IJCOM 2022 March;1(3):154-61

Chronic Lower Back Pain and Its Relationship with Vibration Exposure and Sitting Duration; A Cross-Sectional Study Among Commercial Motorcycle Driver

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Abstract

Background: Lower back pain (LBP) complaints are a health issue that may lead to restrictions on work activities. Motorcycles vibrations and long sitting duration on the motorcycles can cause chronic lower back pain complaints. Base motorcycles drivers receive motorcycles vibration exposure while riding a motorcycle. With the large number of base motorcycles drivers in Indonesia, the specific health problems (LBP complaints) in this group need to be examined.
Methods: This research method uses a cross sectional study design to examine the relationship of motor vibration exposure and length of sitting to chronic low back pain with sampling technique used is Consecutive sampling. Consecutive sampling is a way of taking samples by selecting samples that meet the inclusion criteria until a certain time period so that the number of samples is met. The sampling period in this study is 2 days. The variables that measured were chronic lower back pain complaints, vibration, long sitting time, age, IMT, smoking, and working time. Data analysis using SPSS Statistics version 25.0.
Results: A total of 95 subjects were included in this study. Based on Fisher's test, the result of the correlation of chronic lower back pain complaints with motor vibrations > 0.5 m/s2 was obtained p = 0.102; OR = N / A). While for long sitting time of >4 hours result in p = 0.717; OR 0.85; CI 95% = 0.34-2.09. There is no difference in age-related chronic lower back pain complaints. At age> 35 years of age p = 0.722; OR 1.57; CI 95% = 0.31-7,9. No significant association between IMT and chronic lower back pain was found. In the IMT group> 25, p = 0.103 was obtained; OR 2.14; 95% CI = 0.85-5.36. There was no significant difference in chronic lower back pain complaints based on smoking status, where smoking group had p = 0.451; OR 1,45; CI 95% = 0.55-3.78. According to the Fisher test, there was no difference in chronic lower back pain complaints based on working age, where groups with> 4 years of work had a p = 0.908 value; OR 1.07; CI 95% = 0.31-3.91.
Conclusion: In this study the hypothesis was rejected. There is no association between motorcycles vibration exposure and the occurrence of chronic lower back pain complaints in the base motorcycles driver in Bekasi city. There is no association long sitting time with the occurrence of chronic lower back pain complaints in the base motorcycles driver in Bekasi city.
Keywords: Motorcycles vibration, sitting duration chronic low back pain.

Abstrak

***Latar belakang**: Keluhan nyeri punggung bawah (LBP) adalah masalah kesehatan yang dapat menyebabkan pembatasan kegiatan kerja. Getaran sepeda motor dan lama duduk pada sepeda motor dapat menyebabkan nyeri punggung bawah kronis. Pengendara ojek pangkalan menerima paparan getaran sepeda motor saat mengendarai sepeda motor. Dengan banyaknya pengemudi sepeda motor pangkalan di Indonesia, masalah kesehatan khusus (LBP) dalam kelompok ini perlu diteliti.*
***Metode**: Metode Penelitian ini menggunakan desain studi cross sectional untuk meneliti hubungan pajanan getaran motor dan lama duduk terhadap kejadian keluhan nyeri punggung bawah kronik dengan teknik pengambilan sampel yang digunakan adalah Consecutive sampling. Consecutive sampling adalah cara pengambilan sampel yang dilakukan dengan cara memilih sampel yang memenuhi kriteria inklusi sampai kurun waktu tertentu sehingga jumah sampel terpenuhi. Kurun waktu pengambilan sampel dalam penelitian ini selama 2 hari. Variabel yang diukur adalah nyeri punggung bawah kronis, getaran, lama duduk, usia, IMT, merokok, dan waktu kerja. Analisis data menggunakan SPSS Statistics versi 25.0.*
***Hasil**: Sebanyak 95 subjek dilibatkan dalam penelitian ini. Keluhan nyeri punggung bawah kronis dengan getaran motorik > 0,5 m / s2 diperoleh p = 0,102; OR = N / A). Sedangkan untuk waktu duduk lama > 4 jam menghasilkan p = 0,717; OR 0,85; CI 95% = 0,34-2,09. Tidak ada perbedaan dalam keluhan nyeri punggung bawah kronis terkait usia. Pada usia>35 tahun p = 0,722; OR 1,57; CI 95% = 0,31-7,9. Tidak ditemukan hubungan signifikan antara IMT dan nyeri punggung bawah kronis. Pada kelompok IMT> 25, p = 0,103 diperoleh; OR 2,14; 95% CI = 0,85-5,36. Tidak ada perbedaan yang signifikan pada keluhan nyeri punggung bawah kronis berdasarkan status merokok, di mana kelompok merokok memiliki p = 0,451; OR 1,45; CI 95% = 0,55-3,78. Tidak ada perbedaan keluhan nyeri punggung bawah kronis berdasarkan usia kerja, di mana kelompok dengan >4 tahun kerja memiliki nilai p=0,908; OR 1,07; CI 95% = 0,31-3,91.*
***Kesimpulan:** Dalam penelitian ini hipotesis ditolak. Tidak ada hubungan antara paparan getaran sepeda motor dan terjadinya nyeri punggung bawah kronis pada pengemudi sepeda motor pangkalan di kota Bekasi. Tidak ada hubungan lama duduk dengan terjadinya nyeri punggung bawah kronis pada pengemudi motor di kota Bekasi.*
***Kata kunci**: Getaran sepeda motor, durasi duduk, nyeri punggung bawah kronis.*

Background

Lower back pain complaints are a very common world health issue, which results in restriction of activity as well as absence of work. Many factors are associated with lower back pain complaints such as body mass index (IMT), height, exercise habits, work time, work position, and workload.[1] The average human spends a third of his life at work. The increasing number of workers, including motorcycles drivers, increase the incidence lower back pain complaints. Lower back complaints is not a disease or diagnosis but is a term for pain that is felt in certain anatomical areas of the human body with various variations in the duration of pain. Based on The Global Burden of Disease 2010 Study (GBD 2010) 1 of 291 diseases studied, Lower back pain complaints are the biggest contributor to global disability. Base motorcyles drivers have risk of being exposed to physical factors when working, namely the vibration produced by the engine motor. The type of vibration received by the base motorcycle driver is a whole-body vibration or whole body vibration. [2]

The whole-body vibration on the base motorcycle driver can have several unfavorable effects on health where one of them is a complaint of lower back pain. This risk increases when the base motorcycle driver exposed to high, frequent and regular vibrations. In addition to vibration, sitting duration also has a share in the emergence of lower back pain complaints. Lower back pain do not cause death, but cause individuals who experience it to be unproductive so that it will cause a very large economic burden for individuals, families, communities, and government. According to WHO, lower back pain can be caused by various musculoskeletal diseases, psychological disorders and wrong mobilization. Based on the duration of complaints experienced, lower back pain can be divided into acute lower back pain and chronic low back pain. This study aimed to find the relation of motorcycles vibration exposure and sitting duration to chronic lower back pain complaints.[3]

Methods

This study uses cross sectional /cross-section study design to identify the relationship of motor and long-term motor exposure to chronic lower back pain complaints. The research was conducted in the city of Bekasi, West Java around Bekasi station. The study was conducted in February 2020, and approved by FKUI Ethics Committee, Number 19-12-1437/2020. The target population of this study was the base motorcycles drivers in Indonesia, while the target population was the driver of the base near Bekasi city station, West Java. The sampling technique used in this study is Consecutive sampling. by selecting a sample that meets the inclusion criteria for a certain period of time until the sample size is met.[4] It is known that the number of base motorcycle drivers around Bekasi City station numbered 200 subject and all of them were invited to be willing to take part in the research sample. The invitation was distributed as many as 200 invitations and those who came and were willing to be sampled were 106 people and 94 other motorcycle drivers did not come because they were on duty carrying passengers in the field. From the 106 subjects, 10 were excluded because they were < 20 years old or > 60 years old and 1 person had a history of falling from a motorbike in 2015 and complained of spinal disorders. There were 95 subjects who met the inclusion and exclusion criteria and were willing to take part in the study. Primary data were obtained through questionnaire filling, height/weight measurements and physical examination done by medical doctors, while for motor vibration measurement using vibrationmeter and done by certificate industrial hyginiest. The way to measure how long a motorcycle driver sits on a motorbike uses a logsheet that contains the date of charging and the length of sitting every hour on the motorbike in the last 24 hours. The process of selecting prospective respondents starts with providing information about the aims and objectives of the study. Respondents who were willing to come filled out an informed consent questionnaire were then explained the procedure for filling out the questionnaire. Variables in this study are vibration, sitting duration, age, IMT, smoking, and working time. While analysis is used in this study are univariate and bivariate analysis. Multivariate analysis is not attached to the results of this study due to R-square value of the main variables studied namely vibration and sitting duration obtained only 5% so there is no significant relationship.

Result

The implementation of the research began with the recruitment of subjects by consecutive sampling of the driver of the object from all bases around Bekasi city station, West Java. It is known that the population of the base motorcycles drivers around Bekasi station is 200 people and all are invited to participate in the sample. The invitation was distributed around 200 invitations and those attending and willing to sample were 106 people and 94 other bus drivers did not come because they were on duty to bring passengers to the field. From 106 subjects recruited, 10 were excluded because they were <20 or 60 years of age and 1 person had a history of falling from a motorcycle in 2015 and complaining of spinal disorders. A total of 95 subjects met the inclusion criteria and were willing to participate in the study.

Table 1. Subject's Demographic and Occupational Characteristics

Variable	N	%	Mean (SD)
Age			47,6 (9,9)
< 35 years	10	10,5	
≥ 35 years	85	89,5	
IMT			23,7 (4,1)
< 25 kg/m^2	60	63,2	
> 25 kg/m^2	35	36,8	
Working time			11,9 (7,4)
< 4 years	19	20	
> 4 years	76	80	
Sitting duration			4,8 (2,6)
< 4 hours	41	43,2	
> 4 hours	54	56,8	
Smoking			
Yes	60	63,2	
No	35	36,8	
Motorcycles vibration			0,27 (0,28)
< 0,5 m/s^2	87	91,6	
> 0,5 m/s^2	8	8,4	

Table 1. shows that the majority of respondents (89.5%, n = 85) were ≥ 35 years old. In terms of body index (IMT), the majority of respondents had an IMT of <25 kg / m2. It can be seen that the majority of respondents have been working for > 4 years. There are 41 subjects (43.2%) have sitting duration for <4 hours during work and 54 subjects (56.8%) have sitting duration for> 4 hours during work. The majority of the respondents smoked. In terms of motor vibration, 87 respondents (91.6%) experienced motorcycles vibrations of <0.5 m / s2. However, the majority of the respondents surveyed did not have chronic lower back pain complaints as 69 respondents (72.64%) while the other respondents, 26 subjects complaining of chronic lower back pain complaints, as shown in Table 2.

A bivariate analysis in Table 3 showed that all respondents complaining of chronic lower back pain received motor vibrations <0.5 m / s^2 According to the Fisher test, there was no difference in chronic lower back pain complaints based on vibration (p = 0.102). Based on the length of sitting during work, no significant difference was found for the group sitting> 4 hours and <4 hours during the day, and complaining of chronic lower back pain. Statistical tests revealed no significant difference in chronic lower back pain complaints (p = 0.717; OR 0.85; CI 95% = 0.34-2.09). Majority of respondents who complained of chronic lower back pain were <35 years old. There was no difference in age-related chronic lower back pain complaints (p = 0.722; OR 1.57; CI 95% = 0.31-7,95)

Based on the IMT, the same number was obtained for respondents who reported chronic lower back pain complaints for groups with IMT> 25 kg / m2 and IMT <25 kg / m2. According to the IMT, there was no significant difference in chronic lower back pain complaints (p = 0.103; OR 2.14; CI 95% = 0.85-5.36). On smoking status, 18 respondents complained of chronic lower back pain while 42 subjects did not. In the non-smoking group, 8 subjects had chronic lower back pain complaints and 27 subjects did not. There was no significant difference in chronic lower back pain complaints based on smoking status (p = 0.451; OR 1.45; CI 95% = 0.55-3.78). Based on the work period, of all respondents who complained of chronic lower back pain, the majority of respondents had been employed> 4 years. According to Fisher's test, there was no difference in chronic lower back pain complaints (p = 0.908; OR 1.07; CI 95% = 0.31-3.91).

Table 2. Subject Distribution Based on Low Back Pain Characteristics

Variabel	N	%	Mean (SD)
Lower back pain complaints ≥ 12 weeks with VAS 1-7	26	27,36	
No Lower back pain complaints ≥ 12 weeks with VAS 1-7	69	72,64	
K Detail distribution:			
Pain complaints			
There is a chronic lower back pain complaints (VAS 1-7)	43	45,3	1,4 (1,9)
There is no a chronic lower back pain complaints	52	54.7	
Laseque test			
Positif	36	37,9	
Negatif	59	62,1	
Lower back pain complaints			22 (50,4)
< 12 weeks	64	67,4	
≥ 12 weeks	31	32,6	

Table 3. Analysis of Relationship between Lower Back Pain Complaints and Each Variables from All Respondents

Variabel	Chronic Lower Back Pain Complaints		p	OR CI 95 %
	Yes	No		
Vibration				
> 0,5 m/s²	0	8	0,102*	N/A
≤ 0,5 m/s²	26	61		
Sitting duration				
> 4 hours	14	40	0,717	0,85
≤ 4 hours	12	29		(0,34-2,09)
Age				
≥ 35 years	24	61	0,722*	1,57
< 35 years	2	8		(0,31-7,95)
IMT				
> 25 kg/m²	13	22	0,103	2,14
≤ 25 kg/m²	13	47		(0,85-5,36)
Smoking				
Yes	18	42	0,451	1,45
No	8	27		(0,55-3,78)
Working time				
> 4 years	21	55	0,908	1,07
≤ 4 years	5	14		(0,31-3,91)

Discussion

The study involved 95 subjects who were all male drivers. This result is similar to a previous study by Ogundele et al who studied the prevalence and management of lower back pain in Nigerian drivers, whose study also included 393 subjects in total men.[5] The Jongprasitkul et al study in Thailand included 72 male ocular drivers - male and 48 female oars drivers. However, it can be seen that the number of drivers of male oars is still higher than that of females. Note that the study reported a significant difference in lower back pain complaints between the two sexes (p = 0.034), where female drivers were more at risk for lower back pain complaints.[5]

In this study, the majority of subjects (89.5%, n = 85) were ≥ 35 years old, and only 10.5% (10) subjects < 35 years of age with a mean age of 47,6 ± 9,9 years. This data is likely to be higher for the subjects subjected to the study than the data obtained by Ogundele et al who reported a mean age of the subjects 31,3 ± 4,5 years.[6] However, the average age of the subject was still in the productive age category of 15-64 year. Based on Tarwaka's research, it was found that age> 35 years had a greater risk of suffering from chronic low back pain and in this study the prevalence of subjects who complained of chronic low back pain was a relatively old age (> 35 years).

In this study, only 36.8% (35) subjects had excess weight with IMT > 25 kg / m2, whereas 63.2% (60) subjects had IMT < 25 kg / m2, with average subject IMT being 23, 7 ± 4.1 kg/m^2. In contrast, in the study of Ogundele et al, the majority of subjects (85.7%, n = 337) were overweight.[6] Another study by Sifai et al on all school bus drivers in the area, found that out of the 36 subjects studied the majority subjects (86%, n = 31) had excess weight.[7]

The majority of the subjects in this study (80%, n = 76) had been working as a base object driver for> 4 years with an average overall working life of 11.9 ± 7,4 years. It can thus be concluded that the majority of subjects have long exposure to vibration. However, from their own vibration level, the majority of subjects (91.6%, n = 87) received motor vibrations of <0.5 m/s^2. It is likely that the majority of the motors used by the respondents are new productions with engine technology systems that produce smoother vibrations. In a study conducted by Sifai et al, the majority of subjects (72.2%, n = 26) received bus vibrations of <0.5 m/s^2 and found 7 subjects (19.4%) complained of lower back pain. The study did not distinguish between acute and chronic back pain. and the measured vibration is the vibration of the driver's seat.[7]

The vibration experienced by the driver of the oak belongs to whole body vibration which is one of the risk factors for lower back pain. Vibrations <0.315 m/s^2 are still categorized as comfortable, vibrations of 0.315-2.5 m/s^2 are categorized as inconvenient, and> 2.5 m/s^2 are categorized as extremely uncomfortable. Thus, most subjects in this study still experience vibration within their comfort limits. Vibration levels are influenced by the type of vehicle, engine size, weight, and age of the vehicle as well as the various components of the vehicle (seat type, suspension) and road conditions. Vibrations are transmitted to the buttocks and back. In addition, the steering wheel and footrest also transmit vibrations through the driver's hands and feet. Factors influencing the effect of vibration on the driver include acceleration and frequency, exposure duration, use of protective gear, and vehicle maintenance. In addition, biodynamic factors such as grip, body position, and motor / steering gear and individual factors such as speed and ability of the driver and individual vulnerability are also affected.[8]

Majority of the subjects in this study (56.8%, n = 54) sit for> 4 hours during the work and the average sitting time during the entire course was 4.8 ± 2.6 hours. According to Gupta et al's study, the majority of adults sit 6-8 hours / day and prolonged sitting is a risk factor for lower back pain. It is characterized by increased intra-disc pressure, lumbar spine stiffness, and decreased back muscle strength. However, there are still limited studies that measure longevity during work and outside work hours separately.[7] A total of 63.2% (60) of the subjects smoked, in which smoking was one of the risk factors for lower back pain.[8]

In this study, 45.3% (43) of subjects had chronic pain complaints with VAS 1–7, whereas 54.7% (52) had no chronic pain complaints. The pain level calculated as chronic pain is pain with a VAS value of 1-7. People with chronic lower back pain complaints usually have lower VAS levels than those with acute lower back pain. Patients with severe pain levels (VAS scores of 8-10) are unable to perform the tasks independently, and thus lack the ability to navigate well and prefer to rest and avoid driving. According to a study by Ogundele et al, the prevalence of lower back pain in commercial motorcyclists in Ilesa Southwest, Nigeria was 40.7%.

In the Ogundele et al study pain complaints were not distinguished between acute and chronic, and subjects with a history of back pain less than 7 days before the study can be included.[6]

The prevalence of lower back pain in this study was lower (27%) compared to Ogundele's study (40.7%). Different results were reported by a study by Akinpelu et al in Nigeria who reported that the prevalence of lower back pain in the driver reached 64.8%. In the study, lower back pain was the most common musculoskeletal complaint in the driver followed by shoulder pain (30.8%), knee pain (27%), neck pain (17%) and upper back pain (2.6 %). Data on lower back pain were obtained through interviews with the Standardized Nordic Questionnaire. However, the study was conducted on car drivers, not motorists.[9] Similar to the Akinpelu study, the study conducted by Sifai et al by filling out the Standardized Nordic Questionnaire found that the prevalence of lower back pain in school bus drivers was 30.5%. Back pain is not distinguished between acute and chronic.[7]

A study on a driver in Thailand in by Jongprasitkul et al also reported a high prevalence of lower back pain which is 58.3% of the 120 subjects studied. This may be due to differences in subject characteristics, where the study included not only male but female drivers and found that lower back pain rates were significantly higher in female driver groups.[5] Subject data for lower back pain were obtained with Oswestry filling. Disability Questionnaire. Studies include acute and chronic lower back pain complaints. In terms of complaint duration, the majority of subjects (67.4%, n = 64) had lower back pain complaints for < 12 weeks with a mean duration of lower back pain complaints in all subjects being 22 $\pm$ 50.4 weeks. Lower back pain is classified as chronic lower back pain complaints for > 12 weeks. Thus, most subjects in this study had acute, non-chronic lower back pain complaints.

Our study showed no difference in complaints of chronic lower back pain based on vibration (p = 0.102). No subjects receiving motor vibrations> 0.5m / s2 were found to complain of chronic lower back pain. All subjects with chronic lower back pain complaints of 26 (27.37%) received a vibration of < 0.5m / s2. In this case vibrations under the NAV can cause chronic lower back pain complaints. Shivakumara et al reported that whole body vibration as experienced by the driver of the oars was a major risk factor for lower back pain, with a threshold value of vibration considered to be extremely> 2.5 m / s2. Shivakumara in his study measured the motor vibration in the driver's seat.[10] The study of Sifai et al found that subjects with chronic lower back pain complaints received a vibration of> 0.5 m / s2 of only 4 subjects (11.11%) 42 In this study, the limit used for grouping vibrations was 0, 5m / s2.

Sitting duration was not associated with chronic lower back pain complaints (p = 0.717; OR 0.85; CI 95% = 0.34-2.09). From the results of this study, subjects who sat> 4 hours and complained of chronic lower back pain of 14 people (14.73%) while those who sat <4 hours and complained of chronic lower back pain of 12 people (12.63%). The duration of the complaints of chronic lower back pain in both groups was not significantly different. A study by Yue et al on 893 teachers in China showed that lower back pain was associated with longer sitting during work, where teachers who spend> 4 hours per day at work were more at risk for lower back pain (OR = 1.42; CI 95% 1.00-2.02).[11] The Yue et al study used the Nordic Musculoskeletal Questionnaire (NMQ) to determine lower back pain without acute or chronic differentiation. The questionnaire asked research subjects whether they had experienced neck, shoulder, and lower back pain for more than 1 day in the previous 12 months. Studies by Gupta et al reported that long sitting, either total sitting (during work and outside of work hours), long occupational (during work), or long sitting outside of work had a positive association with lower back pain intensity.[12]

In this study, no measurements related to sitting long hours outside of work. These differences can also be due to the differences in the job characteristics of the subjects involved, where both studies examined office workers, whereas this study took the subject of the subject driver. The risk factor for chronic lower back pain complaints in the driver is greater than that of the office worker, where the driver has a prolonged risk of sitting and vibration while working, while the office worker has only a long sitting risk.

There was no difference in the prevalence of chronic lower back pain complaints by age (p = 0.722; OR 1.57; CI 95% = 0.31-7,95). However, it was found that the prevalence of chronic lower back pain complaints was higher in the age group> 35 years (25.3%) compared to the age group < 35 years (2.1%). This result is in contrast to a study by Ogundele et al reporting ≥ 31 years of age as a risk factor for chronic lower back pain complaints (p < 0.001). Similarly, research by Jongprasitkul et al also

reported that there is a significant relationship between age and lower back pain complaints. The study did not distinguish between acute and chronic lower back pain complaints. In the study, subjects age was grouped into 20-30 years, 31-40 years, 41-50 years, and > 50 years.

The highest prevalence of lower back pain was reported in the age groups > 50 years (75%) and 31-40 years (61.82%). A study by Ogundele et al reported no differences in acute or chronic lower back pain complaints based on IMT.[6] However, higher rates of lower back pain were found in groups with IMT > 25 kg / m2 (23%) compared to those with IMT < 25 kg / m2 (12%). The study by Jongprasitkul et al also did not report the association of IMT with either acute or chronic lower back pain complaints in a Thai driver, but this study reported a significant relationship between weight and lower back pain complaints, which found higher weight gain in subject group with lower back pain complaints (p = 0.001).[5] The study by Sifai et al also did not report the association of IMT with either acute or chronic lower back pain complaints in school bus drivers in Semarang.

Smoking status was not proven to have a significant relationship with chronic low back pain (p = 0.451; OR 1.45; 95% CI = 0.55-3.78). This result is different from the results of a study by Jongprasitkul et al who reported that smoking is a risk factor for low back pain (p = 0,000). In that study, the prevalence of low back pain in the group of subjects who did not smoke was only 36.73%, while the prevalence in the ex-smoker group reached 85.71% and in active smokers reached 70.18%.[5] The prevalence of lower back pain was higher than this study is likely because in the Jongprasitkul et al study covered acute and chronic low back pain while this study only included complaints of chronic low back pain.

We found no differences in chronic low back pain complaints based on years of service (p = 0.908; OR 1.07; 95% CI = 0.31-3.91). This result is different from the study of Ogundele et al who reported a significant difference where the motorcycle taxi drivers who have worked for more than 5 years have a higher risk of experiencing low back pain (p < 0.016). This difference in results can be due to differences in the duration of work used.[6] Also in the Ogundele et al study included all complaints of acute and chronic pain not differentiated. Research by Jongprasitkul et al also reported a significant relationship between work period with complaints of low back pain both acute and chronic. In that study, the age of the subjects was grouped into <3 years, 3-5 years, > 5-10 years, > 10-20 years, and > 20 years. The highest prevalence of low back pain was reported in subjects who had worked for > 10-20 years (76.92%) and > 20 years (75%).

The strength of this study is the research use more than one main variable (dependent variable) and several independent variable such as: age, IMT, smoking factor and working time so the conclusion more reliable with quantitative and qualitative data. However, we identify the limitation of this study, which was several variables that may influence the incidence of lower back pain that has not been explored in this study, such as patterns of physical activity, alcohol consumption, sleep patterns, motor sitting position, and comorbid illnesses.

Conclusion

There is no relationship between motor vibration exposure with the occurrence of chronic lower back pain in complaints the base motorcycles driver. There is no relationship between sitting duration with the occurrence of chronic lower back pain complaints in the base motorcycles driver. The findings of this study can be used in general because they have followed the applicable research rules, specifically for the relationship of vibration and chronic low back pain complaints can be applied not only to the base motorcycle driver but in other jobs that receive vibrations as a whole body vibration.

Acknowledgment

I express many thanks to Hiperkes Office of DKI Jakarta Provincial and Bekasi PMI management for facilitating and support my Thesis

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