

**THE INFLUENCE FACTORS OF MUSCULOSKELETAL COMPLAINTS
TO EMERGENCY NURSE (EN) IN EMERGENCY ROOM (ER)
AT RSUD DR. MOEWARDI HOSPITAL**

RESEARCH PUBLICATION

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FAKTOR – FAKTOR YANG BERPENGARUH TERHADAP KELUHAN MUSKULOSKELETAL PADA PERAWAT DI RUANG INSTALASI GAWAT DARURAT (IGD) RSUD Dr. MOEWARDI

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ABSTRAK

Latar belakang : Keluhan muskuloskeletal menjadi trend penyakit akibat kerja. Perawat menjadi bagian dari pekerja yang berisiko mengalami keluhan muskuloskeletal karena merupakan kelompok terbesar petugas kesehatan. Perawat Instalasi Gawat Darurat (IGD) memiliki mobilitas yang melibatkan aktivitas fisik yang tinggi, bekerja di dalam lingkungan yang bersuhu dingin, selain itu faktor fisik dan psikologi sedikit banyak berpengaruh terhadap bagaimana mereka melakukan pekerjaan. Penelitian ini bertujuan untuk mengetahui hubungan antara faktor aktivitas fisik, lingkungan, individu, dan psikologi terhadap keluhan muskuloskeletal dan mengetahui faktor dominan yang berpengaruh.

Metode : Penelitian ini menggunakan pendekatan *Cross-Sectional* pada 55 responden dengan menggunakan instrumen *Dutch Musculoskeletal Questioners (DMQ)* dan *Nordic Body Map (NBM)*, analisa data deskriptif (distribusi frekuensi, dan persentase), *Chi-Square* dan regresi logistik dengan nilai $\alpha < 0,05$.

Hasil penelitian : Penelitian ini menunjukkan bahwa uji *Chi-Square* signifikan antara aktivitas fisik ($p=0,010$), lingkungan ($p=0,034$), individu ($p=0,047$), psikologi ($p=0,009$) terhadap keluhan muskuloskeletal. Uji regresi logistik lingkungan (OR (IK95%)=0,32) dan psikologi (OR (IK95%)=0,23).

Kesimpulan : Ada hubungan antara faktor aktivitas fisik, lingkungan, individu, dan psikologi dengan keluhan muskuloskeletal pada perawat di Instalasi Gawat Darurat (IGD) RSUD Dr. Moewardi. Faktor lingkungan memiliki pengaruh dominan terhadap keluhan muskuloskeletal dibanding faktor psikologi.

Kata kunci : Keluhan Muskuloskeletal, Perawat Instalasi Gawat Darurat (IGD), Faktor Risiko.

RESEARCH PUBLICATION

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ABSTRACT

Background: Musculoskeletal Complaints to be a trend of occupational diseases. Nurses to be part of the workers at risk of musculoskeletal disorders as the largest group of health care workers. Nurse Emergency Room (ER) has a mobility that involve high physical activity, working in cold temperature environments, in addition to the physical and psychological factors less influential on how they do the job. This study aims to determine the relationship between physical activity factors, environmental, individual, and psychology of musculoskeletal complaints and determine the dominant factors that influence.

Methods: This study used a cross-sectional approach in 55 respondents using a Dutch Musculoskeletal questionnaire (DMQ) and Nordic Body Map (NBM) instrument, descriptive data analysis (distribution of frequency and percentage), Chi-Square and logistic regression with an alpha value $< 0,05$.

Results: This study shows that the Chi-Square test of significance between physical activity ($p = 0.010$), the environment ($p = 0.034$), individuals ($p = 0.047$), psychological ($p = 0.009$) of musculoskeletal complaints. Logistic regression test environment (OR (IK95%) = 0.32) and psychological (OR (IK95%) = 0.23).

Conclusion: There is a correlation between physical activity, the environment, the individual, and psychology with musculoskeletal disorders in Emergency nurses (EN) at Emergency Room (ER) RSUD Dr. Moewardi Hospital. Environmental factors have a dominant influence on musculoskeletal complaints than psychological factors.

Keywords: Musculoskeletal Complaints, Emergency Nurse (EN), Influence Factors.

INTRODUCTION

Background

Musculoskeletal complaints become the trend of occupational diseases (Chung, 2013). Nurses become part of workers at risk of musculoskeletal disorders as the largest group of health care workers. Nurse Emergency Room (ER) has mobility involving high physical activity, working in cold temperature environments, in addition to the physical and psychological factors more or less influence on how they do the job (Shafiezadeh, 2011).

From the preliminary study conducted in 10 nurses, 7 nurses experienced musculoskeletal complaints such as pain until 1 to 2 days, and complaints of tingling in 3 nurses and shortly disappear with rest. Observations were conducted by researchers, nurses in ER Hospital Dr. Moewardi have high mobility. This has led to several nurses often complain of fatigue, the interaction of co-workers or doctors become distracted, lose concentration when on the move, feeling dizzy, emotional instability, lack of enthusiasm at work and tend to avoid work.

The research objective was to determine the association between physical activity factors, environment, individuals, and the psychology of the musculoskeletal complaints and determine the dominant factors that influence.

THEORETICAL

Musculoskeletal system

The musculoskeletal system is part of the human body has a system of coordination, one of which is the muscular and skeletal systems (Burghardt, 2012). The musculoskeletal system is supporting the body shape and

role in the movement. The system consists of the joints, skeleton, tendons, ligaments, exchanges, and special tissues that connect these structures (Price and Wilson, 2006).

Musculoskeletal complaints

a. Definition of musculoskeletal complaints

Musculoskeletal complaints can be defined as a disorder that arises as a result of the damage to the tendons, muscles, ligaments, joints, nerves, cartilage, or spinal discs (Anap DB et al, 2013). According Tarwaka (2013) complaint is categorized into two, namely:

- 1) Temporary complaints (reversible), is a complaint that occurs when the muscles subjected to static loads, but these complaints will disappear immediately when loading are terminated.
- 2) Settled complaints (persistent), is a muscle complaint is settled. Although the administration burden stopped, pain in muscles constantly felt.

b. The mechanism of occurrence of musculoskeletal complaints

Excessive muscle contraction causes the blood circulation to the muscles is reduced according to the degree of contraction is influenced by the amount of power needed. Decreased oxygen supply to the muscles, carbohydrate metabolism and as a result there has inhibited the accumulation of lactic acid that causes muscle soreness (Tarwaka, 2013). Three symptoms that indicate the severity of musculoskeletal namely:

- 1) The first stage
Pain and fatigue while working but after a rest will recover and not interfere with work capacity.

- 2) The second stage
The pain persists after night and disturb the break.
- 3) The third stage
The pain persists despite adequate rest, pain when doing repetitive work, disturbed sleep, occurs incapacity work.

c. The impact of musculoskeletal complaints

The pain resulting dislocation, the risk of injury and even paralysis. The psychology of the reduced level of alertness, decreased job control, decreased social support, job stress, job burnout due to delays in cognitive function of the brain and changes in organs outside of awareness so that potential accidents. Economically, the reduced output, costs incurred due to worker absenteeism or sick workers, labor turnover costs for recruitment and training, as well as other costs - another unexpected (Barham, 2009).

d. Prevention of musculoskeletal complaints

- 1) Engineering techniques
Using the technique of elimination, substitution, partitions and ventilation.
- 2) Engineering Management
Education and training, working time arrangements and rest balanced, intensive supervision.

Factors that occurrence of Musculoskeletal Complaints

a. Physical activity factors

Excessive stretching complaints by workers who work activities require great exertion such as lifting activities, pushing, pulling, and withstand heavy loads.

Repetitive activity is work performed continuously as work

hoeing, splitting large timber, lift - lift.

Work attitude is not natural is working attitude resulted in the position of the body moving away from the natural position, for example, the movement of hands raised, too bent backs, heads-up, etc.

b. Environmental factors

The direct pressure on the soft tissue. For example, at the time of the hand should be holding the tool, then the soft tissue of hand muscles will receive direct pressure on the grip tool.

Excessive exposure to cold temperatures can reduce agility, sensitivity and strength of workers so that the labor movement becomes slow, difficult to move, along with the decline in muscle strength.

c. Individual factors

Complaints perceived musculoskeletal system at the age between 35-65 years. The first complaint is felt at the age of 35 years and will continue to increase the level of complaints in line with age. Comparison of muscle complaints between men and women is 1: 3, so that gender should be considered in designing the workload. The habit of smoking increased muscle complaint is closely related to the old and the level of smoking. Muscle complaints rarely felt by someone who has enough time to rest and time of exercise the body two or three times a week. Weight, height and body mass is a factor that can cause musculoskeletal system complaints although the effect is relatively small.

d. Psychological factors

The workload is the ability of the body of workers to the demands of work or responsibilities being given to the workers. Excessive workload will lead to job stress both physical and psychological and emotional reactions.

According Tarwaka (2013), shift work is working time patterns have continuity, turnover and special work schedule in the morning, afternoon and evening given the manpower to do something by the institution.

Job stress is defined stress as a stimulus, stress response and stress as a stimulus-response. Physical work stress, include hypertension, peptic ulcers, asthma, menstrual disorders and others. Psychological work stress, psychological disorders which include mild to severe. Mild mental disorders, such as nervous, tense, angry, apathy and lack of concentration, severe psychological disorders, such as depression and anxiety.

RESEARCH METHODOLOGY

Study Design

Type a descriptive quantitative research using the approach Cross - Sectional. The population in this study are all nurses who served in the Emergency (ER) Dr. Moewardi Hospital which amounts to 58 people. Sampling technique using total sampling, so once selected based on criteria derived 55 people.

Research Instruments

Dutch Musculoskeletal Questionnaire (DMQ) to self-report, anonymously, which examines individual factors, physical, and psychological environment that affect

the onset of musculoskeletal complaints related to work.

Nordic Questionnaire Body Map (NBM) the description of the body map showing the 28 items of the body, which is often experienced musculoskeletal complaints.

Data analysis

Descriptive univariate analysis (frequency distribution and percentages), bivariate Chi-Square and multivariate logistic regression.

RESEARCH RESULT

Univariate analysis

Physical Activity Factors

Table 1. Distribution of respondents by Physical Activity Factors

Physical Activity Factors	Total	%
a. Low risk	28	50,9
b. High risk	27	49,1
Total	55	100

Table 1. The number of 28 respondents or 50.9% with low risk and 27 respondents or 49.1% high risk.

Environment Factors

Table 2. Distribution of respondents by Environment Factors.

Environment Factors	Total	%
a. Low risk	39	70,9
b. High risk	16	29,1
Total	55	100

Table 2. The number of 39 respondents or 70.9 % with low risk and 16 respondents or 29.1 % high risk.

Individual Factors

Table 3. Distribution of respondents by Individual Factors.

Individual Factors	Total	%
a. Low risk	25	45,5
b. High risk	30	54,5
Total	55	100

Table 3. The number of 25 respondents or 45,5 % with low risk and 30 respondents or 54,5 % high risk.

Psychological Factors

Table 4. Distribution of respondents by Psychological factors

Psychological factors	Total	%
a. Low risk	39	65,5
b. High risk	16	34,5
Total	55	100

Table 4. The number of 39 respondents or 65,5 % with low risk and 16 respondents or 34,5 % high risk.

Bivariate Analysis

The relationship between physical activity factors with musculoskeletal complaints to Emergency Nurses (EN) in the Emergency Room (ER) at the Dr. Moewardi Hospital.

Table 6. Results of the analysis of the relationship between physical activity factors with musculoskeletal complaints

		Musculoskeletal complaints				<i>p</i>	<i>OR</i>	$p = RO / (1+RO)$
		Low		High				
		f	%	f	%			
Physical activity factors	Low	18	64,3	10	35,7	0,010	4,27	0,81
	High	8	29,6	19	70,4			
Total		26	47,3	29	52,7			

Table 6. it can be seen that the respondents were influenced by low physical activity, less experienced musculoskeletal complaints of 64.3% and the respondents were influenced by high physical activity, more experienced musculoskeletal complaints amounted to 70.4%. The Chi-square test $p = 0.010$ obtained values and $OR = 4.27$, so it can be concluded that there is a correlation

Musculoskeletal Complaints

Table 4. Distribution of respondents by Musculoskeletal Complaints

Musculoskeletal Complaints	Total	%
a. Low risk	26	47,3
b. High risk	29	52,7
Total	55	100

Table 5. The number of 26 respondents or 47,3 % with low risk and 29 respondents or 52,7 % high risk.

between physical activity with musculoskeletal complaints in nurses in the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses with high physical activity 4.27 times experienced musculoskeletal complaints compared to nurses who have lower levels of physical activity, so that the probability of a nurse who has high physical activity can suffer musculoskeletal complaints by 81%.

The relationship between environment factors with musculoskeletal complaints to Emergency Nurses (EN) in the Emergency Room (ER) at the Dr. Moewardi Hospital.

Table 7. Results of the analysis of the relationship between environment factors with musculoskeletal complaints

		Musculoskeletal complaints				<i>p</i>	<i>OR</i>	<i>p = RO / (1+RO)</i>
		Low		High				
		f	%	f	%			
Environment factors	Low	22	56,4	17	43,6	0,034	3,88	0,80
	High	4	25	12	75			
Total		26	47,3	29	52,7			

Table 7. known respondents influenced by environmental factors lower, less experienced musculoskeletal complaints and 56.4% of respondents were influenced by environmental factors higher, more experienced musculoskeletal complaints 75%. The Chi-square test $p = 0.034$ obtained and $OR = 3.88$, it can be concluded that there is a relationship between environmental factors with

musculoskeletal disorders in nurses in the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses exposed to 3.88 times in the environment experienced musculoskeletal complaints compared with nurses who are not exposed to the environment, so the probability of high physical activity nurses to experience musculoskeletal complaints by 80%.

The relationship between individual factors with musculoskeletal complaints to Emergency Nurses (EN) in the Emergency Room (ER) at the Dr. Moewardi Hospital.

Table 8. Results of the analysis of the relationship between individual factors with musculoskeletal complaints

		Musculoskeletal complaints				<i>p</i>	<i>OR</i>	<i>p = RO / (1+RO)</i>
		Low		High				
		f	%	f	%			
Individual Factors	Low	14	63,7	8	36,3	0,047	3,06	0,75
	High	12	36,4	21	63,6			
Total		26	47,3	29	52,7			

Table 8. Given influenced by individual respondents is low, less experienced musculoskeletal complaints, while 63.7% of respondents were influenced by the high individual, more experienced musculoskeletal complaints 63.6%. The Chi-square test $p = 0.047$ obtained and $OR = 3.06$, so it can be concluded that there is a correlation between individuals with musculoskeletal disorders in nurses in

the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses are influenced by high individual experiencing musculoskeletal disorders was 3.06 times compared with nurses who influence of individual factors is low, so that the probability of a nurse who is influenced by the high individual experiencing musculoskeletal complaints by 75%.

The relationship between psychological factors with musculoskeletal complaints to Emergency Nurses (EN) in the Emergency Room (ER) at the Dr. Moewardi Hospital.

Table 9. Results of the analysis of the relationship between psychological factors with musculoskeletal complaints

		Musculoskeletal complaints				<i>p</i>	<i>OR</i>	$p = RO / (1+RO)$
		Low		High				
		F	%	f	%			
Psychological factors	Low	22	59,5	15	40,5	0,009	5,13	0,84
	High	4	22,2	14	77,8			
Total		26	47,3	29	52,7			

Table 9. known psychological factors influenced the respondents were low, less experienced musculoskeletal disorders is 59.5% and the respondents are influenced by psychological factors higher, more experienced musculoskeletal complaints amounted to 77.8%. The Chi-square test p = 0.009 obtained value, so it can be concluded that there is a relationship between psychological factors with musculoskeletal disorders in nurses in the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses are influenced by 5.13 times higher psychological experience musculoskeletal complaints compared with nurses who influence psychological factors are low, so that the probability of a nurse who is influenced by high psychological experience musculoskeletal complaints by 84%.

Multivariate Analysis

Table 10. Result of Multivariate Analysis

		Variable	Koefisien	p	OR (IK95%)
Step 1		Physical activity factors	-.851	0,204	0,43 (0,12 – 1,59)
		Environmental factors	-.781	0,291	0,46 (0,11 – 1,92)
		Individual factors	-.591	0,369	0,55 (0,15 – 2,01)
		Psychological factors	-.973	0,195	0,38 (0,09 – 1,65)
		Constant	2.032	0,006	7,63
Step 2		Physical activity factors	-.868	0,191	0,42 (0,11 – 1,54)
		Environmental factors	-.988	0,162	0,37 (0,09 – 1,49)
		Psychological factors	-1.064	0,152	0,35 (0,08 – 1,48)
		Constant	2.022	0,007	7,55
Step 3		Environmental factors	-1.137	0,102	0,32 (0,08 – 1,25)
		Psychological factors	-1.474	0,029	0,23 (0,06 – 0,86)
		Constant	1.973	0,010	7,19

Table 10. Results of the final logistic regression multivariate analysis has two selected variables that really have a meaningful relationship with the variables that affect the musculoskeletal complaints that environmental factors and psychological factors. The strength of the relationship can be seen from indigo OR (EXP (B)). Statistical analysis showed that the value of environmental factors exp B = 0.32, meaning that environmental aspects have a 0.32 times greater influence in musculoskeletal complaints compared to the

psychological factor. Equations obtained from the statistical test results are as follows:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 \dots + b_nx_n$$

$Y = 1973 + (-1137)$ (Environmental factors) $+ (-1474)$ (Psychological factors)

The quality of the equation in terms of calibration have good calibration values and views of the quality equation in terms of discrimination have Area Under the Curve (AUC) by 73% so it medium valuable.

DISCUSSION

Univariate analysis

Physical activity factors

Based on the research results of 28 respondents or 50.9% low risk and 27 respondents or 49.1% high risk.

Physical activity factors include excessive muscle stretching, repetitive activities and work attitude is not natural. Exertion such as lifting, pushing, pulling, and withstand heavy loads, do the work continuously and use awkward posture can be the cause of musculoskeletal complaints and if it is not matched with the right breaks can lead to musculoskeletal injuries (Singh and Arora, 2010).

Environmental factors

Based on the research results of 39 respondents or 70.9% with low risk and 16 respondents or 29.1% high risk.

Environmental factors consist of temperature exposure temperature and vibration. Environment with cold temperatures reduce the ability of the hand to feel, function decline and reduced grip strength. Vibration in the body can reduce sensitivity and lead to unnecessary muscle contraction. Vibration due to machine or tool - a tool by hand can damage nerves and blood

vessels in the hands and arms (Makinen and Hassi, 2009).

Individual factors

Based on the results of 25 respondents or 45.5% low risk and 30 respondents or 54.5% high risk.

Someone who has aged above or equal to 35 years more at risk of musculoskeletal complaints compared with someone who has aged under 35 years. Women have a higher risk than men - men due to hormonal influences, so that women with more than 35 years of age and 3 times the risk of obesity coupled with smoking and fitness activities less (Bedu et al, 2013).

Psychological factors

Based on the research results of 39 respondents or 65.5% lower risk, while 16 respondents or 34.5% high risk.

Psychological factors such as workload, shift work and work stress is closely connected with sex. Women are more often affected by psychological conditions. Performance exertion woman and a man - very different men, in addition to the support of social and socio - economic also can affect a person's psychological state and can be a factor of exposure to the occurrence of musculoskeletal complaints (Wahlstedt et al, 2010).

Musculoskeletal complaints

Based on musculoskeletal complaints shows that 26 respondents or 47.3% with a low risk, while 29 respondents or 34.5% high risk.

World Health Organization explains that the complaint arises as a result of this work in addition to the manual handling of patients and weight, no doubt that the physical danger became the main factors of musculoskeletal complaints, besides other physical factors play a role or influence the work environment uncomfortable.

Bivariate analysis

The relationship between physical activity factors with musculoskeletal complaints

Based on the results of the study respondents were influenced by low physical activity, less experienced musculoskeletal complaints of 64.3% and the respondents were influenced by high physical activity, more experienced musculoskeletal complaints amounted to 70.4%. Of the Chi-square test $p = 0.010$ obtained values and $OR = 4.27$, so it can be concluded that there is a correlation between physical activity with musculoskeletal disorders in nurses in the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses with high physical activity 4.27 times experienced musculoskeletal complaints compared to nurses who have lower levels of physical activity, so that the probability of a nurse who has high physical activity can suffer musculoskeletal complaints by 81%.

Carugno (2012) mismatch between physical ability and workload can lead to musculoskeletal disorders. Factors commonly associated with musculoskeletal disorders excessive stretching of the muscles, repetitive activities which do not give the muscles time to recover, unnatural postures performed in a long time, duration and pressure. Excessive stretching contrary to the circulation causing fatigue and tissue damage. Use part of the body repeatedly to perform the activity increases the risk of musculoskeletal disorders due to not provide muscle relaxation. Resulting awkward posture muscles work harder and cause stress on the ligaments so that it will improve musculoskeletal complaints.

The relationship between environmental factors with musculoskeletal complaints

Based on the results of the study respondents were influenced by environmental factors lower, less experienced musculoskeletal complaints and 56.4% of respondents were influenced by environmental factors higher, more experienced musculoskeletal complaints 75%. Of the Chi-square test $p = 0.034$ obtained and $OR = 3.88$, it can be concluded that there is a relationship between environmental factors with musculoskeletal disorders in nurses in the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses exposed to 3.88 times in the environment experienced musculoskeletal complaints compared with nurses who are not exposed to the environment, so the probability of high physical activity nurses to experience musculoskeletal complaints by 80%.

Environmental factors such as temperature or temperature there and vibration affecting workers and lead to stress that affects the functioning of the organism and peripheral damage and central nervous system (Tint et al, 2013). Indoor temperature extremes and vibration caused from hand-tool increases the risk of musculoskeletal disorders if not using appropriate anti-vibration (Mbutshu et al, 2014).

The relationship between the individual factors with musculoskeletal complaints

Based on the results of the study respondents were influenced by individual factors are low, less experienced musculoskeletal complaints, while 63.7% of respondents were influenced by the high individual, more experienced musculoskeletal complaints 63.6%. Of the Chi-square test $p = 0.047$

obtained and $OR = 3.06$, so it can be concluded that there is a correlation between individuals with musculoskeletal disorders in nurses in the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses are influenced by high individual experiencing musculoskeletal disorders was 3.06 times compared with nurses who influence of individual factors is low, so that the probability of a nurse who is influenced by the high individual experiencing musculoskeletal complaints by 75%. Musculoskeletal complaints is influenced by factors from within the individual, especially age and sex (Sadeghian et al, 2014).

The relationship between psychological factors with musculoskeletal complaints

Based on the results of the study respondents were influenced by psychological factors are low, less experienced musculoskeletal disorders is 59.5% and the respondents are influenced by psychological factors higher, more experienced musculoskeletal complaints amounted to 77.8%. Of the Chi-square test $p = 0.009$ obtained value, so it can be concluded that there is a relationship between psychological factors with musculoskeletal disorders in nurses in the Emergency Room (ER) at the Dr. Moewardi Hospital, nurses are influenced by 5.13 times higher psychological experience musculoskeletal complaints compared with nurses who influence psychological factors are low, so that the probability of a nurse who is influenced by high psychological experience musculoskeletal complaints by 84%.

Christensen (2014) psychological factors are often the cause of all health complaints no exception musculoskeletal

complaints. High workload, job stress and shift work pattern that uses periodic replacement time resulting in impaired body o'clock. Extend the working time over longer working ability usually arise tendency to fatigue, illness, disease and accidents as well as dissatisfaction.

Multivariate analysis

The results of the study conducted by researchers showed from 4 independent variables studied, there are two variables that effect. After logistic regression analysis tested the most dominant factor is the environmental factor.

According to John (2007) Environmental factors that influence the vibration and microclimates. Excessive vibration causes pain in muscles, joints and internal organs causing nausea and trauma to the hands, arms, legs and feet. Vibration is measured by the direction, speed and frequency of the body. Meanwhile, excessive exposure to cold temperatures can reduce agility, sensitivity and strength of workers, so that the movements become slow, difficult to move, along with the decline in muscle strength. A comfortable temperature range is generally 68-74 degrees Fahrenheit and is influenced also by the physical workload with humidity between 20 to 60 percent.

In Magnavita study (2011) found the environment to be the dominant influence on hospital workers in Europe. The study showed that the greatest impact is the change in temperature (OR 2.73), noise and lighting (OR 2.22), and other complaints (OR 3.12). The study also reinforces previous research that states that there is a close relationship between environmental influences and the psychology of the musculoskeletal complaints.

Workplace environmental factors unfavorable conditions, increasing the risk of musculoskeletal disorders due to an increase in muscle tension or accumulation of stress reactions (Magnago, 2010).

Psychological factors influence the complex risk to the occurrence of musculoskeletal complaints though not always easy to identify clearly because the psychological condition of the working environment can affect the performance of personal feelings or group (Simoneau, 2008).

Research conducted Sadeghian (2014) explains that the stress is believed to be the major cause of symptoms that appear as a result of the working relationship with musculoskeletal disorders due to stressful work environment that can increase muscular tension or muscle that contribute to the improvement of musculoskeletal complaints. Smith et al. (2005) found that the prevalence of musculoskeletal complaints among hospital nurses in Korea amounted to 93.6% of nurses suffer from depression and 3.3 times greater risk of experiencing musculoskeletal complaints.

CONCLUSION

Based on the results of research on the factors that affect the musculoskeletal complaints about nurses in the ER (ER) at the Dr. Moewardi Hospital can be concluded that there is a significant relationship between musculoskeletal disorders with physical activity factors, environmental factors, individual factors and psychological factors. From the four factors that have a significant relationship, environmental factors become dominant influence on nurses followed by psychological factors.

SUGGESTION

1. For Dr. Moewardi Hospital:
Conduct education that includes nurses ER (ER) through training - training, workshops or seminars related to occupational diseases one musculoskeletal complaints.
2. For Nurses:
The information provided can raise awareness of the work environment of nurses that can musculoskeletal complaints in anticipation or avoided.
3. For Education Institutions:
Expected to be used as reading material and consideration of the need for the material or the health and safety for nursing students.
4. For Authors:
The author further understand the real picture of health research.

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