure and musculoskeletal complaints in emergency room nurses at Prof. Dr. R. D. Kandou Manado.

According to Islamiati (2014), out of 33 respondents, of the 24 people who had a long working period, 62.5% experienced LBP complaints. Among nine people whose work period was relatively new, 55.6% experienced LBP complaints. These results indicate that there is no relationship between tenure and LBP complaints to forklift operators at PT. Pertamina Lubricants Production Unit Jakarta.

Based on the observations that have been made, it is found that 26 respondents who have worked> 10 years 17 of them experienced LBP, and nine other respondents did not experience it. In comparison, four respondents who entered the working period <10 years. Two of them did not experience LBP, and two other respondents experienced LBP. Respondents were encouraged to perform work rotations to reduce the level of risk of experiencing LBP complaints because the ER is an installation with the highest workload that demands intense time and energy.

3.4 The Relationship of Workloads and Low Back Pain Complaints

Based on table 4 above, it is known that the p-value = 0.001 (p-value < 0.05), meaning that Ho is rejected. This shows that there is a significant relationship between workload and Low Back Pain in nurses at the IGD of the RSUD H. Adam Malik Medan. The reason why workload is related to LBP complaints is because the majority of respondents have a high workload. Nurses' high workload is caused by the work capacity that is not in accordance with the body's ability to handle the workload.

Nurses' knowledge and skills cannot compensate for the difficulty of working in the hospital, which becomes the workload. Nurses are not prepared to deal with patients with various characteristics, and nurses are required to make strict observations of patients during working hours. The nurse stood and walked for a long time and mobilized more than five adult patients with various body weights during one shift. The workload that is borne by nurses every day increases the risk of experiencing LBP complaints.

This is in line with the research results of Indriasari *et al* (2017), which states that the workload of each nurse plays a significant role in increasing LBP complaints. The chi-square test results showed a significant value of p = 0.003, which means that there is a relationship between workload and LBP complaints in nurses in the operation room of the Yogyakarta City Hospital. One of the risk factors that cause LBP is job risk factors such as frequent bending and stooping, lifting heavy loads (> 11.3 kg), pushing and pulling (load> 22.5 kg), etc.

According to Risdianti (2018), the greater the worker's workload weight, the heavier the pain complaints experienced by the respondent. The results of research conducted on female porters in the market Surakarta showed that 53.13% of respondents who experienced moderate workload complained of moderate pain, and 56.25% of

respondents with heavy workloads complained of severe pain (with p-value = 0.000), which means that there is a significant relationship between workload and LBP complaints.

Based on the observations of researchers, nurses often mobilize or assist in the process of transferring adult patients who have heavy body weights, even more than five patients per day. This increases the risk of LBP complaints for nurses. Therefore respondents are expected to adjust the workload to their respective body abilities and not push themselves to work and, as much as possible use tools to ease the respondent's workload.

4 CONCLUSIONS

There is no relationship between BMI and LBP complaints among emergency room nurses at the RSUD H. Adam Malik Medan with p-value = 0,372. There is no relationship between age and complaints from LBP among emergency room nurses at the RSUD H. Adam Malik Medan with p-value = 0,367. There is no relationship between working period and LBP complaints among emergency room nurses at the RSUP H. Adam Malik Medan with p-value = 0,611. However, there is a relationship between workloads and LBP complaints among emergency room nurses at the RSUD H. Adam Malik Medan.

It is recommended that nurses use the free time when working to stretch the muscles so that the muscles are not stiff due to work, and adjust the body's ability to the workload being done. The results of this study can also be used as a reference in the hospital in the formulation of fixed procedures (SOP) regarding the work attitudes of nurses when carrying out nursing actions and the need to pay attention to their workload, so they are not excessive, especially by providing assistance for lifting heavy loads such as moving patients.

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