Road Crashes Among Food Delivery Riders (P-Hailing) During Pandemic in Kuala Lumpur

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Abstract Due to COVID-19 outbreak in Malaysia, a movement control order was implemented on March 18, 2020. As a result, many people ordered food through food delivery services, which may have come at a high cost due to the recent spike in food deliveries. This study aims to establish the causes and the most frequent mentioned elements that contribute to road crashes among riders. Road accidents are a severe concern since they result in death or injury, yet the number of fatalities among riders continue to rise. The study was done in the vicinity of Kuala Lumpur and the data was gathered through a survey using online Google Form questionnaire. The instrument was measured using a reliability test and exploratory factor analysis (EFA) to generate an empirical verification of the questionnaire's validity and reliability. Then, a descriptive analysis was undertaken for each variable to determine the primary factor. As a result, the critical fact resulted in cell phone use while travelling on the highway was a human factor component. The study's findings drew more attention to the issue and raised awareness about road safety.

Keywords Food delivery rider · P-hailing · Motorcycle accident · Exploratory factor analysis · Descriptive analysis

1 Introduction

Road transportation is a requirement that is highly beneficial to a country and its citizens, especially in enhancing access to the workplace, financial services, educational facilities, and health care facilities. After chronic diseases such as heart failure, stroke, and pulmonary infection and difficulty in breathing, injury caused by a car collision is one of the leading causes of death worldwide. It had also harmed the city's primary

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mode of transportation, which is traffic accidents, including deadly accidents. From 1990 to 2011, total accident-related deaths in Malaysia grew every year, while total road-related deaths increased by 70% [1, 2]. According to police records gathered during Operation Selamat 16, the number of fatal road accident cases has increased somewhat, according to Deputy Inspector-General of Police Datuk Mazlan Mansor. According to him, there was a minor increase in fatalities this year when 206 fatal accident instances were reported compared to 197 incidents in 2019.

The number of deaths has also risen from 216 to 230. Deaths have also increased from 216 to 230. With 147 deaths, motorcyclists and pillion riders had the largest number of fatal and most significant statistic [3].

Motorcycle delivery services are well-known in Malaysia, and they operate in a variety of businesses, including food delivery, postal delivery, and small item delivery. Except those who work for registered business owners, no specific figures on the number of registered motorcyclists were available [4]. Food delivery personnel have been viewed as a vulnerable category among other types of motorists because they are forced to deliver orders to consumers within the period set by the managements. They were more likely to be exposed to the road while on the mission. Even though they are at a higher risk of being engaged in a collision, they are also at a higher hazard stage due to their longer exposure on the lane [5].

COVID-19, a novel coronavirus discovered in Wuhan, China, in December 2019, was declared a pandemic by the World Health Organization (WHO) in early March 2020. Most countries' most popular countermeasure to COVID-19's proliferation was a "lockdown," which limited people's daily activities to only the most essentials and prevented them from leaving their homes [6]. Meanwhile, to prevent the virus from spreading further, Malaysia had implemented a movement control order (MCO) that took effect on March 18, 2020. However, as more people become stranded at home due to the COVID-19 outbreak, the demand for food delivery services is increasing. Unfortunately, with motorcycle riders risking their lives to meet deadlines while attempting to increase commissions by increasing the number of pick-ups and deliveries, the recent increases in food delivery may have come at a high cost. A total of 150 fatal accident riders from two well-known food delivery firms were recorded three months after the MCO was enforced on March 18 to contain the COVID-19 outbreak [7].

As a result, this study aims to establish the causes and the most frequent mentioned elements that contribute to road crashes among riders. The paper's goals could be met, and an accurate instrument to assess each variable's reliability and validity on the tool could be created. Food delivery rider criteria and features, methodology, data analysis, findings, debate, and conclusion are all covered in this section.

2 Research Methodology

2.1 Sample of Study and Data Collection

This study was primarily conducted in Kuala Lumpur. The target participants for this study was all types of food delivery riders from various Kuala Lumpur-based companies. Because most of these meal delivery services were centred in Kuala Lumpur's big cities, "FoodPanda," "GrabFood," "DeliverEat," "UberEats," "Honestbee," "RunningManDelivery," "FoodTime," "Dahmakan," "Mammam," and "Shogun2U" were among the companies [8]. In Kuala Lumpur, it was believed that over 3500 motorcycle delivery riders, including food and parcel deliveries, were present [9]. As a result, the sample size needed for this study was $s = 346$. The sample size grew slower and remained relatively steady in slightly more than 380 cases [10].

After determining the target population, sampling frame, sampling method, and sample size, the next step was to collect data [11]. First, a "Google Form" was used to create the survey question. The information was then disseminated via social media platforms such as "Twitter," "Facebook," "Whatsapp," "Telegram," and "Instagram," as no personal interaction, including interviews and questionnaire delivery, was permitted during the outbreak.

2.2 The Instrument (Questionnaires)

A group of food delivery riders was investigated. The survey approach was used to construct many questionnaires. They were separated into three sections: A, B, and C. Section A comprised several questions based on the population randomly assigned to them based on their profile. Section B included several questions about human variables that contribute to traffic crashes among cyclists. Lastly, Section C was where the questions about environmental factors that cause road crashes among riders were asked. There will be 33 questions, with five questions in area A, 11 questions in section B, and 13 questions in section C.

Section A was, first and foremost, a demographic data survey that allowed for the gathering of background information. Gender, age range, work time hour, riding experience, and riding frequency were the five sorts of inquiries. The questions provided context to the collected survey data, allowing the respondents to be described and the data to be further analysed.

Second, the inquiries in this area revolved around what human variables contribute to motorcycle accidents. Human factors were researched and grouped into three types of behaviour: red-light running, cell phone use while riding, and speeding. As a result, multiple-choice survey questions required respondents to select only one option from various options. Because the response options were pre-determined, the respondents had a more straightforward time filling out the survey. They were also simple to

employ in various ways, and they assisted in the generation of knowledge that was simple to analyse and provide mutually exclusive preferences.

Finally, to achieve the goal in this part, a type of dichotomous survey question was used. Many designed criteria were used to inquire about environmental factors that cause road crashes among riders: lighting, roadway surface, and the weather conditions. There are two possible answers to the dichotomous question. In surveys, dichotomous questions such as Agree/Disagree, Yes/No, True/False, or Fair/Unfair are frequently employed. They were used to distinguish between respondents' characteristics, experiences, and opinions. As a result, Yes/No is employed as a sort of response in each question.

2.3 Data Analysis

Reliability and Validity Test. Alpha Cronbach will express the instrument's reliability level based on the significant objectives mentioned. Alpha Cronbach's alpha value of 0.6 is considered high dependability and a good index value [12, 13]. In comparison, Alpha Cronbach's score was less than 0.6, indicating that it was faulty. Alpha Cronbach's coefficients of 0.60–0.80 are considered modest yet acceptable. In the 0.8 and 1.00 ranges, however, Alpha Cronbach was regarded to be quite good. Therefore, the level of reliability of the devices was assessed using Alpha Cronbach values for the instruments created [14].

On the other hand, validity refers to an empirical measure's ability to accurately detect the genuine meaning of the concepts under investigation [15]. According to its definition, validity is a tool that analyses whether data is suitable, honest, relevant, and valuable [16]. Exploratory Factor Analysis is used in this study to determine the instrument's validity (EFA). Furthermore, in this study, EFA served another purpose: identifying and combining multiple items from the questionnaire into structures under a single variable [17]. As proposed by Hair et al. [18], EFA was required to examine the organization of hidden dimensions among the observable variables displayed in the items of an instrument. As a result, in this study, using Exploratory Factor Analysis and Cronbach's Alpha would be the best technique to acquire empirical verification of the questionnaire's validity and reliability.

Descriptive Statistic In a quantitative research study, descriptive statistics were statistical representations of what was provided or the data disclosed understandably. The central tendency metrics were examples of the mean, median, mode, and variability sizes suited for standard deviation, variance, and minimum and maximum variables. Tables, graphs, and discussion threads were utilized in two of these measures to help people understand the significance of the data collected and processed.

3 Results and Discussion

3.1 Reliability Analysis

Statistical Analysis of the Reliability of the Pilot Study. For sections B and C of the questionnaire form, which was sent to 35 respondents in the circle of the riders, the statistical findings of the pilot study's reliability were examined using SPSS software. Cronbach's Alpha values were slightly low for part B (0.486) and extremely good for section C (0.913). As a result, the section C questions can be directly applied to the actual study without further adjustment. The questions in section B had been thoroughly evaluated, and if one of the questions was removed from the questionnaire form, fresh Cronbach Alpha values of 0.610 were created. The Cronbach Alpha value was higher than before, even though the fifth question related to one of the human variables, cell phone use while riding, was removed from SPSS. As a result, the question will no longer be required for the research.

Statistical Analysis of the Reliability of the Actual Study. After executing a pilot study, Cronbach's Alpha values were still required for the primary investigation, which had a total of 346 participants. As a result, the analysis was carried out in the same way as the pilot research. This study's reliability analysis was divided into two portions, B and C, referred to as human factors and environmental variables, respectively. Both sections' Cronbach Alpha ratings were moderate, at 0.781 and 0.856, respectively, indicating that both were good because they exceeded 0.6. In addition, the Cronbach's Alpha value for section B grew in this study, surpassing that of the previous one. Both portions were sufficient in demonstrating that all the cases mentioned above occurred among the motorcyclists, resulting in the road accident.

3.2 Validity Analysis

The validity test is carried out using factor analysis. It is also utilized to ensure that the quantifiable items employed in this study are acceptable. The two statistical measures employed to determine the capacity to do factor analysis were the Kaiser–Meyer–Olkin (KMO) sample adequacy measure and Bartlett's Test of Sphericity. Bartlett's Test of Sphericity must be significant (p 0.05) for the factor analysis to be considered acceptable, and the KMO index must be 0.60 as the minimum value for good factor analysis [19]. For the independent and dependent variables in this section, two-factor analyses were done separately.

The Kaiser–Meyer–Olkin (KMO) Test is a measure of how suited our data is for Factor Analysis. The test measures sampling adequacy for each variable in the model and for the complete model. The statistic is a measure of the proportion of variance among variables that might be common variance. The lower the proportion is, the more suited our data is to Factor Analysis. KMO return values are between

Table 1 KMO and Bartlett's test for independent variables

KMO and Bartlett's test		
Kaiser–Meyer–Olkin measure of sampling adequacy		0.650
Bartlett's test of Sphericity	Approx. chi-square	167.816
	Df	10
	Sig	0.000

0 and 1. A rule of thumb for interpreting the statistic by KMO is discussed. KMO values that are between 0.8 and 1 indicate that the sampling is adequate while values that are less than 0.6 indicate that the sampling is not adequate and remedial action should be taken. Some authors put this value at 0.5, so use our own judgement for values that are between 0.5 and 0.6, whereas values that are close to zero means that there are large partial correlations compared to the sum of correlations. In other words, there are widespread correlations which is a huge problem for factor analysis.

Bartlett's Test of Sphericity compares an observed correlation matrix to the identity matrix. Essentially, the test is used to check if there is a certain redundancy between the variables that we can summarize with a few numbers of factors. The null hypothesis of the test is that the variables are orthogonal, i.e. not correlated. The alternative hypothesis is that the variables are not orthogonal, they are correlated enough to where the correlation matrix diverges significantly from the identity matrix. This test is often performed before we use a data reduction technique such as principal component analysis or factor analysis to verify that a data reduction technique can compress the data in a meaningful way.

Independent Variables. The significance of the KMO and Bartlett's Tests for the independent variable is shown in Table 1. The KMO was 0.650, more significant than the previous reading of 0.60. According to Bartlett's test, the correlation matrix is factorable, which yielded a statistically significant result (p 0.00).

Dependent Variables. The significance of the KMO and Bartlett's Tests for the dependent variable is shown in Table 2. The KMO was 0.834, more significant than the previous value of 0.60. The correlation matrix is factorable according to Bartlett's test, which yielded a statistically significant result (p 0.00).

Table 2 KMO and Bartlett's test for dependent variables

KMO and Bartlett's test		
Kaiser–Meyer–Olkin measure of sampling adequacy		0.834
Bartlett's test of Sphericity	Approx. chi-square	2709.656
	df	253
	Sig	0.000

3.3 Descriptive Statistics

Tables 3 and 4 show the data collection of respondent responses, including the minimum and maximum data and the mean and standard deviation. The questionnaire form includes two variables: dependent and independent variables.

The independent variable was demographic data, whereas the dependent variable was human and environmental factors, divided into three groups. Red-light running (RLR) on the road, mobile phone use (MPU) while riding on the highway, and speeding (S) when riding on the road were all considered human factors. Meanwhile, lighting conditions (LC), roadway surface (RS), and weather conditions were also environmental factors (WC). Those variables for human and environmental aspects each have three and two options, respectively. According to Tables 1 and 2, the minimum and maximum variables should be in the range of 1–3.

Furthermore, the many options for each element were not equally distributed. The environmental factors, for example, employed a Yes/No format to ask respondents to choose an alternative. In terms of human aspects, the solutions presented for each type were not the same. However, the order of all answers suggested the same interpretation, with the first choice indicating that respondents were very interested in the elements presented. The second option stated that respondents were somewhat dedicated to the aspects supplied, implying that the respondent executed the deed only on a few occasions. Finally, the third option was the opposite of the first and second options, referring to people who were either disengaged or never engaged with the provided element.

The mean and standard deviation for each variable were displayed in Tables 1 and 2 by subtracting the most outstanding value from each variable and putting them together. As a result, the mean and standard deviation values are 1.6994 and 2.4711, respectively, and 0.46634 and 0.74479. As a result, the highest and lowest mean values correspond to cell phone use while riding on the road and illumination circumstances, respectively.

4 Conclusion

This study aimed to discover the elements that contribute to road crashes among cyclists and establish which factor was the most frequently mentioned. The questionnaire form includes two variables: dependent and independent variables. The independent variable was demographic data, whereas the dependent variable was human and environmental factors, divided into three groups. Red-light running on the road (RLR), mobile phone use while riding on the highway (MPU), and speeding while riding on the road were all considered human factors (S). Meanwhile, lighting conditions (LC), roadway surface (RS), and the weather conditions were environmental factors (WC). According to the study's findings, factors in the questionnaire

Table 3 Descriptive statistic and normally assessment for human factors

Variables			Descriptive statistics			
Human factors	Item label	Item	Min	Max	Mean	Standard deviation
Red light running behaviour on the road	RLR 1	1. Recalling the last five traffic lights you ride through, how many of them were red when you entered the intersection	1.00	3.00	2.1156	0.74479
	RLR 2	2. You are approaching an intersection with fewer cars, and the traffic has just turned red. Which of the following would you likely do?	1.00	3.00	2.4711	0.52808
	RLR 3	3. You are in a rush to deliver a customer's order and have been stopped by several red lights in a row. Then, you are approaching another intersection with yellow light for several seconds, but you know it is about to turn red. Which of the following would you likely do?	1.00	2.00	1.4595	0.49908
Mobile phone uses while riding on the road	MPU 1	4. Do you think it is dangerous to use your phone while riding?	1.00	3.00	2.2919	0.67998

(continued)