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PUBLIC PERCEPTION TOWARDS SAFETY DRIVING BEHAVIOUR (CASE STUDY: JAWA BARAT)

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Abstract

Dangerous driving behavior is one of the factors causing accidents and fatalities. Deaths from traffic accidents are ranked eighth on the list of the highest causes of death in the world. In 2020, 29% of the total fatal accidents were caused by speeding behavior. There are various factors that cause drivers to tend to drive vehicles at high speeds, ranging from psychological factors to environmental factors. Therefore, it is necessary to have an understanding of road users regarding perceptions related to safe driving behavior. In this study, 5 (five) locations were used for data collection, namely Bekasi City, Bekasi Regency, Bandung City, Bandung Regency, and Garut Regency. Based on this research, road users consider that the supporting components of road safety are sufficient but the fines related to violations committed, especially speed violations are still considered too high. In addition, there is no significant difference between the five study sites

Keywords: Speeding, Driving Behaviour, Traffic Violation, Driver Perception, Accident

Abstrak

Perilaku mengemudi yang berbahaya merupakan salah satu faktor penyebab terjadinya kecelakaan dan korban meninggal dunia. Kematian akibat kecelakaan lalu lintas menduduki peringkat ke-delapan dari daftar penyebab kematian tertinggi di dunia. Pada tahun 2020, 29% dari total kecelakaan fatal diakibatkan oleh perilaku mengebut (*speeding*). Terdapat berbagai faktor yang menyebabkan pengemudi cenderung memacu kendaraan dengan kecepatan tinggi, mulai dari faktor psikologis hingga faktor lingkungan. Oleh karena itu, perlu adanya pemahaman terhadap pengguna jalan mengenai persepsi terkait perilaku mengemudi yang berkeselamatan. Pada penelitian ini, 5 (lima) lokasi menjadi tempat pengumpulan data, yaitu Kota Bekasi, Kabupaten Bekasi, Kota Bandung, Kabupaten Bandung, dan Kabupaten Garut. Berdasarkan penelitian ini, pengguna jalan menilai bahwa komponen-komponen pendukung keselamatan jalan sudah mencukupi namun denda terkait pelanggaran yang dilakukan terutama pelanggaran kecepatan masih dianggap terlalu tinggi. Selain itu, tidak terdapat perbedaan yang signifikan antara kelima lokasi studi

Kata Kunci: *Speeding*, Perilaku Mengemudi, Pelanggaran Lalu Lintas, Persepsi Mengemudi, Kecelakaan

INTRODUCTION

Background

Dangerous and aggressive driving is one of the factors that lead to traffic accident. Meanwhile, the same behaviour also associates with traffic violation particularly on speeding. In Indonesia, traffic accident contributes on 25,266 death per year behind cardiovascular disease and stroke. Currently, traffic accident is the eighth leading cause of death in the world. To make thing worse, the majority of the traffic accident victim are between 15 and 64 years old which still classified as productive age.

Figure 1. Death Rate from Traffic Accident per 100,000 inhabitants in the World

Figure 1 demonstrates the death rate due to traffic accident around the world. The darkest red indicates more than 40 deaths per 10,000 inhabitants while the lightest yellow indicate fewer than 5 deaths per 100,000 inhabitants. According to the map, Libya is the country with most death per 100,000 inhabitants. In general, most countries in Europe is dominated by lighter yellow colour meanwhile countries in Africa is subject to higher death rate.

Table 1. Number of Death due to Traffic Accident by G20 Countries

Country	Deaths per 100,000 inhabitants per year	Deaths per 100,000 motor vehicles per year	Country	Deaths per 100,000 inhabitants per year	Deaths per 100,000 motor vehicles per year
United Kingdom	2.9	5.7	Turkey	12.3	46.4
Germany	3.7	6.4	Mexico	12.3	43
Japan	4.1	5.7	United States	12.4	14.2
Australia	4.5	7.4	Argentina	13.6	24.3
France	5	8.4	Indonesia	15.3	36.7
Italy	5.2	6.3	India	16.6	130.1
Belgium	5.4	9	China	18.8	104.5
Canada	5.8	8.9	Brazil	23.4	57.5
South Korea	6.5	13	South Africa	25.1	133.9
Russia	11.6	50	Saudi Arabia	27.4	119.7

Table 1 demonstrates the number of deaths per 100,000 inhabitants per year and per 100,000 motor vehicles per year for G20 member. As the G20 member is dominated by developed countries such as United Kingdom and Germany, the number may show low number of death either per 100,000 inhabitants or 100,000 motor vehicles. However, for developing countries such as Mexico, Indonesia, or Brazil, the number of deaths per 100,000 inhabitants is relatively high. Interestingly, USA as one of the developed countries still hold a quite high number of deaths which higher than developing countries like Turkey and Mexico.

For more than two decades, speeding has been involved in approximately one-third of all motor vehicle fatalities. In 2020, speeding was a contributing factor in 29% of all traffic fatalities (National Highway Traffic Safety Administration, 2020). Moreover, speeding is more than just a traffic violation. The consequences are far-ranging from (1) greater potential for loss of vehicle control, particularly when the driver is inexperience in controlling high-speed vehicle, (2) reduced effectiveness of occupant protection equipment, for example the response of airbag which related to the crash impact force, (3) increased stopping distance after the driver perceives a danger, (4) increased degree of crash severity leading to more severe injuries, 5% increase in average speed causes 10% of traffic accident occurrence probability and 20% of fatal accident occurrence probability, and (5) increased fuel consumption/cost.

LITERATURE REVIEW

Speeding Behaviour

Speeding is one of the common behaviours on the road traffic. In some cases, people need to reduce the travel time to arrive to their destination in time. Therefore, they tend to drive their vehicle in high speed or even exceeding the speed limit. Ironically, such irresponsible behaviour is contributing on traffic accident occurrence particularly fatal accident. In 2020, 35% of the fatal crash due to speeding involve men between 15 and 20 years old (National Highway Traffic Safety Administration, 2020).

There are several factors that influence the tendency to speeding. (1) Situational factors, As mentioned earlier, most people tend to reduce their travel time by increasing the vehicle speed or when on a long trip with a few cars around. Moreover, the psychological issues such as anger, anxiety, and fright also had significant influence on driving behaviour performance (Roidl et al., 2014). (2) Social pressure, the surrounding condition significantly affect the driver, people tend to avoid being different even on the road. People feel obligated to drive the similar speed as the other cars (Kusuma et al., 2019).

(3) Inattention, the location of the speed limit sign may have a contribution on the speeding phenomenon, the poor visibility location may decrease people awareness towards the speed limit. Furthermore, playing music also considered as contributors to speeding, particularly genres that contain aggressive and faster tempo. It is found that such genres may led to tendency of speeding and reduction of eye movement as well as the attention to the surrounding environment. (Babic et al., 2021). (4) “It feels good”, some drivers enjoy driving

fast, especially using sophisticated car. However, thrill seeking associated with competitive attitudes toward driving which led to driving violations. (Yıldırım-Yenier et al., 2016).

Road Safety Instrument

According to the law, the road must be supplemented by road safety instrument, in which consist of directly related and indirectly related to road user. The directly related-to-road-user road instrument aim to promote the road safety and accessibility for road user in the traffic. The road instrument is including: (1) *traffic sign*: prohibition sign, command sign, warning sign, guidance sign, etc (2) *road markings*: full markings, strip markings, in-line markings, chevron markings, etc and (3) *traffic signal*: traffic phase, traffic cycle, pelican, etc.

Figure 2. Example of Road Sign in Indonesia

Several research have studied the impact of traffic signs or road supplementary instrument towards the general road safety behaviour. Previous research found that there is a significant effect of sign familiarity and interaction between sign types and sign familiarity on sign comprehension time (Maulina, et al., 2022) which led to the awareness and acknowledgement of surrounding traffic signs. The other research focus on the impact of multi-board sign which generated more mental workload than the single-board sign does and also affects driving performance (Yang, et al., 2020). Meanwhile the other study examined the efficacy of the improved traffic signs and markings on driving and perception performance at flashing- light-controlled grade crossings. The results indicated that the effect of improved design of signs and markings could enable drivers to perceive signs timely and fixate on the flashing-light signal in advance (Ma and Yan, 2021).

METHODOLOGY

Study Area

All of the study area for this paper are located on West Java province, namely Bekasi City, Bekasi Regency, Bandung City, Bandung Regency, and Garut Regency. The basis of the

study area choice is considering the socio-economic differences for each area while at the same time each area also has similar characteristics especially from the spatial perspective.

Table 2. Socio Demographic Characteristics for each Study Location

	Bekasi	Kab. Bekasi	Bandung	Kab. Bandung	Kab. Garut
Area (km^2)	210	1,274	167	1,762	3,065
Road length (km)	21,955	31,530	38,447	127,530	286,032
Number of inhabitants	3,075,690	3,899,017	2,510,103	3,831,505	2,636,637
Number of motor vehicles	1,176,665	1,516,074	1,738,665	1,104,264	427,565
Number of vehicle and inhabitant ratio	0.382	0.388	0.692	0.288	0.162
Accident rate	624	1,142	407	338	303
Accident per km ratio	0.028	0.036	0.01	0.002	0.001
Regional Minimum Wage (Rp)	4,816,921	4,791,843	3,774,860	3,241,929	1,975,220

Table 2 explores the characteristics of each study area from socio-economic and demographic component such as number of inhabitants and regional minimum wage. Bandung city has the highest vehicle ownership and number of inhabitants ratio with 0.692 which implies that there is 1 (one) vehicle for every 2 persons. Meanwhile Bekasi City only has 0.382 vehicles ownership and inhabitant's ratio considering it has the highest regional minimum wage in comparison to the rest study area.

Accident per km ratio may related to the quality of the road itself. For example, Bekasi regency has lower road network in comparison to Bandung City. However, the accident rate is almost three times higher. It also applied for Bekasi city which has only 21,955 km road but generate 624 accident per year in which still higher than Bandung regency. Meanwhile, regional minimum wage seems did not affect the general accident characteristics in each city.

Data Processing

Table 3. Number of Respondent for each Area

	Motorcycle	Passenger Car	Truck
Kota Bekasi	33	29	3
Bekasi	64	7	6
Kota Bandung	87	8	4
Bandung	63	20	3
Garut	18	23	3

Table 2 show the distribution of respondent for each area and transport mode. Although the data collection is conducted through partnership with the police, it is hard to obtain the data from truck driver. No area has reach more than 10 respondents for truck driver. However, Bekasi regency have the highest proportion for truck driver considering the area is surrounded by logistic activity. The data collection is conducted near the respective resort police office for each study area:

Table 4. Study Location for each Administrative Area

Administrative Area	Survey Location
Bekasi City	Jalan Ahmad Yani
Bekasi Regency	Jalan Tanjungpura
Bandung City	Jalan Soekarno Hatta
Bandung Regency	Jalan Nagreg Citaman
Garut Regency	Jalan Limbangan Cigagade

The questionnaire consists of several part. The first part attempt to collect respondent's socio demographic characteristics such as gender, driving license, trip frequency, occupation, and etc. The next part encompasses the *likert-scale* question regarding to the perception of the road safety component as the following:

- General perception towards road safety: road infrastructure conditions and its safety aspect
- Perception towards road safety indicators: factor such as pavement improvement, law enforcement, information, and training
- Perception towards speed: speed-related characteristics such as satisfaction and infrastructure
- Perception towards speed limit: speed limit existence and current regulation
- Perception towards speed and driving license: the implementation of demerit system which may culminate in driving license withdrawal
- Perception towards traffic law enforcement: probability of getting ticket after exceeding the speed limit

Table 5. Example of Survey Questionnaire

No	Question	Scale			
		Highly disagree	Disagree	Agree	Highly Agree
1	In general, the urban road is safe				
2	In general, the rural road is safe				
3	The safety instrument like signage and median at the urban road is visible and safe				
4	The safety instrument like signage and median at the rural road is visible and safe				

Likert scale is a psychometric scale commonly involved in research that employs questionnaires. A Likert scale is commonly used to measure attitudes, knowledge, perceptions, values, and behavioural changes. A Likert-type scale involves a series of statements that respondents may choose from in order to rate their responses to evaluative questions.

RESULTS AND ANALYSIS

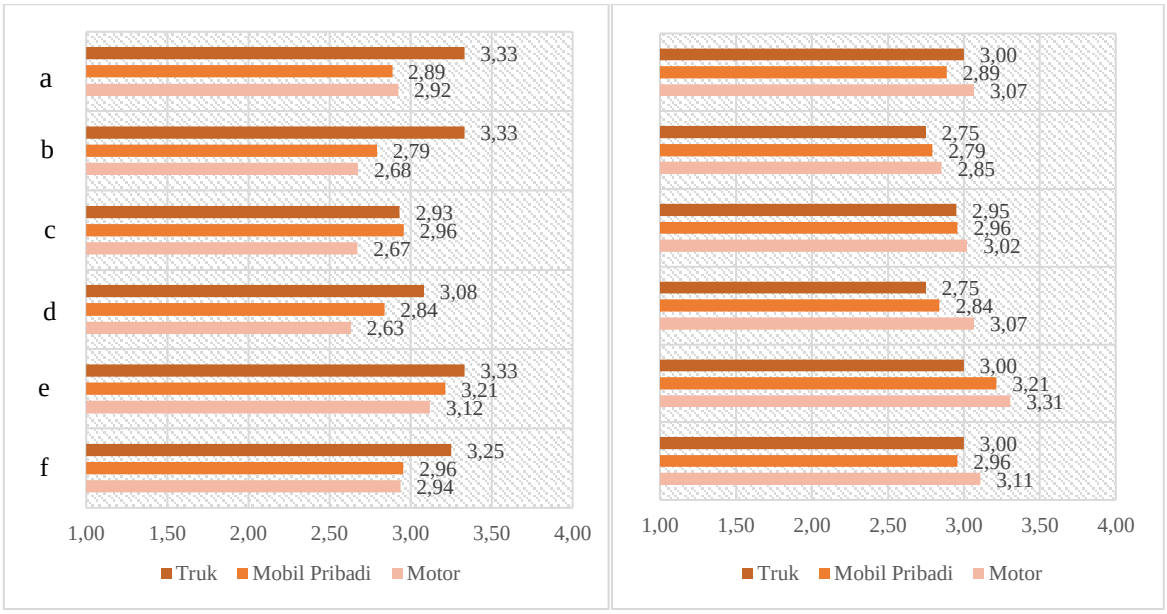
In conducting the analysis, the results of the respondents' answers were divided by region and type of vehicle. The perception of road safety was simplified into six indicators according to the components of the questions asked to respondents as follows.

Table 6. Indicators used in this study

	Indicators
a.	People acknowledge the speed monitoring system by the police
b.	Law enforcement regarding to driving speed is appropriate
c.	The existing speed limit is appropriate
d.	Having the tendency to driving in high speed
e.	Traffic police function is adequate to promote road safety
f.	Road infrastructure is adequate to promote road safety

Public Perception

Kota Bekasi – Kota Bandung

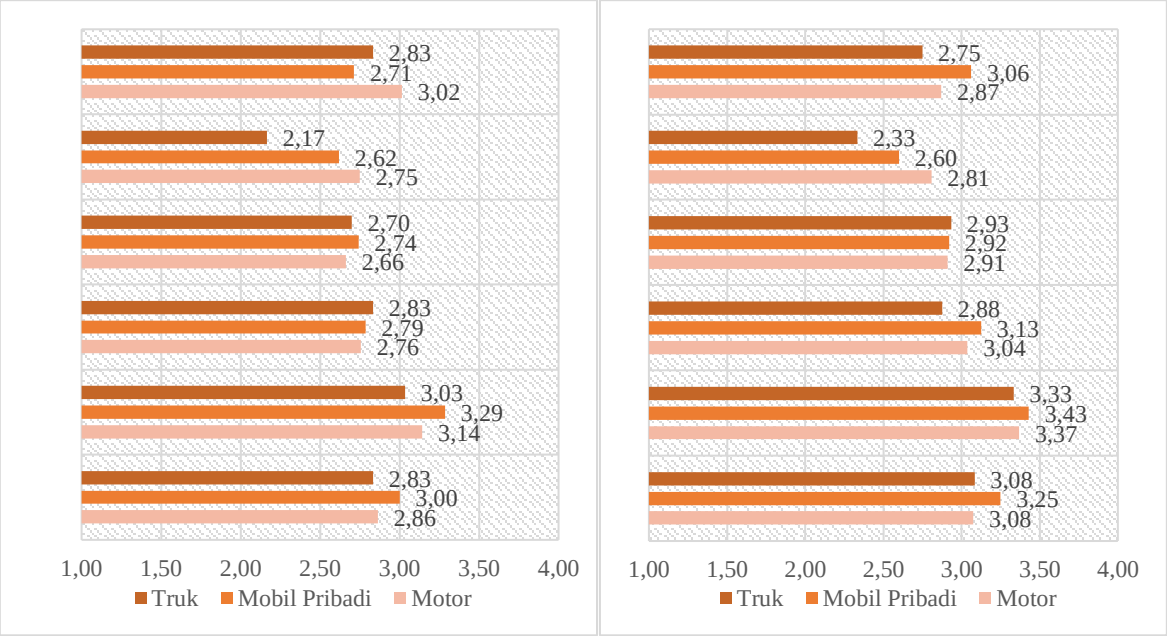


(a) (b)

Figure 3. Public Perception (a) Kota Bekasi; and (b) Kota Bandung

Between the two cities, Bekasi and Bandung demonstrated a quite opposite pattern. In Bekasi, truck drivers perceived positively most of the indicators. Meanwhile, motorcycles have the highest positive perception towards the road safety indicator. From the survey results, it can be seen that the people in Bekasi City and Bandung City support the road safety campaign held by the police and the Traffic police function is adequate to promote road safety. On the other hand, the perception of the people of Bandung City regarding law enforcement on speed limit violations is still not appropriate. In urban areas, inspections of motorized vehicles are carried out to check driver's certificates or vehicles, which for most drivers is considered unnecessary. Traffic regulations also influence a better perception of truck vehicles in the city of Bekasi where there are not many restrictions on city roads, while in the city of Bandung, heavy vehicles will be directed to pass through the city's outer ring road to reduce the volume of heavy vehicles passing through city roads.

Kabupaten Bekasi – Kabupaten Bandung



(a) (b)

Figure 4 Public Perception (a) Kabupaten Bekasi; and (b) Kabupaten Bandung

Bekasi Regency and Bandung Regency demonstrated a pretty similar pattern. Overall, the two regency car drivers perceived most of the indicators positively. The lowest perception is regarding to traffic law enforcement. In this case, the driver does not agree that the punishment for violating the speed limit is revoking a driving license. That case is related to the highest one regarding positive perceptions for the police to conduct campaigns or counselling about road safety. The regulation socialization and information spread is important for society before implementing law enforcement.

Drivers in either Bandung city or regency may seek high speed positively and have tendency to drive in high speed compared to Bekasi area due to the high number of heavy vehicles as an impact of logistic activity in Bekasi area. Ironically, although Bekasi Regency is an industrial area, the driver's perspective on road safety infrastructure is still below Bandung Regency. An industrial area should be supplemented with adequate road safety infrastructure as an accident is more likely to occurred when heavy vehicle is involved. Moreover, the area's topography affects the driver's perspective on the appropriate speed limit speed. As seen in Bandung Regency, the road's winding and upswing make the drivers more aware of their safety without paying attention to the existing signs.

Kabupaten Garut

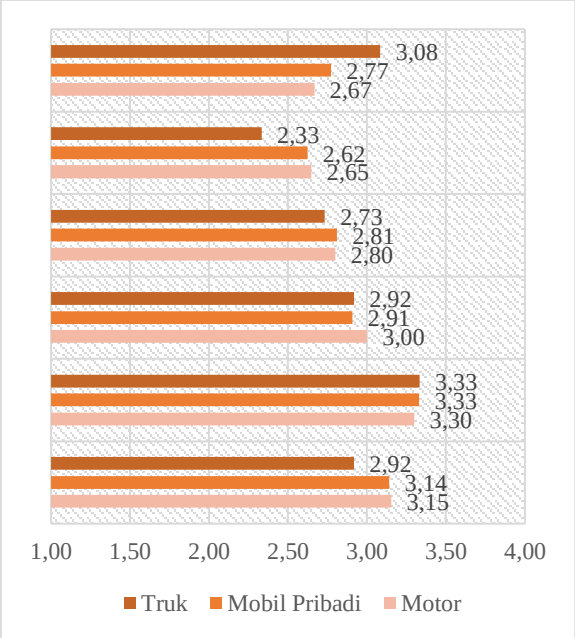


Figure 5 Public Perception in Kabupaten Garut

Garut regency also generate similar pattern as the previous location. The lowest perception is truck driver regarding the traffic law enforcement. Nowadays, heavy vehicles are the target of several inspection due to over dimension and overload (ODOL) phenomenon. Therefore, law enforcer would likely to conduct an inspection on heavy vehicle which for the driver is not always necessary, particularly if the respective vehicles is fit to operate.

Basically, most of the study area create a similar result. It implies that although each area has its own characteristic either economically or demographically, the people perception towards the safety aspect is the same. All the study area agree that police hold an important role on promoting road safety through education and law socialisation, while some policies like law enforcement is still unnecessary in some cases. As the paper focus on speeding behaviour, ironically, most driver did not acknowledge or aware regarding the speed limit regulation. Some people thought that as long as they fully aware to the surrounding, it is appropriate to speeding

CONCLUSIONS

The road quality and its supporting infrastructure is adequate to promote road safety. In general, speeding phenomenon is fair as long as the corresponding driver still stay alert and aware towards the surrounding. Most driver is familiar with the speed limit sign. However, they tend to ignore the sign. The penalty due to speeding is too high.

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REFERENCES

Babic, D., Babic, D., Sucha, M., Stanic, V. dan Toman, M. 2021. The influence of music genres on the driving behaviour of young drivers and their visual scanning of the environment. *Transportation Research Part F: Psychology and Behaviour, 81*, 396-407. doi:10.1016/j.trf.2021.07.001

Faschina, S., Stieglitz, R.-D., Muri, R., Strohbeck-Kühner, P., Graf, M., Mager, R. dan Pflueger, M. O. 2021. Driving errors, estimated performance and individual characteristics under simulated and real road traffic conditions - A validation study. *Transportation Research Part F: Psychology and Behaviour*, 221-237.

Kusuma, A., Maulina, D. dan Hutami, A. M. 2019. Analysis of Speed and Social-psychology Factors of Speeding Behaviour on Drivers in DKI Jakarta. *Journal of Indonesia Road Safety, 2*(3), 133-148.

Ma, S. dan Yan, X. 2021. Examining the efficacy of improved traffic signs and markings at flashing-light-controlled grade crossings based on driving simulation and eye tracking systems. *Transportation Research Part F: Psychology and Behaviour, 81*, 173-189. doi:10.1016/j.trf.2021.05.019

Maulina, D., Andini, E., Tanri, D., Kamsanih, N., Mazaya, S. dan Zhafirah, T. 2022. Traffic signs comprehension among motorcyclists: the effect of sign type and sign familiarity. *Humaniora, 13*(1), 81-90. doi:10.21512/humaniora.v13i1.7379

National Highway Traffic Safety Administration. (2020). *Overview of Motor Vehicle Crashes in 2020.* Washington DC: U.S. Department of Transportation.

Roidl, E., Frehse, B. dan Höger, R. (2014). Emotional states of drivers and the impact on speed, acceleration and traffic violations—A simulator study. *Accident Analysis and Prevention, 70*, 282-292. doi:10.1016/j.aap.2014.04.010

Yang, Y., Chen, Y., Wu, C., Easa, S. M., Lin, W. dan Zheng, X. 2020. Effect of highway directional signs on driver mental workload and behavior using eye movement and brain wave. *Accident Analysis and Prevention, 146*, 105705. doi:10.1016/j.aap.2020.105705

Yıldırım-Yenier, Z., Vingilis, E., Wiesenthal, D. L., Mann, R. E. dan Seeley, J. 2016. Relationships between thrill seeking, speeding attitudes, and driving violations among a sample of motorsports spectators and drivers. *Accident Analysis and Prevention, 86*, 16-22. doi:10.1016/j.aap.2015.09.014