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Travel Distance and Rest Periods as Factors Associated with Low Back Pain in Intercity Bus Drivers: a Qualitative Case Study

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ABSTRACT

Low back pain (LBP) is a common lower back pain felt by bus drivers due to the static sitting position they use during work. This study aims to explore the causes of LBP symptoms felt by intercity bus drivers, focusing on travel distance and rest periods during work. The research method used was a qualitative case study. The informants were 7 intercity bus drivers (Tulungagung-Surabaya) who were selected using the purposive sampling method. Data collection techniques included in-depth interviews, participant observation, documents, archival recordings, and physical device observations. The study showed that workers typically worked 10–12 hours per day, traveling approximately 300 km round trip. Rest periods varied from 2–6 hours per round trip, but were not always sufficient for physical recovery, as complaints of lower back pain due to prolonged sitting and fatigue due to insufficient rest time and rarely receiving medical treatment. Dominant self-management strategies included rest, massage, drinking water, or herbal remedies. **Conclusion:** Management is advised to more structure driver driving and rest schedules in accordance with occupational safety standards. Regulators are also expected to monitor work hours and provide education on ergonomics and occupational health to minimize the risk of low back pain and maintain the safety and quality of transportation services.

I. Introduction

Low back pain (LBP) is a common musculoskeletal felt and a leading cause of disability and reduced work productivity globally. In the professional driver population (truck, bus, taxi, and freight drivers), LBP occurs with high prevalence and is considered a significant occupational health problem. The prevalence of LBP in drivers varies between studies but is generally high. Recent literature studies using meta-analyses and systematic reviews report a one-year prevalence of approximately 50–55% in the professional driver population, with a substantial one-week/momentary report prevalence. These figures are significantly higher than in some other working populations, highlighting the need for preventive interventions and appropriate management in the workplace (Jia., et al, 2024).

In East Java, several local studies and final projects/theses have found high incidence rates and identified contributing occupational and individual risk factors. A study of online motorcycle taxi drivers in Bangkalan reported a strong association between sitting duration (driving time) and low back pain (p-value <0.001 in the study sample). Similar findings were also found in studies of public transport and bus drivers, where driving duration and body posture were strongly associated with low back pain (Islami, A. D. 2024).

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Drivers are exposed to several occupational risk factors that contribute to the development of LBP, including: exposure to whole-body vibration (WBV) from vehicles, prolonged sitting, non-ergonomic sitting posture, unsupportive seat design, and psychosocial factors related to work pressure and poor rhythm/rest. WBV exposure and prolonged sitting have been reported to be strongly correlated with the incidence of LBP in drivers. The dose-response relationship between vibration exposure and LBP is also supported by epidemiological studies (Lyons J, 2002).

LBP is a leading cause of musculoskeletal complaints in bus, truck, and taxi drivers, impacting productivity and healthcare costs. The impact of LBP on drivers is not only clinical (pain, limited mobility), but also has economic consequences, including decreased productivity, sick leave, healthcare costs, and potential occupational safety risks (e.g., reduced concentration while driving). Therefore, early detection, ergonomic preventive measures, and evidence-based management programs are crucial (Pickard O. et al, 2022).

Some interventions that have shown promising results include improved ergonomics (seat design, seat suspension), trunk strengthening and stability exercise programs, task rotation and structured rest schedules, and multi-component workplace interventions. RCTs in drivers have shown that active seat technology or seat mobilization systems can reduce LBP symptoms and muscle tension in the context of prolonged driving. Ergonomic interventions (suspension seats, lumbar support seat designs), job rotation, and trunk strengthening and activity management exercise programs have been shown to help reduce symptoms and disability. Furthermore, international guidelines recommend non-surgical approaches based on active exercise and education for chronic LBP. Clinical trials in drivers have shown positive results for active seats/suspension technology. WHO and clinical guidelines emphasize active approaches, reduced immobility, and evidence-based interventions for chronic LBP (Dennerlein JT.et al, 2021). This study focuses on analyzing the extent to which the distance traveled and the duration of rest in a day affect complaints of lower back pain in intercity bus drivers.

II. Methods

The research method used is a qualitative case study. The research informants are intercity bus drivers (Tulungagung-Surabaya) selected using purposive sampling of 7 people who were successfully met and willing to be interviewed by filling out an informed consent form. Data collection techniques include in-depth interviews, participant observation, documents, archival recordings, and physical device observations conducted for 1 month. Qualitative data analysis is carried out periodically using thematic analysis to organize, analyze, and interpret non-numerical data such as text or narratives to find hidden themes, patterns, and meanings that help understand the research problem in depth.

III. Results and Discussion

Based on interviews, bus drivers drive an average of 5–6 hours per round trip, or a total of approximately 10–12 hours per day, covering a distance of approximately 300 km. Driving time can increase if there is congestion or heavy traffic. Drivers' rest periods vary between 2–6 hours per round trip, with a total rest period of 6–12 hours per day, depending on the number of round trips and the work situation. These findings indicate that bus drivers' working hours are quite long and potentially exceed the recommended safe working hours for drivers. This is inconsistent with Indonesian regulations, which limit bus driving to a maximum of 8 hours per day, with a mandatory rest period of at least 30 minutes after every 4 hours of continuous driving. This regulation is stipulated in Law Number 22 of 2009 concerning Road Traffic and Transportation (LLAJ), Article 90. Long driving hours can increase the risk of fatigue, which can lead to decreased concentration, increased risk of accidents, and musculoskeletal health problems such as LBP.

According to the European Transport Safety Council (ETSC, 2018), the safe driving time limit for public transport drivers is a maximum of 9 hours per day, with a minimum 45-minute break every 4.5 hours. Working hours exceeding this standard increase the risk of fatigue and accidents. In the context of

intercity and intra-provincial bus drivers, driving durations of 10–12 hours per day indicate a high potential for fatigue.

Long travel distances (±300 km round trip) are associated with prolonged static sitting. Ghasemkhani et al. (2008) found that long-distance vehicle drivers had a higher prevalence of low back pain complaints than other workers due to a combination of long sitting duration, vehicle vibration, and lack of body stretching.

The Indonesian Ministry of Transportation (2015) also stipulates that public vehicle drivers should have sufficient rest time and not drive continuously for more than 8 hours per day to reduce the risk of traffic accidents. The rest duration of 2–6 hours per return trip or a total of 6–12 hours per day reported by informants actually varies relatively. A study by Williamson et al. (2011) showed that the quality and quantity of rest affect driver fatigue levels. Inadequate or poor-quality rest will still increase the risk of accidents and health problems.

Bus drivers' driving duration exceeds national and international recommendations of 8–9 hours per day. Travel distances of approximately 300 km round trip increase the risk of musculoskeletal disorders, particularly low back pain, due to prolonged sitting and vibration. Indonesian regulations limit bus driving to a maximum of 8 hours per day, with a mandatory rest period of at least 30 minutes after every 4 hours of continuous driving. This rule is stipulated in Law Number 22 of 2009 concerning Road Traffic and Transportation (LLAJ). The varied rest periods observed by informants do not necessarily provide optimal recovery, especially when sleep quality is poor. This highlights the importance of interventions such as work hour management, driver rotation, and stricter rest schedules to maintain driver health and safety.

LBP is a common felt among drivers, especially after prolonged sitting and fatigue. The majority of informants reported pain or stiffness in the lower back, particularly when fatigued, sitting for extended periods, or not drinking enough water. To alleviate the pain, most informants first changed their sitting position. The intensity of the pain varied among informants, which may be related to age and previous medical history.

LBP is a common felt, but it generally doesn't interfere with driving, so it's rarely evaluated by a medical professional. Informants prefer self-care measures such as rest, drinking water, getting a massage, or taking traditional herbal medicine. Drivers also expressed a desire for regular company health checks, while personal preventative measures focus more on maintaining hydration, getting enough rest, and getting a massage.

A study showed that prolonged sitting in a static position increases the risk of low back pain because it causes muscle tension and pressure on the intervertebral discs (Punnett & Wegman, 2004). Suppliers are among the occupational groups at high risk of LBP due to ergonomic factors, work duration, and vehicle vibrations (Bovenzi & Zadini, 1992).

Changing sitting positions, getting enough rest, drinking water, and getting massage are all forms of self-care. However, the literature suggests that these efforts only temporarily reduce symptoms and do not address the underlying cause (Qaseem et al., 2017). Regular health checkups, back stretching exercises, and ergonomic posture education have been shown to reduce the prevalence of LBP (Mahmud et al., 2011).

Based on the facts and theories above, researchers assess that low back pain in drivers is a serious occupational health problem that is often underestimated. Self-care practices such as massage or herbal medicine may provide temporary relief, but do not reduce long-term risks. Regular company health checks are essential for early detection of musculoskeletal problems. Furthermore, education on seating ergonomics, gentle stretching techniques during stops, and the importance of hydration should be provided periodically. While drivers' personal preventative measures are commendable, company policy support in the form of health facilities and regular rest schedules would be far more effective in reducing the risk of chronic LBP.

IV. Conclusion

LBP is a common felt among drivers due to prolonged sitting, fatigue, and lack of hydration. Interviews revealed the causes bus drivers drive an average of 5–6 hours per round trip or 10–12 hours per day, covering a distance of approximately 300 km round trip, and this duration can increase during traffic jams. Rest periods vary from 2–6 hours per round trip (a total of 6–12 hours per day). This work pattern indicates a high workload and potential for fatigue, necessitating better work and rest schedule management. The intensity of pain varies according to age and medical history. Most drivers manage their felt independently through rest, drinking water, massage, or herbal medicine, and rarely seek medical attention. They expect company support in the form of regular health checks, while their personal efforts focus more on prevention by maintaining hydration, getting enough rest, and changing sitting positions.

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