

Conference Paper

Safety and Fatigue Risk Factors among Online Motorcycle Drivers in Depok City, Indonesia

Tiara Nurhafizhah, Indri Hapsari Susilowati, Akbar Maulana, and Muhammad Fitrah Habibullah

Occupational Health and Safety Department, Faculty of Public Health, Universitas Indonesia, Jl. Margonda Raya, Beji, Pondok Cina, Kota Depok, Jawa Barat 16424, Indonesia

Abstract

In Indonesia, the motorcycle is often the first choice for transportation, and has been especially popular as a taxi service since the creation of an online request system, known as Ojek Online. Unfortunately, this online employment has less engagement than traditional taxi companies and other public transportation companies in research area that can give guarantee for ensuring their drivers' safety and health. Many drivers are exposed to uncontrolled risks. Our research concerns drivers' health and safety factors. The goal is to determine which factors most affect a drivers' actions and safety. This study utilises both qualitative and quantitative research. Our qualitative research gathers in-depth health complaints made by drivers, especially in regard to their musculoskeletal symptoms. Our quantitative research focuses on other aspects that affect their ability to drive safely, such as their durations of rest, bad driving habits and work hours. The sampling method used in this research could be used to represent the entirety of the drivers' health and safety factors. The respondents in this research come from Depok, Bekasi, Bogor and Tangerang. The randomly sampled respondents agreed to answer the questions by themselves. The number of our respondents is 70. Our study found that the most influential factor affecting safe driving ability is fatigue. The results show that 62.85 percent of respondents experience fatigue while driving. Further, the data shows an imbalance among drivers in regard to age, work hours, total distance driven and rest time. Drivers' bad habits also negatively impact the safety of the rider. The most reported health effect was musculoskeletal symptoms in the lower part of the drivers' back. The second most reported health effect was in regard to the drivers' buttocks and wrists. The results of this research show that musculoskeletal disorders and fatigue affect the drivers' condition, which can negatively impact drivers' and customers' safety.

Keywords: fatigue, musculoskeletal symptoms, safety, online motorcycle drivers

Corresponding Author:
Indri Hapsari Susilowati
indri@ui.ac.id

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1. Introduction

In Indonesia, the motorcycle is often the first choice for transportation, and has been especially popular as a taxi service since the creation of an online request system, known as Ojek Online. Customers who want to use Ojek Online to go places can easily request a driver through their smartphone or other device. Ojek Online experiences its highest demand at rush hour (between 4 pm and 8 pm), where Ojek Online customers fill almost every space on the road. We are interested in doing research on Ojek Online, as there are $\pm 900,000$ drivers (estimated drivers in Jakarta) involved in this industry. Hence, we are focusing on the factors that affect drivers' health and safety.

In Indonesia there are three major Ojek Online companies which partner with drivers of all ages and genders. With this kind of partnership, drivers and companies don't have to limit work hours, work duration, how many trips are taken or distance. Drivers can work freely as they please. Because of this, there are variations in drivers' rest and work duration, distance travelled, and other job habits. The other interesting fact is, not all drivers are full-time drivers; there also those who drive part-time or in their spare time after work.

To promote drivers' health and safety, Indonesia's government provides insurance. Ojek Online companies also provide their own kind of insurance. Unfortunately, the thing that concerns us the most here is that companies don't have special regulations to ensure drivers' health and safety. So, there are many uncontrolled risks that drivers are exposed to. The goal of this research is to acknowledge the risks that most affect drivers' safety and their health (especially in regard to musculoskeletal symptoms).

2. Methods

This study uses observational research that studies the data in both a qualitative and quantitative way. The data was obtained through observation and interview with the drivers. The sampling method used in this research could be used to represent the entirety of the drivers' health and safety factors. The research was done in Depok in the areas surrounding the University of Indonesia's campus. The 70 respondents come from Depok, Bekasi, Bogor and Tangerang. The randomly sampled respondents agreed to answer the question by themselves.

Our qualitative data aims to gather in-depth drivers' health complaints in regard to their musculoskeletal symptoms. We used a musculoskeletal disorders questionnaire (BRIEF form) to gather this information from the respondents. Our quantitative data

focuses on other aspects that affect safe driving such as rest duration, total distance, work hours, total trips, driver age, hand phone placement and age of the motorcycle.

3. Results

The results show that almost half of respondents (43%) had experienced a near miss event during their work. The reported distraction factors which increase the risk of near miss or accident events include fatigue, uncomfortable helmet, uncomfortable motorcycle, using gadgets and other factors. We obtained the results by asking whether those risk factors affected their focus while driving. The results found that 62.85 percent (44 persons) experienced fatigue at some point while driving (Figure 2). Based on this data, we can assume that fatigue is the most influential factor on a drivers' ability to drive safely.

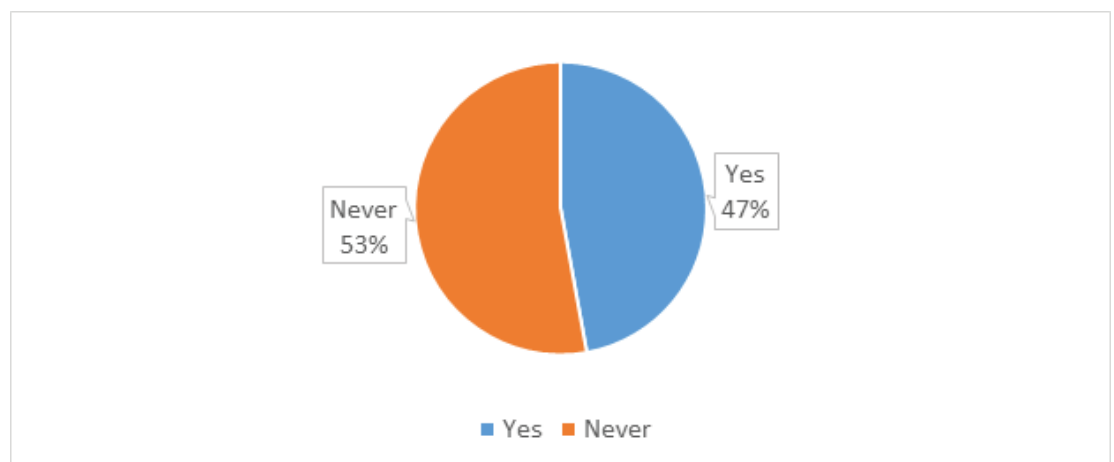


Figure 1: Near-miss event chart.

Data was also gathered on factors such as age, work duration, total distance and rest duration. According to the data, 18.57 percent (13 drivers) are 16–25 years old, 48.57 percent (34 drivers) are 26–35 years old, 18.57 percent (13 drivers) are 36–45 years old, 14.29 percent (10 drivers) are 46–55 years old (Table 3).

In regard to work duration, 60 percent (42 drivers) work more than 11 hours per day, 34.29 percent (24 drivers) work for 6–11 hours per day and the remaining 15.71 percent (14 drivers) work for less than 6 hours per day. For 55.71 percent (39 drivers), the average total distance covered in every trip exceeded 50 KM, while the average total distance was less than 50 KM per trip for 44.29 percent (31 drivers). The other factors that can also affect the drivers' condition is the duration of rest. The data shows that 2.86 percent (2 drivers) rest for more than 8 hours per day, 60 percent (42 drivers)

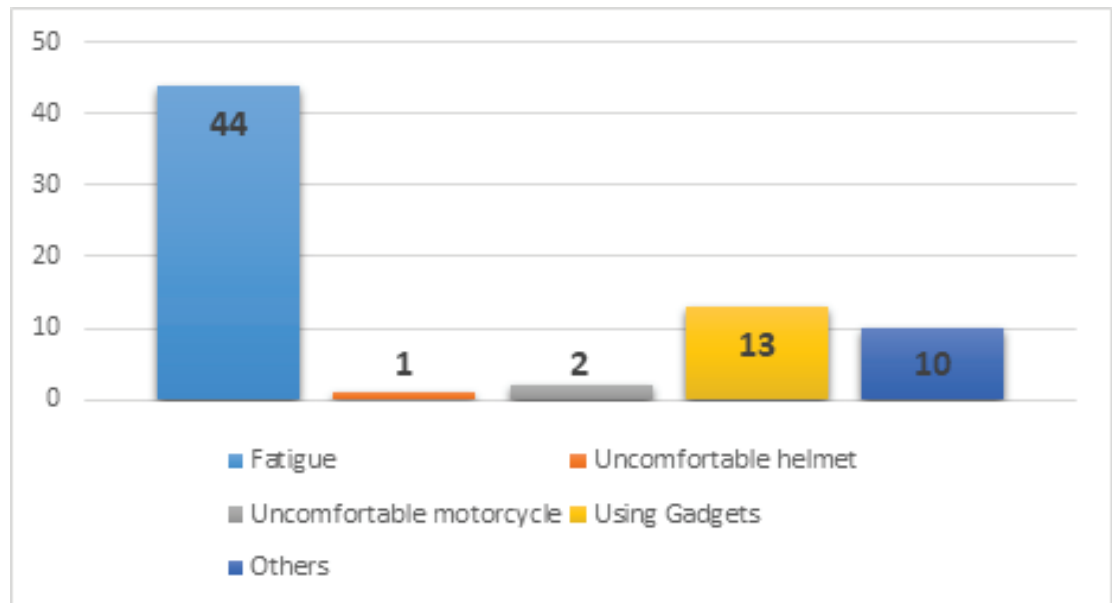


Figure 2: Driving distractors factors chart.

rest for 6–8 hours per day and 15.71 percent (11 drivers) rest for less than 6 hours per day (Table 1).

The most reported health effect was musculoskeletal symptoms in the lower part of the drivers' back. The second most reported was symptoms in the drivers' buttocks and wrists. Based on the data, 27 percent (19 drivers) feel pain in their lower backs, 15 percent (11 drivers) feel pain in their wrists, 15 percent (11 drivers) feel pain in their buttocks or thighs, 13 percent (9 drivers) feel pain in their necks, 12 percent (8 drivers) feel pain in their shoulders and the rest feel pain in another part of the body (Figure 3).

4. Discussion

Variables include near miss incidents, distraction factors, drivers' age, work and rest duration, total distance and musculoskeletal symptoms felt. These variables can be divided into two categories: risk factors and consequences felt. Risk factors are the conditions that can lead to unsafe driving. Consequences are the impacts of this job, which may or may not be exacerbated by those risk factors.

In this study we focused on physiological and lifestyle risk factors. Supported by this statement, "Risk factors of muscular discomfort among motorcyclist can be biological, environmental, vehicular, physiological and lifestyle-based" [1]. Selected from the risk factors category, we have: (1) Driving distraction factors, which are conditions and actions that disturb a drivers' focus while driving. Fatigue is the most likely to

TABLE 1: Drivers' characteristic table.

Characteristic Drivers	Sd	n	%
Age			
• 16–25 years old	2.364	13	18.57
• 26–35 years old	2.742	34	48.57
• 36–45 years old	3.095	13	18.57
• 46–55 years old	3.635	10	14.29
Work Duration			
• 1–5 hours	1.893	4	5.71
• 6–10 hours	1.459	24	34.29
• 11–15 hours	1.313	35	50
• 16–20 hours	1.113	7	10
Total Distance			
• 1–50 KM	14.609	29	41.43
• 51–100 KM	14.363	31	44.29
• 101–150 KM	13.15	4	5.71
• > 150 KM	53.572	5	7.14
• Unidentified	–	1	1.43
Rest Duration			
• < 6 hours	0.823	25	35.71
• 6–8 hours	0.805	42	60
• > 8 hours	0.707	2	2.86
• Unidentified	–	1	1.43

contribute to distraction, with 62.85 percent reporting it. The second factor most likely to contribute to distraction is the use of gadgets, with 13 out of 70 drivers reporting this. (2) Drivers' age can also affect driving focus, directly or indirectly (by causing fatigue faster). This result is related to the journal article that states that experiencing discomfort while driving increases with the age of the driver [2]. This factor does exist and requires further research. (3) Work and rest duration and total distance travelled in a day can affect fatigue. For many drivers, there is an imbalance between these three factors, increasing fatigue. (4) Musculoskeletal symptoms can lead to unsafe driving conditions, because this make drivers uncomfortable and causes them to lose their focus while driving. The majority of motorcyclists experience discomfort, mainly in their upper body parts, while riding motorcycles [2]. In addition to the aforementioned risk factors, there are other factors that could distract motorcyclists when they are

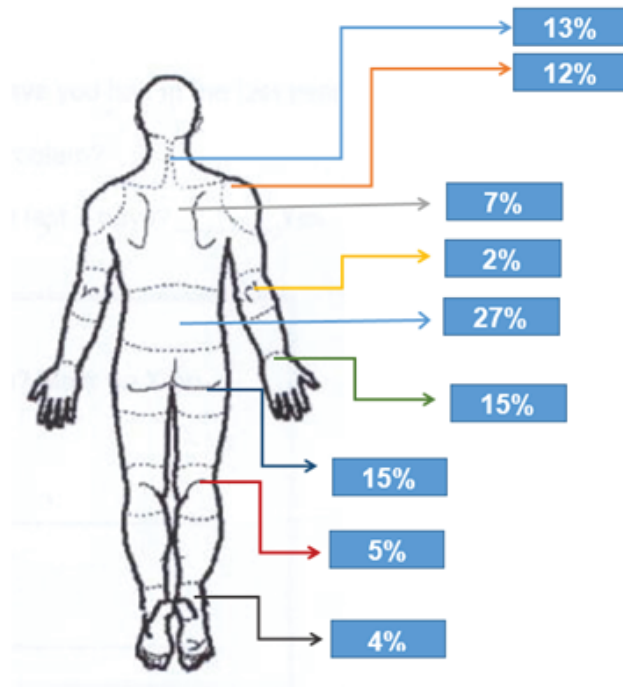


Figure 3: Musculoskeletal symptoms.

riding, such as clothing [3], uncomfortable helmets, their focus, motorcycle condition, etc.

Consequences experienced by the drivers are: (1) near miss situations in which drivers almost got into accidents, a proven concern, as 33 of 70 drivers experienced it, (2) fatigue, which is just one of many effects of discomfort [4] and (3) musculoskeletal symptoms. There are many factors which disturb human comfort while one uses a motorcycle [5]. In conclusion, we believe that drivers are regularly exposed to unideal conditions, and all of the aforementioned factors require further concern and research.

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