International Journal Of Health, Engineering And Technology (IJHET) *E-ISSN 2829 - 8683*
Volume 5, Number 1, May 2026, *Page. 1283 - 1287*
Email : editorijhess@gmail.com

The Relationship Between Driving Duration And Seating Position And Complaints Of Lower Back Pain Among Minibus Drivers At The Beriman Wilken Terminal In Tomohon

Angel Sharon Margaretha Sinulingga[1)], Theo Mautang [2)], Richard A Palilingan[3)], Lucyana Pongoh[4)], Jonesius E Manoppo[5)], Jilly Toar[6)]
[1,2,3,4,5,6)] Public Health Program, Manado State University

*Corresponding Author
Email : angelsharonmargaretha@gmail.com

Abstract

Lower back pain is commonly experienced by minibus public transportation drivers, which is believed to be influenced by the duration of driving and non-ergonomic seating positions. This study aims to determine the relationship between driving duration and sitting position and complaints of lower back pain among minibus public transport drivers at the Beriman Wilken Terminal in Tomohon. A cross-sectional observational study was conducted on 41 drivers. Data were collected via a questionnaire and an assessment of sitting posture using the RULA method. Chi-square test results indicated a significant association between driving duration and lower back pain complaints ($p = 0.004$) as well as between sitting posture and lower back pain complaints ($p < 0.000$). The majority of drivers drove more than 8 hours per day and had non-ergonomic sitting positions, which contributed to lower back pain complaints.

Keywords: ***Driving Duration, Sitting Position, Lower Back Pain, Public Transportation Drivers.***

INTRODUCTION

Low Back Pain is one of the neuromusculoskeletal disorders that are very much experienced by the community. This condition causes limited movement and also the inability to do activities. Low back pain is not a condition that can cause death, but it causes a person to be suboptimal in carrying out their roles in the work, family, and community environment. Some other factors that can cause low back pain complaints include age, physical activity, working period, posture deformities at work, and having a history of back trauma.

The prevalence of low back pain according to data from WHO (2020) states that low back pain affects 619 million people worldwide, the number of cases is estimated to increase to 843 million cases by 2050 which is partly due to population expansion and aging. Indonesia is one of the industrial countries with a fairly high incidence of low back pain. The prevalence of low back pain in Indonesia is estimated to be between 7.6% and 37%. There are 26.74% of the population aged 15 years and above who suffer from lower back pain disorders (Susanti & Wulandari, 2024). Based on Basic Health Research data in 2018, the prevalence of musculoskeletal diseases in North Sulawesi was reported to be 8.35%.

In the Tomohon market, many work as public transportation drivers. Based on initial surveys and interviews with 5 angkot drivers, long driving and poor sitting positions while working are at risk of experiencing low back pain complaints. From the results of interviews with 5 angkot drivers, 3 of them experienced low back pain.

RESEARCH METHODS

This study is a quantitative research that is observational, with a cross-sectional approach. This study aims to determine the relationship between the independent variable (independent variable) of driving time and sitting position with the bound variable (dependent variable) of low back pain complaints in Tomohon City public transportation drivers in 2025. The population in this study is 41 people from the Tomohon Faith Market public transportation driver. The sample in this study was 41 using total sampling. Total Sampling is a sampling method in which the number of samples is equal to the existing population. Sugiyono also explained that if the population is less than 100, then the entire population can be used as a sample in the study (Roflin and Liberty, 2021) so that the sample in this study is 41 people.

Research instruments are methods used to measure and collect data on scientific papers. Research instruments are very important because they can affect the validity of the data used in the research. The instruments in this study are in the form of a questionnaire consisting of a low back pain questionnaire with a value of r (a=0.89) developed by Kusuma (2022) with the title Relationship between Workload and the Incidence of Low Back Pain in Nurses at Wangaya General Hospital, Denpasar City 2022, the RULA questionnaire used to find out the sitting position and the long driving questionnaire developed by Hardy (2020) with the title Factors Related to Lower Back Pain Complaints In The driver of PT. Putra Nusa Mulya in 2020.

Primary data is data taken by researchers themselves. Primary data in this study was obtained through observation and direct interviews with respondents using questionnaires. Secondary data is data used to support research such as the number of city transportation drivers (angkot) in Tomohon City. Bivariate analysis was performed to see the relationship between independent variables and dependent variables using the Chi Square test with a 95% confidence degree.

RESULTS AND DISCUSSION

The results of the research that have been obtained by researchers at the Wilken Tomohon Iman Terminal, regarding the Long Driving Relationship, Sitting Position with Lower Back Pain Complaints in Wilken Tomohon Terminal Angkot Drivers are as follows:

Table 1. Frequency Distribution Based on Respondent Age

Age	(n)	(%)
26-35	5	12.2
36-45	10	24.4
46-59	14	34.1
60-75	12	29.3
Total	41	100.0

Based on table 1, it was obtained that most of the respondents were in the age range of 26-35 years amounting to 5 people (12.2%) and 36-45 years old amounting to 10 people (24.4%) and 46-59 years old amounting to 14 people (34.1%) and 60-75 amounting to 12 people (29.3%).

Table 2. Frequency Distribution of Long Driving Categories

Long Driving	(n)	(%)
Min 1-8 hours	6	14.6
Max >8 hours	35	85.4
Total	41	100.0

Based on table 2, respondents with a minimum driving time category of 6 people (14.6%), while those with a maximum driving time were 35 people (85.4%) out of a total of 41 respondents.

Table 3. Frequency Distribution of Low Back Pain Categories

Low Back Pain	(n)	(%)
Lightweight	6	14.6
Medium	13	31.7
Height	22	53.7
Total	41	100.0

Based on table 3, it is known that most of the respondents experienced low back pain in the high category, namely 22 people (53.7%), while the medium category was 13 people (31.7%), and mild as many as 6 people (14.6%).

Table 4. Frequency Distribution Sitting Position Category

Sitting Position		(n)(%)
Low	5	12.2
Height		3687.8
Total		41100.0

Based on table 4, it is known that most of the respondents had a high sitting position, which was 36 people (87.8%), while a low sitting position was only 5 people (12.2%).

Table 5. Chi Square Test Results The Relationship Between Driving Time and Low Back Pain (NPB)

Old Driving	NPB								P Value
	Lightweight n	%	Medium n	%	Height n	%	Total	%	
Maximum	0	0.0	13	37.1	22	62.9	35	100.0	0.000
Minimum	6	100	0	0.0	0	0.0	6	100.0	

Based on table 5, of the total of 41 respondents, it is known that 35 respondents with a maximum driving time, as many as 62.9% experienced high low back pain, and there were 37.1% (13 respondents) experiencing moderate pain. Meanwhile, of the 6 respondents with a minimum driving time, all (100%) only experienced mild pain.

The results of the Chi-Square test showed a value of $p = 0.000$ (< 0.05), so it can be concluded that there is a significant relationship between the length of driving and the incidence of low back pain in drivers at the Wilken Tomohon Faith Terminal.

International Journal Of Health, Engineering And Technology (IJHET) E-ISSN 2829 - 8683
Volume 5, Number 1, May 2026, Page. 1283 - 1287
Email : editorijhess@gmail.com

Table 6. Chi Square Test Results The Relationship Between Sitting Position and Low Back Pain (NPB)

Position Sit	NPB								P Value
	Lightweight n	%	Medium n	%	Height n	%	Total	%	
Risky Low	3	60.0	2	40.0	0	0.0	5	100.0	0.004
Risky Height	3	8.3	11	30.6	22	61.1	36	100.0	

Based on table 6 out of a total of 41 respondents, it is known that 36 respondents with high-risk sitting positions, as many as 61.1% experienced severe low back pain, 30.6% experienced moderate pain, and only 8.3% experienced mild pain. Meanwhile, of the 5 respondents with a low-risk sitting position, most (60.0%) experienced mild pain, and 40.0% experienced moderate pain, with no one experiencing severe pain.

The results of the Chi-Square test showed a value of p = 0.004 (< 0.05), so it can be concluded that there is a significant relationship between the sitting position and the incidence of low back pain in drivers at the Wilken Tomohon Faith Terminal.

CONCLUSION

Based on the results of the research and discussion of the relationship between Long Driving, Sitting Position with Lower Back Pain Complaints in Wilken Tomohon Terminal Angkot Drivers, it can be concluded: There is a significant relationship between driving time and low back pain in Wilken Tomohon Terminal Faith Angkot drivers, with p value = 0.000<0.05. There was a significant relationship between sitting position and low back pain in Wilken Tomohon Terminal Faith angkot drivers, with p value = 0.004<0.05

REFERENCES

Afif, M., Hartono, Y., & Hidayat, R. (2021). Hubungan lama mengemudi dengan keluhan low back pain pada sopir truk antar kota CV Semeru Putra Semarang. Jurnal Kesehatan Masyarakat, 9(2), 112–120.

Ahmed, S., Rahman, H., & Yusuf, M. (2022). Gender differences in muscle physiology: Implication for musculoskeletal disorders. International Journal of Human Physiology, 14(1), 33–41.

Bantoro, S. J., Prihatin, M. Y., & Pratama, S. B. (2024). Hubungan lama kerja, postur kerja, dan jenis kelamin dengan kejadian low back pain pada pekerja weaving PT Apac Inti Corpora. Jurnal Kesehatan Kerja Indonesia, 12(1), 45–55.

Fahreza, I. (2022). Hubungan durasi duduk saat mengemudi dengan keluhan musculoskeletal disorders pada supir bus Terminal Amplas. Jurnal Ergonomi & Transportasi, 5(1), 12–20.

Fakar, L., Ridwan, S., & Nurhadi, T. (2023). Hubungan lama mengemudi dengan kejadian low back pain pada sopir DAMRI Mataram. Jurnal Kesmas Nusantara, 8(3), 145–154.

Hardy, N. R. (2020). Ergonomic sitting posture and driving-related musculoskeletal complaints among public transport drivers. Journal of Occupational Ergonomics, 6(2), 77–85.

Hutabarat, T. (2021). Ergonomi dan penerapannya di lingkungan kerja. Pustaka Mandiri.

Imanda, R. (2020). Penyakit akibat kerja dan faktor risikonya. Jurnal K3 Indonesia, 14(1), 25–34.

Irsadioni, D. (2021). Pengaruh posisi duduk dan lama kerja terhadap nyeri punggung bawah pada supir travel X di Kota Malang (Skripsi, Universitas Brawijaya).

Khalil Gibran, M., Setiawan, A., & Putri, D. (2020). Body mass index and its association with low back pain among adults. Indonesian Journal of Spine Health, 4(2), 55–63.

Kojongian, M. T., Lomboan, E. B., Palilingan, R. A., Salam, I., & Sattu, Y. (2025). Hubungan Antara Umur Dan Masa Kerja Dengan Keluhan Musculoskeletal Disorders (MSDs) Pada Pekerja Rumah Panggung di Kelurahan Woloan 2 Kecamatan Tomohon Barat Kota Tomohon. Jurnal Kolaboratif Sains, 8(12), 8876-8886.

Leni, A., & Triyono, T. (2018). Hubungan usia dengan keluhan muskuloskeletal pada pekerja manual handling. Jurnal Fisioterapi Indonesia, 6(1), 20–27.

Maizura. (2015). Masa kerja dan risiko keluhan musculoskeletal pada pekerja pabrik. Dalam Wati, M. (2020). Jurnal Kesehatan Kerja, 8(2), 33–40.

Megawati, S. (2020). Durasi kerja dan pengaruhnya terhadap keluhan nyeri punggung bawah pada pekerja sektor informal. Jurnal Kesehatan Olahraga, 3(2), 89–97.

Mulfianda, A., Rahmawati, S., & Darmawan, Y. (2021). Gender differences and risk of musculoskeletal disorders in workers. Journal of Musculoskeletal Science, 7(1), 25–34.

Nugroho, H. (2020). Risiko gangguan musculoskeletal pada pengemudi transportasi umum. Jurnal Keselamatan Kerja, 9(3), 180–188.

Nyoman, I. G. (2022). Kuesioner Nyeri Punggung Bawah (adaptasi dari The Pain and Distress Scale oleh William J. K. Zung).

Prihatin, M. Y., Yusuf, A., & Ramlan, D. (2020). Efektivitas penerapan kesehatan kerja pada sektor transportasi dan risikonya terhadap musculoskeletal disorders. Jurnal K3 & Ergonomi, 13(1), 14–27.

Rangkang, J. R., Mautang, T., & Paturusi, A. (2021). Hubungan Antara Pelaksanaan Program Kesehatan Keselamatan Kerja Dengan Kejadian Kecelakaan Kerja Pada Pt Cahaya Nataan Di Ratahan 2020. Physical, 2(1), 123-130.

Rudiana, T. (2019). Pengaruh jenis kelamin terhadap risiko low back pain pada pekerja industri. Jurnal Teraputik Klinis, 4(2), 66–73.

Sangaji, A., Hamzah, F., & Lolo, T. (2020). Hubungan usia dengan keluhan musculoskeletal pada tenaga kerja sektor informal. Jurnal Kesehatan Masyarakat, 12(1), 58–66.

Soeradji Tirtonegoro Hospital. (n.d.). Penyebab dan mekanisme nyeri punggung bawah. Departemen Promosi Kesehatan RSUP Dr. Soeradji Tirtonegoro.

Sugathot, M., Alfiansyah, R., & Putra, L. (2020). Duduk statis dan risiko nyeri punggung bawah pada pekerja transportasi. Jurnal Ergonomi Modern, 5(2), 43–50.

Suma'mur. (2014). Higiene perusahaan dan keselamatan kerja. Sagung Seto.

Susanti, D., & Wulandari, R. (2024). Prevalensi low back pain di Indonesia berdasarkan Riskesdas. Jurnal Epidemiologi Nasional, 15(1), 30–40.

Undang-Undang Republik Indonesia Nomor 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan.

Wati, M. (2020). Masa kerja dan keluhan otot rangka pada pekerja: Review. Jurnal Kesehatan Kerja Nusantara, 7(2), 91–98.

World Health Organization. (2020). Low back pain global health estimates. https://www.who.int