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The relationship between sitting posture and neck pain incidence in educational staff at the Universitas Muhammadiyah Surakarta

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ABSTRACT

Background: While working, many educational staffs complain about musculoskeletal problems due to sitting for an extended periods. Sitting posture affects neck pain because the pressure on the intervertebral disc is twice as great when sitting compared to standing. A good sitting posture is to relax momentarily because the muscles experience tension, reducing neck pain.

Methods: This cross-sectional study was carried out in December 2022 with a population of Educational Staff at the Universitas Muhammadiyah Surakarta who met the inclusion and exclusion criteria. The sampling technique in this study was purposive sampling, and 84 samples were obtained. The research data were collected by broadcast email, WhatsApp messages, and direct distribution to staff. Data were analyzed with SPSS 25.0 to determine the correlation between sitting posture and the incidence of neck pain.

Results: The Spearman Rho test analysis showed a *p*-value<0.05, indicating a significant relationship between sitting posture and neck pain among educational staffs at the Universitas Muhammadiyah Surakarta. In contrast, the correlation coefficient showed 0.452, indicating a moderate correlation between sitting posture and neck pain. The relationship was in positive value so that the level of neck pain was reduced.

Conclusion: The sitting posture is related to neck pain incidence among academic staff at the Universitas Muhammadiyah Surakarta. This study has an excellent impact on observing the factors contributing to neck pain incidence in academic staff at the Universitas Muhammadiyah Surakarta. In contrast, the further study requires finding the other aspects of neck pain in teams to minimize the occurrence of complaints in the future.

Keywords: Educational staff, neck pain, sitting posture.

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INTRODUCTION

While working, many educational staff complain about musculoskeletal problems due to sitting for an extended periods.[1,2] Musculoskeletal events in cases of back pain decreased with physiotherapy.[3] Sitting posture affects neck pain because the pressure experienced by the intervertebral disc is twice as tremendous when sitting than in the standing position.[4] A good sitting pattern is to relax for a while because the muscles experience tension to reduce neck pain.[5]

Staff with a sitting posture complain about one of the necks.[6] Musculoskeletal discomfort in the most experienced areas is neck with an incidence of 61.5%, back incidence at 59.6%, and waist incidence of 57.6%.[7]

Occupational health has a good effect on work productivity. This is continuous with the incidence of neck pain affecting the work productivity of educational staff at the Universitas Muhammadiyah Surakarta (UMS).[8] This is a decrease in muscle pain during Covid-19 compared to before the pandemic. This is because office staff work from home and are not predominantly sitting. The situation is improving, and the office staff's work begins on ordinary activities to allow neck pain.[9]

Risk factors are closely related to neck pain, including long duration when working, wrong body position, and tension in the neck muscles.[10] The duration of prolonged sitting above 2 hours is the main factor that causes neck and arm pain.[11] The incidence of neck pain increases with age and regular use of computers or laptops 4 hours per day or more.[12] Postur sitting is one of the causes of neck arm pain[13]. Sitting interspersed with activities every 30 minutes, such as standing, not experiencing neck pain.[14] Long duration and stooped position in working are the main factors of neck pain.[15]

Sitting upright is a good position because it reduces the load on the lumbar and efficiently distributes the contact of the neck muscles.[16,17] The recline position at an angle of 135° reduces discus pressure by about 25%.[18] The bent position, when the neck or trunk is bent, makes the moment of extension necessary to maintain posture, and the spinal extensor needs to be activated.[4,19] Neck pain occurs due to incorrect positioning and static

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posture.[20] Sitting positions are static and dynamic at work, raising complaints.[21]

Analysis of the Relationship between Sitting Patterns and the incidence of neck pain aims to find out how significant the incidence of neck pain is so that if the incidence is too high, it will interfere with the performance and productivity of UMS staff.[8] Sitting posture with a prevalence of 20% of staff in a reclining sitting position experiencing neck pain.[15] Meanwhile, during the pandemic, the prevalence of neck pain with a non-slouched sitting posture was 11.2% experiencing neck pain.[9] This has resulted in a decrease in staff productivity improving. Work health has a positive and significant effect on work productivity. This is continuous with the incidence of neck pain affecting staff work productivity.[8] So, the importance of this analysis is whether the relationship between Sitting Posture and the incidence of neck pain in UMS staff will increase again when entering the new average period or decrease so that it affects the workforce of UMS staff.

METHODS

The research method is a cross-sectional study taking a sample of 84 respondents. The design of this study is observational analytic, which relates variables to find a correlation/relationship. Observational research is research conducted by researchers with only observation without giving action to the variables to be studied. Analytical research leads to problems, facts, or events in a structured and accurate manner related to the overall characteristics or specific areas.[22]

The changed sitting position was analyzed using one of the Quick Exposure Check (QEC) questionnaire items, with a value of 0.94 which means high reliability. The reliability and validity value of the Indonesian version of the neck disability index modification questionnaire is 0.895, which means increased reliability in mechanical neck pain.[23] Neck pain with the NDI scale on neck muscle flexion activity was significantly associated. This is in line with the sitting position, where there is a change in the neck position.[24]

The UMS staff population in 2014 amounted to 200 employees.[25] The population of this study is the education staff at the Universitas Muhammadiyah Surakarta in 2022 which amounts to 356 people. There were 84 samples with the sampling technique taken in this study, namely purposive sampling, by identifying the incidence of neck pain in educational staff at the UMS. Data collection using email broadcasts, WhatsApp messages, and direct dissemination to staff from December 12 to 31, 2022. The number of samples taken was only 84 respondents because many did not want to fill out the questionnaire. The selection process for this research sample takes the inclusion criteria: 1) men and women; 2) work a lot by sitting; 3) Work duration of 4 hours or more. As for the exclusion criteria in this study, namely: 1) Staff who have a history of injury to the neck area; 2) Not willing to be a respondent.

The sample data analysis used a variable spearman rho correlation test with measuring instruments for sitting posture using quick exposure check (QEC) and neck pain using neck disability index (NDI). The Ethics Committee of Dr. Soedjono Magelang approved this research on November 21, 2022, with the number 083/EC/XII/2022.

RESULTS

The characteristics of respondents can be seen in Table 1, which contains personal and work data. These characteristics include gender, age, length of service, duration of employment, workload, and work activity.

The pattern of staff work activity can be seen in Table 2 relating to a sitting posture. The work activity of respondents from each institution can be seen in Table 2. The neck pain and sitting pattern related to the distribution of data can be seen in Table 3. In Table 3, data can be described on the pain level, posture, and sitting pattern of the educational staff at the UMS. The normality test of the data used is the *Kolmogorov-Smirnov* test presented in Table 4. The normality test used sitting posture data and NDI scale pain scores.

Table 4 data shows neck disability index pain data and abnormally distributed Sitting Posture data (significant 2-tailed p-value<0.05), so the *Spearman rho* test can be done to determine the relationship between the 2 variables. Furthermore, the relationship test can be carried out in Table 5.

Table 5 shows the data of the *spearman rho* test. The relationship test results with measuring instruments for sitting posture using QEC and neck pain using the NDI are correlated with a correlation coefficient of 0.452, p-value= 0.000. The value of significant 2-tailed < 0.05 shows the relationship between the sitting posture of education staff within the UMS. The correlation coefficient of 0.452 indicates that the value of closeness is sufficient. Similarity (correlation coefficient 0.452) is positive, reducing neck pain.

Table 1. Characteristics of Respondent Data.

Characteristics of Respondent Data	n	%
Personal Data		
Gender		
Male	51	60,7
Female	33	39,3
Age (years)		
≥35	51	60,7
<35	33	39,3
Employment Factor		
Period of Service		
More than 3 years	70	83,3
Less than 3 years	14	16,7
Duration of Work		
4-6 hours per day	21	25,0
>6 hours per day	63	75,0
Workload		
Low	3	3,6
Moderate	59	70,2
High	22	26,2
Frequent work activities		
Sitting (inside the office)	25	29,8
Erratic (sometimes sitting, sometimes standing)	56	66,7
Often outside the office (such as delivering mail, taking care of files etc.)	3	3,6

DISCUSSION

Data for gender is more men (60.7%) than women who complain of neck pain. This situation follows previous research that states neck pain can occur in workers, with men at 72.1% and women at 27.9%.[26] Gender influences the incidence of neck pain because the work is relatively more complex. Aged over 35 years (60.7%), more people experience neck pain, so following previous research, the age group of 35-49 years has a higher risk of neck pain.[27] This risk arises because the working age of education staff enters an aging period where there is a change in the ability of the immune system to decrease.

As in previous studies, factors of work time, duration, and workload as a cause of neck pain are closely influential.[12] Faculty of Health Sciences and the Faculty of Pharmacy staff have erratic or mobile sitting postures but still experience neck pain. This is a result of a more complex performance.[28] Meanwhile, in the Institute for the Development of Scientific Publications and Textbooks staff, relatively many sit and complain of neck pain. But few, compared to the Faculty of Health Sciences and the Faculty of Pharmacy staff, sit erratically, but complaints arise. With erratic sitting, more complaints appear than sitting continuously in the office.

Similar to the previous study, we found a relationship between the sitting posture and the neck pain of education staff at the UMS, with a correlation coefficient of 0.452.[12] A sitting perspective is entirely associated with 20% pain.[15] During the pandemic, there was an increase in musculoskeletal events due to changes in physical activity.[29] There was no difference after the pandemic, the same staff activity began to enter the new normal, and the level of neck pain decreased.[9,15] Academic staff at the UMS have more erratic work activities (sometimes sitting, sometimes standing). This is inconsistent with previous studies where sitting is a significant factor in neck-arm pain.[13] As shown in Table 2, staff who do not have neck pain complaints are more (53.6%) than those who have complaints despite the work posture of sitting leaning, upright, and bending over. This happens because sitting patterns change temporarily. After all, the muscles experience tension.

When the neck or trunk is bent, the moment of extension is necessary to maintain posture, and the spinal extensor needs to be activated.[4] Neck and back are closely related to prolonged muscle contractions. Therefore, active moments produced by muscles may be related to neck and back pain. On the other hand, the joint reaction force calculated in this study is the sum of bone-on-bone (BB) force and muscle force. The contact of two bones generates the BB force. Sitting in a slumped posture for a long time can cause joint pain because the normal BB force increases the disc pressure.[19]

An upright position is a correct position in sitting.[18] Large angle of about 20° view flexion of the craniovertebral joint (Cranio vertebra) is the most efficient position. In comparison, the angle of view of craniovertebral joint flexion of 0°, 40°, and 60° shows altered muscle activation patterns, such as joint instability caused by weakness of the ligament capsule and delayed onset of postural muscle. Weakness of the neck flexors, longus capitis, and longus colli. Hyperactivity of the superficial-sternocleidomastoid (SCM) muscle and the anterior scalenus. Furthermore, increased tension in the suboccipital muscles and increased muscle fatigue due to the weakening of the neck flexor muscles resulting in neck pain. This means that physiotherapy plays a vital role in the posture of the chest pattern related to neck pain.[17]

This study has limitations on QEC assessments only through questionnaires. The weakness of the questionnaire is whether the respondent understands the content and fills in so seriously that the researcher does not monitor it. In addition, QEC should involve direct observation by researchers, not only from respondents who fill in.

Table 2. Work Activities of Respondents.

Departments of Universitas Muhammadiyah Surakarta	Sitting inside the office		Erratic (sometimes sitting, sometimes standing)		No pain		Mild-moderate pain	
	n	%	n	%	n	%	n	%
Bureau of Academic Administration/ Bureau of Financial Administration	1	14,3	6	85,7	6	85,7	1	14,3
University Assets Bureau	1	25	3	75	2	50	2	50
Bureau of Cooperation and International Affairs			1	100	1	100		
Human Resource Development Agency	3	37,5	5	62,5	6		2	25
Faculty of Teacher Training and Education	1	25	3	75	2	50	2	50
Faculty of Communication &; Informatics			1	100			1	100
Laboratory of Faculty of Pharmacy			1	100			1	100
Institute of Language and General Sciences	1	33,3	2	66,7	1	33,3	2	66,7
Institute for Community Service and Development of Union	1	100			1	100		
Institute for the Development of Pondok Al-Islam and Kemuhammadiyahan	1	100			1	100		
Institute for the Development of Scientific Publications and Textbook[s]	5	83,3	1	16,7	2	33,3	4	66,7
Library Librarian and Digital La1nan Center			3	100	1	33,3	2	66,7
Staff Learning Innovation Bureau			1	100			1	100
Internal Auditor Bureau Staff			1	100	1	100		
The staff of the Faculty of Islamic Religion	4	80	1	20	4	80	1	20
The staff of the Faculty of Business Economics	1	20	4	80	3	60	2	40
Faculty of Pharmacy Staff	3	30	7	70	5	50	5	50
Faculty of Geography Staff			1	100			1	100
Faculty of Health Sciences Staff	1	12,5	7	87,5	3	37,5	5	62,5
Faculty of Medicine Staff			1	100	1	100		
Faculty of Psychology Staff	2	33,3	4	66,7	4	66,7	2	33,3
Faculty of Engineering Staff			5	100	1	20	4	80
Rectorate Staff	1	100					1	100

Table 3. Neck Pain and Sitting Patterns.

Neck Pain and Sitting Patterns	Summary	
	n	%
Neck Disability Index (NDI)		
No pain	45	53,6
Light pain	29	34,5
Consistent pain	9	10,7
Quick Exposure Check (QEC) Sitting Posture		
Sit hunched over	51	60,7
Sit up straight	31	36,9
Sit back	2	2,4

Table 4. Data Normality Test.

	Kolmogorov-Smirnov[a]		
	Statistic	df	*P*-value
Nyeri Neck Disability Index (NDI)	.328	84	.000
Quick Exposure Check (QEC) Sitting Posture	.386	84	.000

a, lilliefors significance correction

CONCLUSION

There was a relationship between sitting posture and neck pain among the education staff at the UMS with sufficient scores. This study had a good impact, so that neck pain is reduced in UMS staff, and there is a need for further research to find the causes of neck pain in staff so that they can minimize the occurrence of complaints in the future.

ETHICAL CLEARANCE

The Research Ethics Commission, Dr. Soedjono Hospital Magelang stated that this research is ethically feasible with number 083/EC/XII/2022.

CONFLICT OF INTEREST

This study has no conflict of interest.

FUNDING

None.

Table 5. Relationship Test.

			Nyeri Neck Disability Index (NDI)	Quick Exposure Check (QEC) Sitting Posture
Spearman's rho	Nyeri Neck Disability Index (NDI)	Correlation Coefficient	1.000	.452**
		Sig. (2-tailed)	.	.000
		N	84	84
	Quick Exposure Check (QEC) Sitting Posture	Correlation Coefficient	.452**	1.000
		Sig. (2-tailed)	.000	.
		N	84	84

**, correlation is significant at the 0.05 level (2-tailed).

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AUTHOR CONTRIBUTIONS

BLP prepares study design and data collection and compiles manuscripts; The AP directs data collection and revises the manuscript.

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