Risky Behaviors of Motorcycle Passengers: Field studies in Jakarta and Bekasi Areas

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Abstract – **The behaviors of motorcycle drivers are rarely studied, while their behaviors caused considerable danger on driving safety. This study aims to identify risky behaviors of motorcycle drivers. This study was conducted in some roads in Jakarta and Bekasi by adopting the work sampling technique. The results showed that risky behaviors were mainly dominated by not wearing a helmet and by carrying more than one person. These behaviors were most commonly found in areas where it was perceived that there was no police and Electronic Traffic Law Enforcement (ETLE), especially in the Bekasi area. The presence of the police is crucial in preventing risky behavior of the drivers. Therefore, it is recommended to further ensure the presence of the police in areas prone to risky behaviors, especially when ETLE is not yet installed, or when it has not been fully applied.**

Keywords – *Motorcycle, Passengers, Risky Behaviors, Work Sampling.*

INTRODUCTION

Motorcycles are the most widely used type of vehicle by the public, namely 81.78 percent. Motorcycle number have the highest growth in Indonesia from 2017-2021, which was around 4.62% per year [1]. The negative impact of the fast growth of the number was that statistics of road accidents involved motorcycles. In 2019, the figure was around 73 percent [2]. This percentage of involvement was much greater compared to other types of vehicles. Meanwhile, the rate of traffic accident fatalities based on accident events during 2020, was also dominated by motorcycles, namely 81 percent [3].

Although many factors influence accidents, such as the condition of the vehicle [4] and road conditions [5], [6], driving behavior is the main factor causing accidents [7]. Research on risky behaviors in motorcycles is mostly aimed at rider behaviors. Some studies in Indonesia highlighted rider behaviors in terms of intention to carry out risky behaviors [8], [9], [10], characteristics of driver [6], and accident in certain locations [5], [6]. Some researches outside Indonesia also mostly discussed similar matters, regarding the possibility of human error [11], factors related to accidents, as well as the fatality rate [12].

Apart from drivers, other parties who contribute to a cause or are affected by risky behaviors are motorcycle passengers. The risky behaviors of passengers can endanger the ride. Moreover, a study said that in motorcycle accidents, passengers were more vulnerable to severe injuries than riders [13]. For example, if the number of passengers is more than one person, then this can be dangerous because the motorcycle is designed to accommodate loads of a certain weight within a certain area. More than one passenger can interfere with driving balance [14], [15]. In addition, sometimes passengers are also not aware that their behaviors can be dangerous.

Given the importance of knowledge about passenger risky behaviors, this study aims to analyze the behaviors of motorcycle passengers. This research examines what passenger's risky behaviors that are often found in society. With this study, we gain knowledge about what risky behaviors often occur and how these conditions occur. For example, where risky behaviors often occur and whether the presence of police or surveillance cameras influences these behaviors. Furthermore, this study

also examines the reasons for these behaviors. This research is expected to provide insight into passenger behaviors so that parties involved in driving safety matters - including passengers, drivers, and the government - can bring up the right approach to overcoming risky behaviors, especially those related to two-wheeled vehicles.

METHODS

This research was conducted by observing some roads in some areas of Jakarta and Bekasi. Observations were made on motorcycles that passed through the road. Focusing on passengers, what is being observed is whether the passenger takes risky actions that can endanger the safety of himself or the rider.

A field study was carried out by adopting the principle of work sampling [16]. Work sampling is generally used to determine working time or productivity from a job that is non-repetitive [17], [18]. Its application is usually to determine the standard time or estimated the daily productivity of work activity [19]. In this study, work sampling was used to observe risky behaviors of motorcycle passengers.

Observations were made on ten roads in Bekasi, East Jakarta, North Jakarta, and South Jakarta during rush hour. The Jakarta and Bekasi areas were chosen because there were many traffic violations found in the Jakarta and Bekasi areas [20], [21], where violations were dominated by motorcycles [22], [23]. In these two areas Electronic Traffic Law Enforcement (ETLE) has also been actively implemented [23], [24]. The number of roads examined in each area was determined based on the potential for violations to occur: 3 in Bekasi, 3 in East Jakarta, 2 in South Jakarta, and 2 in North Jakarta. Road selection was judged in the three areas, representing both on low and high traffic density.

Observations were made at 4 – 5 pm to represent a normal to busy period. Every 5 minutes, one minute of video was taken. From this video, five risky behaviors (RB) of passengers were counted. For each observation period, the percentage of risky behaviors was calculated. Percentages were calculated per period per day, then averaged according to the characteristics discussed. The percentage calculation is based on the total of motorcycle (%RBi to motorcycle) (1) and based on the total of Risky Behaviors (%RBi to RB)(2).

$$\%RBi \text{ to motorcycle} = \#RBi / \#motorcycle \qquad (1)$$
$$\%RBi \text{ to RB} = \#RBi / \#RB \qquad (2)$$

Figureure 1 illustrates the main steps in this research. Observations count the number of risky behaviors per 5 minutes period. The percentage for each period was calculated (formula 1 and 2), and followed by the average daily data. Based on this data, the number of risky behaviors are categorized based on area, supervision (presence of ETLE and police), and road density.
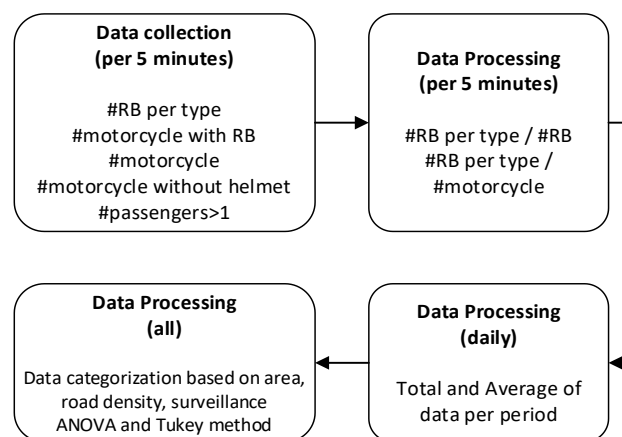

Figureure 1. Data Collection and Processing Steps

Passengers Risky Behaviors

1. Traveling with more than one person, including children

Traveling with more than one person as passengers is dangerous because it can cause imbalance [14]. The rules regarding this are in Law Number 22 of 2009 concerning Road Traffic and Transportation Article 106 Paragraph 9 which reads as follows: "Anyone who drives a motorcycle without a sidecar is prohibited from carrying more than 1 (one) passenger." [25]. This rule applies to all types of passengers, both children, and adults. Therefore, drivers should not be allowed to ride with more than one person, even if they were children. Children are allowed to ride motorcycles if they are considered old enough to be able to ride alone on the back.

2. Passengers do not wear helmets

Everyone who rides a two-wheeled vehicle, both as a driver and a passenger, must wear a safety helmet. This is regulated in Law Number 22 of 2009 concerning Road Traffic and Transportation. Article (1) of the Law explains, "Any person who drives a motorcycle does not wear the Indonesian national standard helmet as referred to in Article 106 paragraph (8) shall be subject to imprisonment for a maximum of 1 (one) month or a fine of up to Rp. 250,000 (two hundred) fifty thousand rupiah)." [25].

Any passengers - both adults and children - are required to wear an appropriate helmet [14], [26].

3. Sitting in a sideways position

The position of the passenger who sits sideways is very dangerous when riding a motorcycle [27] Even though there is no specific Indonesian law that regulates this, the position is very dangerous because it unbalances the motorcycle. The passenger seat must be in the same direction as the driver. Ideally, both hands hold and both knees against the driver's thighs.

4. Child sits on the front side

The option that is often taken for riding a child is to place it in front of the rider, to be precise, between the rider and the handlebars. Riding a small child on the front of a motorcycle is declared dangerous by driving safety practitioners [14], [15]. There are no rules in Indonesia prohibiting this manner, but this habit should not be continued because it is dangerous [28].

5. A child in the back seat alone

Allowing a small kid in the back seat without sufficient security will be dangerous because the driver will have difficulty directly supervising the kid [15]. Under five years old, children cannot grip an adult's body tightly from behind, so there is a risk of falling. A kid must wear safe driving equipment and sit in a special seat [29].

Data processing

Data that collected from 10 days observations were calculated daily in the form of total and percentage of daily observations. Then the data was summed, averaged, or normalized, based on requirements.

Data representation: Graphs

There are four characteristics that were studied, which are: the type of risky behaviors, the area, the surveillance of the road situation, and the density of the road. The calculated data of characteristics was presented in table and presented in bar graph.

a. Types of risky behaviors

There are five risky behaviors types that being analyzed, as mentioned in section "Passengers Risky Behaviors". The types are: more than one passenger, not wearing helmet, kid(s) in the front, toddler on the back, and side way-sit

b. Area

The observed area was divided into for category which are Bekasi, East Jakarta, North Jakarta, and South Jakarta. Only three Jakarta areas that were selected as samples based on cluster sampling [30], representing all Jakarta characteristics

c. Perception of surveillance

This surveillance condition is the perception of presence or absence of police and Electronic Traffic Law Enforcement (ETLE). The ETLE program is an information technology-based traffic law enforcement system that uses cameras to record traffic violations and automatically recognize license plates. This results in the e-ticket as a fine to be paid at the bank [31]. So, surveillance can be divided into 3 categories: police-ETLE, police-No ETLE, and no police-no ETLE.

d. Road density

Road density is divided into 4, in the category of low to high traffic density. Determination of the level of road density was based on the number of motorcycles passing during observation. The number of motorcycles> 800 means very high density of traffic; >600 – 800 means high density; >400 – 600 means normal traffic, and low traffic was identified when traffic density was less than 400 motorcycles per period.

Data analysis: ANOVA

As further analysis, one-way ANOVA tests were used to analyze whether area (4 levels), surveillance (3 levels) and road density (4 levels) factors caused significant differences in risky behaviors values. The explanation of each section was already mentioned in the previous section. These three factors were analyzed separately because initially the research area was determined in the research design, while drivers/passengers' perceptions of surveillance and road density were calculated from field conditions.

There are two responses tested, namely the percentage of risky behaviors to total motorcycle (equation 1) and the percentage of risky behaviors to total risky behaviors (equation 2). The data used as responses in ANOVA analysis is the initial observation data, which is the percentage of risky behaviors in every 5-minute period. Because observations were carried out for 10 days with 12 observation periods each (5-minute periods for 1 hour), there was a total of 120 data in ten days. To ensure data randomness requirements, for the ANOVA test, only 50 data were selected randomly from the 120 data. If a significant value is found, the ANOVA test is followed by the Tukey test to see which means are different.

RESULT AND DISCUSSION

Result
From observations made for 10 days on 10 roads in Jakarta and Bekasi area with different characteristics, the average percentage of daily risky behaviors (per total motorcycles) and the percentage number of risky behaviors (per total risky behaviors) were presented in Figure 2. The percentage of risky behaviors is 12.3 % (total of Figure. 2). This means that if 100 motorcycles are passing by, around 100 motorcycle passengers did the risky behaviors and 10 of them are because the passengers are not wearing helmets.
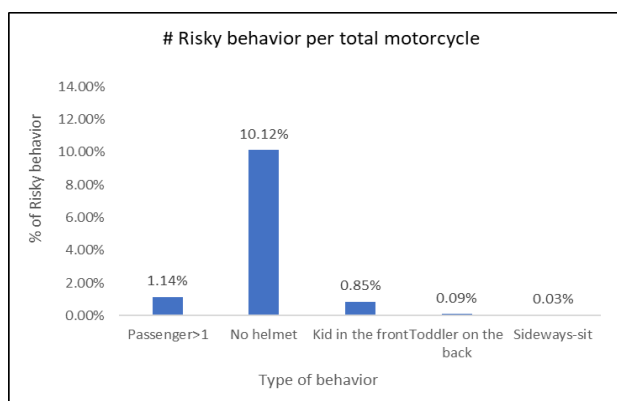

Figure 2. Percentage Risky behaviors (#RB / total motorcycle)
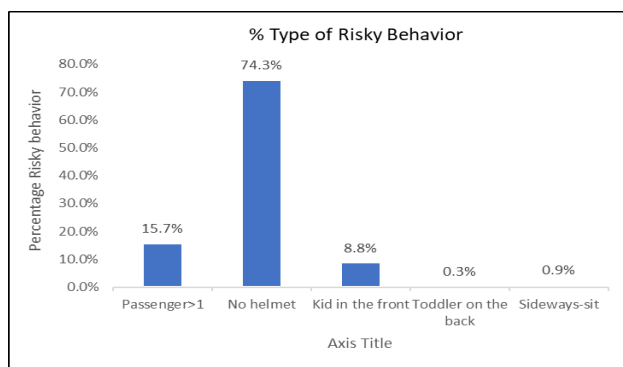

Figure 3. Percentage Type of Risky Behaviors (#Rb_i / Total RB)

Types of Risky Behaviors
The biggest risky behaviors found was not wearing a helmet, which is 10.12% (Figureure 2). This data is calculated per passenger. If there are two passengers and both are not wearing helmets, then it is counted as two risky behaviors. So around 74.3% of the risky behaviors that occurred was passengers not wearing helmets (Figure. 3). This is in line with other studies related to risky behaviors in motorcyclists which state that not wearing a helmet is the most common behaviors-related violation [32], [33], [34].

Furthermore, passengers of more than one person were found in around 15.7% of motorcycle passengers' risky behaviors. From the data, there are 2 to 3 motorcycle passengers of adults or children. From observations in the field, most motorcycles carry children in the middle of the seat or in front of the driver. About 8.8 % RBs were related to the placement of children on the front of the motorcycle. This behaviors may or may not be combined with the risky behaviors of carrying more than one passengers.

Other risky behaviors that found in a much smaller percentage were sideways-sitting and kind on the back. The sideways sitting position was found in women who wear short or long skirts, which complicates them to sit in a proper method. To maintain the body balance, these passengers usually hold on to motorcycles or riders. The smallest percentage is a small child who is placed on the back of his motorcycle. Only about 0.3% of risky behaviors are related to this case. However, this number can indicate 3 out of 100 risky behaviors were related to this incident. In some observations, toddlers were tied to the driver's back to prevent them from falling (both with special tools and some kind of ordinary cloth), but some were left to hold on alone without any safety. This behavior is dangerous, especially if the child is not holding on properly or is tired/sleepy.

Factors Related to Risky Behaviors
This section discusses the possible factors related to the behaviors. Each image presented in Figure. 4 to Figure. 7 shows 3 bar graphs in different colors. For example in Figure. 4, the blue graph (%RB) shows the average of daily risky behaviors percentage in the area. The daily risky behaviors percentage was calculated by dividing number of risky behaviors to number of motorcycles in the related area.

Table 1. Data Illustration For Figureure 2 and 3

Area	% RB	Risky behaviors		Motorcycle	
		#	%	#	%
Bekasi	20.1%	461	52.0%	2231	32.3%
East Jakarta	7.8%	192	21.6%	2456	35.5%
North Jakarta	12.3%	164	18.5%	1376	19.9%

Area	% RB	Risky behaviors		Motorcycle	
		#	%	#	%
South Jakarta	6.9%	70	7.9%	847	12.3%
Total		887	100%	6910	100%

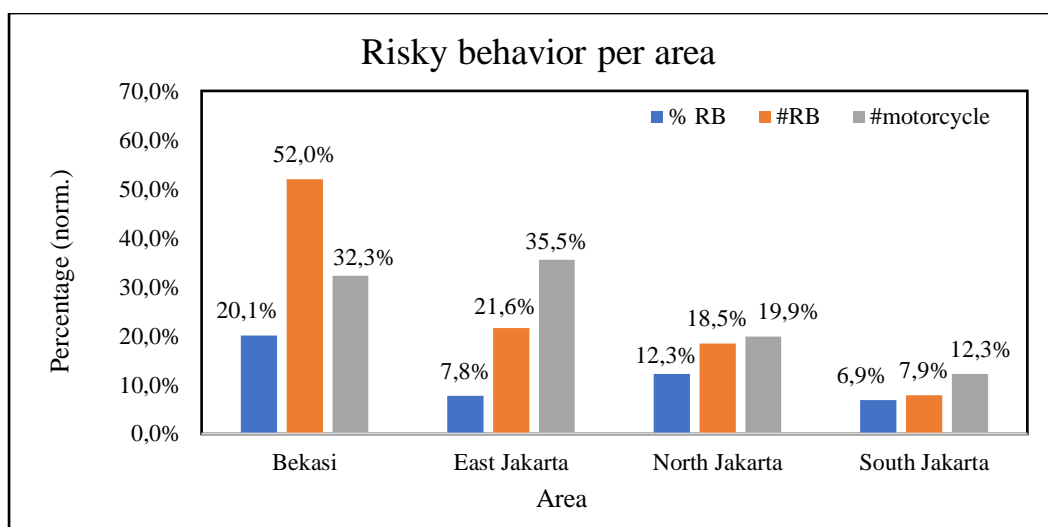Figureure 4. Percentage of Risky Behaviors Per Area

The orange graph (#RB) shows the number of risky behaviors (number of RB in certain area per number of risky behaviors), and the grey graph (#motorcycle) shows the number of motorcycles that have been normalized to the total. Table 1 illustrates data that was used to calculate the graph. Figure. 4 shows that the biggest risky behaviors occurred in the Bekasi area. Even though the number of motorcycles observed was relatively lower than in East Jakarta, the average percentage of risky behaviors was much higher than in other areas.

Table 2. ANOVA Result Using The Factor of Area
(Percentage of motorcycle with risky behaviors)

Source	DF	Adj	Adj MS	F-Value	P-Value
Area	3	0.141	0.047	7.91	0
Error	46	0.272	0.006		
Total	49	0.413			

Table 3. ANOVA Result Using The Factor of Area
(Percentage of risky behaviors)

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Area	3	0.2974	0.0991	7.3	0
Error	46	0.625	0.0136		
Total	49	0.9224			

Based on one-way ANOVA with the response percentage of motorcycles with risky behaviors (Table 2) or percentage of risky behaviors (Table 3), it is concluded that areas significantly differ the means of both responses. Therefore, the analysis continues with the Tukey method to find out which

areas have significantly different risky behaviors values.

From Table 4 and 5, it can be seen that the risky behaviors value in the Bekasi area is significantly different from other areas, which is higher. Bekasi is included in an area that has a high number of motorcycle accidents, with a high fatality rate as well [21], [35], [36]. The behaviors of drivers who often obey traffic rules is one of the causes [35], [36]. Our study corroborates the findings in these studies. We complete the results with the findings that violations and dangerous behaviors are not only found in drivers, but also in passengers.

Table 4. Categorization of Risky Behaviors Value Based on Area, Using Tukey Method (Percentage of motorcycle with risky behaviors)

Daerah	N	Mean	Grouping	
Bekasi	18	0.159	A	
Jakarta Timur	15	0.068		B
Jakarta Utara	8	0.057		B
Jakarta	9	0.023		B

Table 5. Categorization of Risky Behaviors Value Based on Area, Using Tukey Method (percentage of risky behaviors Means that do not share a letter are significantly differen)

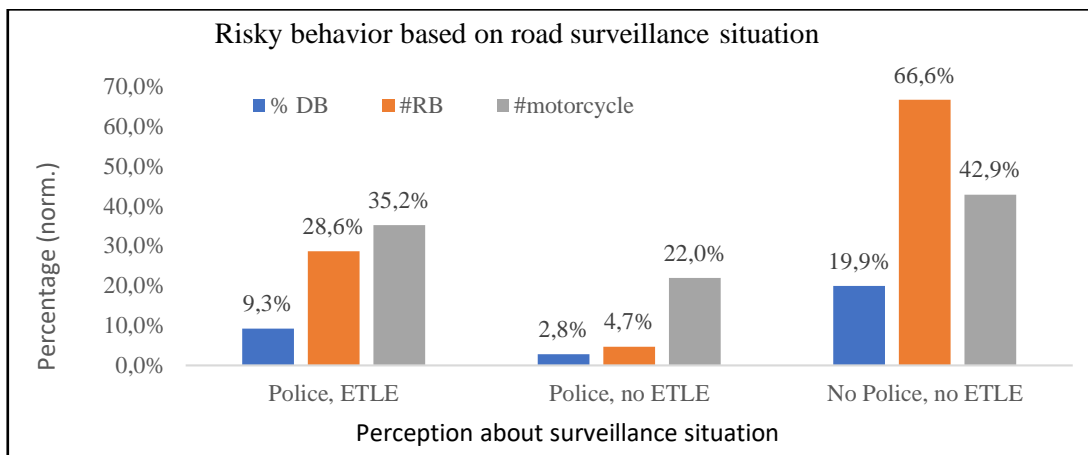| Daerah	N	Mean	Grouping	
Bekasi	18	0.2403	A	
Jakarta Timur	8	0.1118	A	B
Jakarta Utara	15	0.1074		B
Jakarta	9	0.0375		B

Figureure 5. Percentage of Risky Behaviors Based on Road Surveillance Situation

The East Jakarta area shows quite interesting data. Even though the number of motorcycles is relatively large (grey scale in Figure. 4), the percentage of risky behaviors is relatively small (7.8%) compared to other areas. The opposite happened with North Jakarta. Even though the number of motorcycles observed was less, it was found that the number of risky behaviors was higher than in East Jakarta (12.3%). The smallest RB data is found in the South Jakarta area, which is 6.9%. With the least number of observed motorcycles among other areas, the number of risky behaviors in that area is very small.

The difference in the number of risky behaviors may also be caused by differences in the perceptions of surveillance. Sometimes if the road is assumed as "safe" for risky behaviors, then a rider will tend to commit risky behaviors [37], [38]. Figure. 5 supports this statement. Nearly 20% of motorcyclists committed violations when the police and Electronic Traffic Law Enforcement (ETLE) devices were not around.

Using one-way ANOVA with the surveillance as a differentiated factor, Table 6 shows that the percentage of risky behaviors is indeed significantly different for the response percentage of motorcycles with risky behaviors (p-value < 0.05) (Table 6). Meanwhile, differences in perceptions about surveillance were not proven to significantly differentiate the percentage of risky behaviors (Table 7). Furthermore, Table 8 shows that there are

different values in the "No police and No ETLE" condition compared to the other two conditions. In the other two conditions, the perception that the brand is being monitored by the police (either by tone or absence of ETLE), causes motorbike riders or passengers to be more alert and make fewer risky behaviors.

Table 6. ANOVA result using the factor of surveillance perception (Percentage of motor cycle with risky behaviors)

Source	D	Adj	Adj	F-	P-
Surveillanc	2	0.16	0.080	15.01	0
Error	47	0.25	0.005		
Total	49	0.41			

Table 7. ANOVA result using the factor of surveillance perception (Percentage of risky behaviors)

Source	D	Adj	Adj	F-	P-
Daerah	3	0.297	0.392	0.196	17.33
Error	46	0.625	0.531	0.011	
Total	49	0.922	0.922		

Table 8. Categorization of Percentage of Motorcycle With Risky Behaviors Based on Surveillance Perception, Using Tukey Method

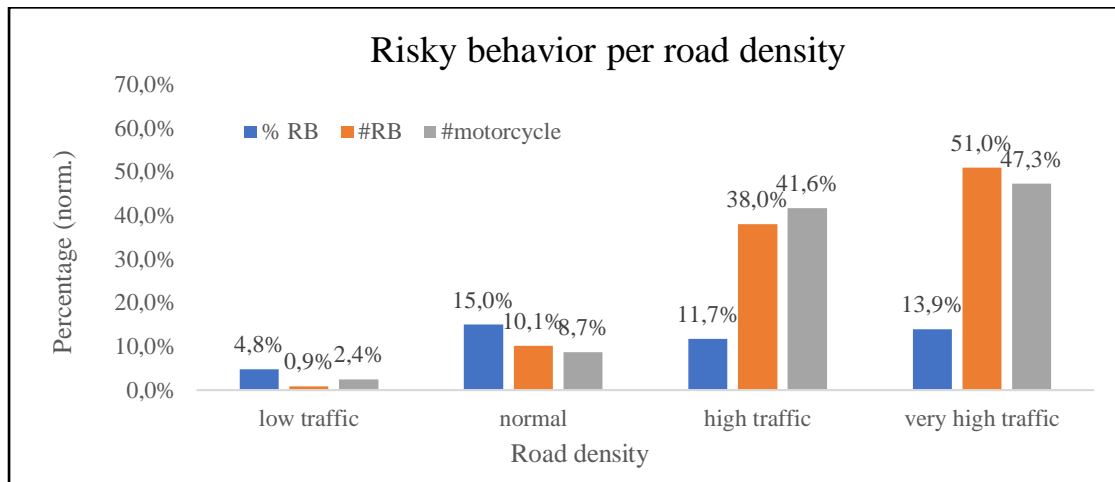| Surveillance	N	Mean	Grouping
No police, no	21	0.156	A
Police, ETLE	19	0.053	B
Police, no ETLE	10	0.024	B

Figureure 6. Percentage of Risky Behaviors Based on Traffic Density

Slight anomaly occurs in other data where more risky behaviors (occur in areas where it was perceived that there are police and ETLE, higher than areas where there are police (without ETLE). This is quite in line with several studies in several areas that have implemented ETLE in Indonesia. A number of studies have concluded that although ETLE has the potential to reduce road risky behaviors, ETLE is not always effective due to various obstacles in its implementation [31], [38], [39], [40]. These obstacles, for example, in terms of supervision and personnel limitations [40], utility and trust [39], public knowledge [38] transparency, and accountability [31]. It explains why the presence of the police is more dominant in determining motorbike's behaviors than the presence of ETLE.

The next characteristic observed is road density. Roads are grouped into 3 categories, namely normal, high, and very high traffic. Since only small portion of data that has low traffic, then for the ANOVA, low and normal traffic data were mixed. Figure. 6 shows that road density does not affect RB. Whether on roads with normal, high, or very high traffic, passengers still do RB with a similar percentage value.

This is supported by the One-way ANOVA results (Table 9) which also shows that the road density factor does not differentiate between the percentage of motorbikes with risky behaviors or the percentage of risky behaviors (p value > 0.05). Although there is a tendency that the higher the road density, the higher the violation rate, it turns out that variations in this data do not show significant differences.

Table 9. ANOVA result using the factor of road Density (Response: percentage of motor cycle with risky behaviors)

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Density	2	0.045	0.023	2.89	0.065
Error	47	0.368	0.008		
Total	49	0.413			

Table 10. ANOVA result using the factor of road Density (Response: percentage of risky behaviors)

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Density	2	0.086	0.043	2.43	0.099
Error	47	0.836	0.018		
Total	49	0.922			

There is likely to be an interaction between areas, perceptions of surveillance in that area, and the density of an area. Figure. 7 shows the area interaction data, perceptions of surveillance in the area, and the density of the area. The value shown in each graph is the average of each calculated characteristic. ANOVA analysis for interaction was not carried out because the surveillance and density factors were calculated at the time of observation, so the data collected regarding these two factors was not designed from the start of the research.

Confirming previous findings, the highest risky behaviors occurred in areas that were perceived as not having strict surveillance, whether at normal, high, or very high traffic. Areas like this are found in Bekasi, East Jakarta, and North Jakarta, with the largest %RB occurring in Bekasi.
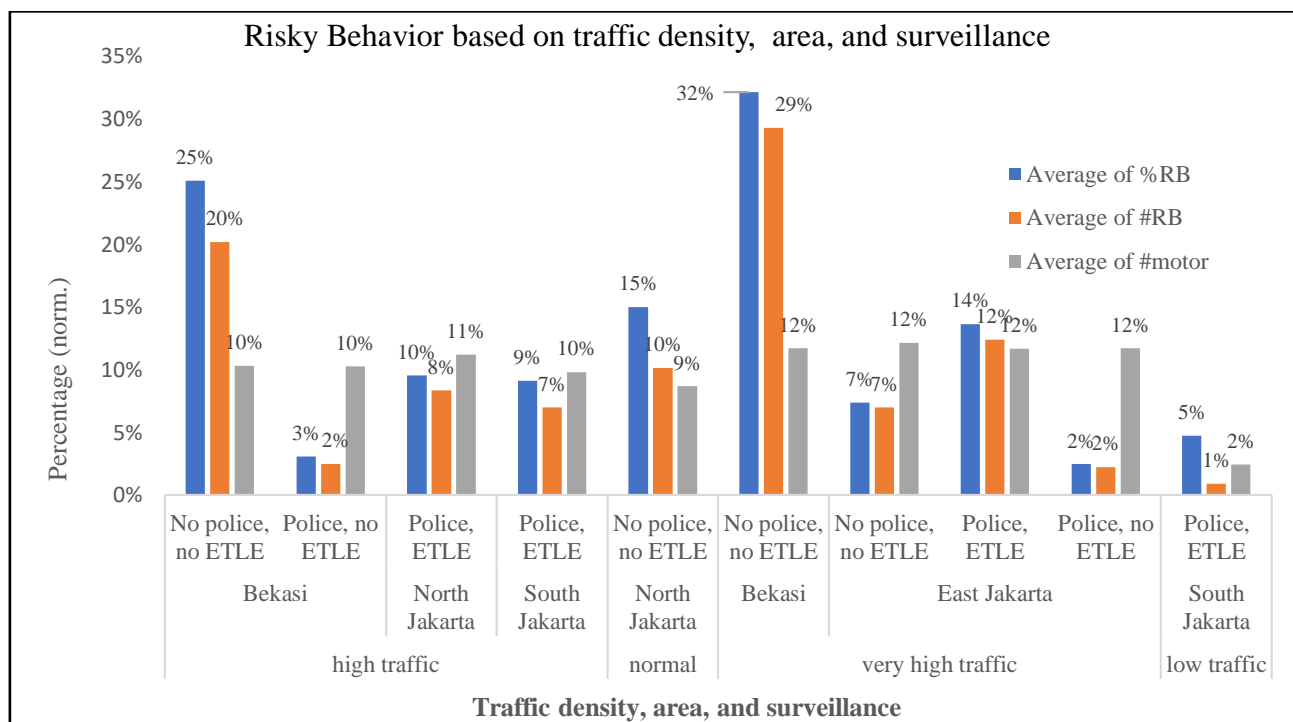
Figureure 7. Percentage of Risky Behaviors Based on Traffic Density, Area, and Perception of Surveillance

In a very busy area without strict supervision in Bekasi, the %RB Figureure even reaches a high value, namely 32% of the total motorcycles passing. This Figureure reflects 29% of the total RB from all data. Other areas in Jakarta are not too different from each other, meaning that potential risky behaviors can occur in all areas of Jakarta and in any traffic conditions. The range of RB is around 2%-32%.

Discussion
This study is in line with similar studies which concluded that the biggest violations related to two-wheeled motorbikes were related to driving activities, compared to violations related to vehicles, or when parking [7]. The most dominant violation is not wearing a helmet [32], [33], [34]. Additionally, a study has recorded more than 50% of cellphone use while riding a motorcycle [34]. On the other hand, other research states that the weak low enforcement caused the large number of violations committed by two-wheeled riders [32].

Our study focused on the risky behaviors of passengers because passengers are a determining factor for driving safety and victims of unsafe driving behaviors. The effect of the presence of passengers can be seen from a study regarding the effect of the presence of passengers on drivers. For example, a study has concluded that the driving activity with an actively speaking passenger brought higher number of accidents than silent passenger [41]. The factors discussed in our studies are the location of the risky behaviors, traffic density, and perception of surveillance. Although not specifically mentioning passengers, behaviors on the road dominates the violations. Other research stated that traffic laws in Indonesia cannot be implemented effectively, evidenced by the large number of violations committed by two-wheeled riders [32].

From this study, it appears that the Jakarta and Bekasi regions have somewhat different characteristics in terms of the number of RBs. Even without the police and ETLE, the percentage of RB in the Jakarta area is much smaller than in Bekasi. In areas with police and ETLE – all of which are in the Jakarta area – potential risky behaviors were still found in the tens of percent range, evenly distributed throughout the Jakarta area. The interesting data is that it turns out that the smallest potential for risky behaviors occurs in areas that were perceived to be supervised by the police, even without ETLE, which is in the range of a maximum of 5%. This means that areas with police and ETLE have a greater potential RB value.

The ETLE (Electronic Traffic Law Enforcement) system is a legal breakthrough in law enforcement practices to present a fast and transparent law enforcement system [42]. ETLE utility and trust also affects in compliance, awareness, and habits [39], including driving as a driver or passenger. The implementation of e-tickets in some are in Jakarta has reached more than 50%, meaning that some

people understand enough about the process of paying ticket fines using the e-ticket mechanism [31]. However, there are obstacles with a very high percentage of possible fees outside the procedure with a percentage of (> 50%) and satisfaction in e-ticketing services is very low [31].

These various obstacles are caused by limited camera quality [38], asynchronous application of ticket regulations [38], the number of trained operating personnel, limited supporting facilities, and limited maintenance budget [42]. In addition, socialization of e-ticket implementation and procedures to the public is still uneven, so there are still many implementation obstacles found in the field [31], [38]. Therefore, full support from various parties is needed so that the effectiveness of using ETLE can increase. Training and increasing the number of back office personnel who can operate or analyze ETLE camera capture is absolutely necessary [40], in order to further increase ETLE's credibility and improve people's safety behaviors while driving.

To further analyze these results, interviews were conducted with several motorcycle passengers regarding the behaviors of this RB. Of the 10 people interviewed, they said that if they felt safe, they were not mind breaking rules or behaving in ways that could potentially reduce security. The presence of the police does influence the courage to violate the rules or to do risky behaviors. However, if they often see the police in that place, it is far more influential than just perceiving that there are police and ETLE in the area. In some of the areas studied here, where it was perceived that there were police and ETLE, some risky behaviors were still found because in the reality there are no police and ETLE has not been fully treated for fines for motorcycles yet. Moreover, respondents who were interviewed had never experienced ETLE-based fines. Therefore, they have perception that the ETLE fine tickets have not been applied to motorcycles yet, but only to cars. On the other hand, in areas where it was perceived that they do not yet have ETLE but are often guarded by the police, the level of risky behaviors is lower.

All respondents who were interviewed had never experienced ETLE-based fines. Therefore, they think that the ETLE ticket may not have been applied to motorcycles. On the other hand, in areas where it was perceived that they do not yet have ETLE but are often guarded by the police, the level of risky behaviors is lower. A study mentioned that the types of traffic risky behaviors handled by the

ETLE program include violations of odd-even plates, road signs, road markings, speed limits, seat belts, and using cellphones while driving [31]. This may explain why many motorized offenders do not receive electronic fines.

Based on the results of this study it is proven that the existence of the police is effective in preventing violations or risky behaviors. The presence of the police is more effective than ETLE, possibly because ETLE has not yet been fully enforced for violation caused by motorcycle. Therefore, it is recommended to continue to empower the police in places that are prone to violations or risky behaviors. In the future, ETLE can also be utilized more effectively to reduce this risky behaviors.

This research still has limitations. The first is that the area under study does not cover the entire area of Jakarta or Jabodetabek. Furthermore, the area studied has not covered all aspects studied. For example, in an area, the selection of busy or quiet roads is not evenly distributed, as well as the presence of ELTE. Therefore, in further research it is recommended to involve various regions that have a complete variety of characteristics.

CONCLUSION

This study aims to examine the risky behaviors of motorcycle passengers. Passengers not wearing helmets and carrying passengers of more than one, are the biggest risky behaviors found. These two behaviors are not only risky, but also violation of traffic laws. From observations in various areas in Jakarta and Bekasi, Bekasi has a greater potential for risky behaviors than Jakarta. This potential might occur because some roads in Bekasi do not not have ETLE and the perceptions of police surveillance are not as strict as in Jakarta. The results further show that the presence of the police is more effective than ETLE in reducing risky behaviors. Risky behaviors occurs evenly in areas with normal or busy traffic. Based on this study, it is suggested that there should be more police supervision in various regions. Otherwise, the implementation and fines using ETLE should be enforced more strictly against motorcycles as well as cars. For further research, it is suggested to study each region with each characteristic separately.

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