The Correlation of Subjective Fatigue, Negligence, Knowledge of Safety Riding and Length of Work on Traffic Accidents of Online Motorcycle Taxis in Sidoarjo

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Abstract

Introduction: The number of vehicles in Indonesia has increased every year. The number of two-wheeled vehicles in 2016 was 105.150.082 units and increased to 111.988.863 in 2017 and 120.101.047 in 2018. Unfortunately, along with the increase in motorized vehicle users, the rate of traffic accidents that occurred also increased. One of the causes of the high number of traffic accidents in Indonesia is a large number of jobs in the transportation sector, such as online motorcycle taxis. This study aims to identify the factors that cause traffic accidents, including those caused by fatigue, negligence, knowledge of safety riding, and length of work for online motorcycle taxi drivers.

Methods: This study is an analytic observational study with a cross-sectional design. The study population consisted of 110 online motorcycle taxi riders who are members of the Sidoarjo-Porong Online Driver Association Basecamp. Sampling was done by using the total sampling technique. The variables studied included subjective fatigue, negligence, knowledge of safety riding, length of work, and two-wheeled online motorcycle taxi traffic accidents. Data analysis was performed using Cramer's V Correlation Coefficient or Phi Correlation Coefficient.

Results: The results showed a significant correlation between subjective fatigue and the incidence of accidents as indicated by a value of r = 0.289. Furthermore, it was found that a weak correlation between negligence and the incidence of accidents with a value of r = 0.211. No correlation was found between knowledge of safe riding and the incidence of accidents marked with a value of r = -0.169. Meanwhile, there is only a weak correlation between the length of work and the incidence of accidents with a value of r = 0.214.

Conclusion: Subjective fatigue, neglect, length of work has a correlation with two-wheeled online motorcycle taxi traffic accidents. There is no correlation between knowledge of safety riding with two-wheeled online motorcycle taxi traffic accidents.

Keywords: *Personal Factor, Traffic Accident, Online Taxis, Motorcycle*

Introduction

Economic growth has an impact on various areas of a country's life. One of the signs of economic growth in a country is an increase in private vehicle ownership. According to data from the Badan Pusat Statistik in 2020, it was noted that there was an increase in the number of domestic motorized vehicles in Indonesia from 2016-2018. Or in other words, an increase in the number of vehicles occurs every year. The number of two-wheeled vehicles in 2016 was 105.150.082 units and increased to 111.988.863 in 2017 and 120.101.047 in 2018[1].

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Unfortunately, the increase in motorized vehicle users also results in a higher number of traffic accidents. It is known that the number of traffic accidents in Indonesia in 2014 reached 95,906 cases and increased to 98,970 cases in 2015, and 106,129 cases in 2016. The total number of accident victims in 2016 reached 170,763 people consisting of 26,185 who died, 22,558 were injured severe and 121,550 suffered minor injuries[2]. The various types of vehicles, the dominant vehicles that had traffic accidents were motorbikes with a total of 147,391 units in 2010-2014[3]. This is in line with data from the Kepolisian Republik Indonesia (2017) which states that the largest number of land traffic accidents based on vehicle types in the first semester of 2017 were motorbikes, with 31.4 thousand accidents, followed by 6.3 thousand cars, 3 trucks, 6 thousand accidents, 939 bicycle accidents, 621 bus accidents, and 482 unknown causes[4]. The number of traffic accidents in Indonesia which was above 5000 incidents in 2010-2014 occurred in provinces with high population and heavy traffic. Provinces included in this case are West Java, Central Java, East Java, North Sumatra, and DKI Jakarta. The highest incidence of traffic accidents based on the type of work of motorists in 2010-2014 was in the type of work of private employees who were then followed by students, while the rest worked in other informal sectors[3].

The high number of traffic accidents does not only occur in Indonesia but also occurs in several other countries in the world. According to data from Global Status Report on Road Safety by World Health Organization in 2018, it is stated that the global traffic death rate is 18.2 per 100,000 population, where there is a significant variation in all regions of the world[5]. The regional levels in Africa and Southeast Asia have the highest traffic fatalities with 26.6 and 20.7 deaths per 100,000 population. This is followed by the Eastern Mediterranean and Western Pacific regions, which have rates comparable to global rates of 18 and 16.9 deaths per 100,000 population, respectively. America and Europe have the lowest regional rates, at 15.6 and 9.3 deaths per 100,000 population, respectively. In the world, 1.35 million people died as a result of traffic accidents in 2016[6]. The rate of road transportation accidents in the Asia-Pacific region contributes 44% of the total accidents in the world, which Indonesia is included in[7].

One of the factors contributing to the high number of traffic accidents in Indonesia is the opening of jobs in the transportation sector, such as online motorcycle taxis. Several online motorcycle taxi companies that are growing and developing in Indonesia today are *Gojek, Uber, Grab*, and several other online motorcycle taxi companies that are still small in scale. There are around 300,000 online motorcycle taxi riders by the end of 2017 who are partners of motorcycle taxi companies in Indonesia. Online motorcycle taxi drivers are road users who are at risk of accidents due to job demands that require drivers to work on the road. This is reinforced by news related to accidents or cases of death in online motorcycle taxi drivers due to fatigue or drowsiness, such as an accident on a Go-Jek driver at Tugu Tani and an online motorcycle taxi driver who died crashing into a roadblock in Surabaya[8].The data obtained from the Kepolisian Republik Indonesia (2017) hows that there have been 103 cases of accidents experienced by Go-Jek drivers[4].

Research conducted by Kairupan et al., (2019) in Manado City also found that there were still many motorbike riders, in this case online motorcycle taxi riders and base motorcycle taxis, who still did unsafe actions such as not wearing eye and face protection, do not use hand protection, wear shorts when driving, only use a helmet on the road, use sandals when driving, do not turn on the turn signal and drive at high speed. This is the same as what Henrich's theory states that 80% of work accidents are caused by unsafe action. Humans are a factor that causes accidents which is often called "human error" because humans often do things that trigger accidents. such as being careless, careless, indifferent, and making mistakes. Another factor that causes accidents one of which is the Safety Riding attitude[9].

Research conducted on online motorcycle taxis in Manado shows that there are as many as 20% of them who have negative attitudes, namely driving safely if there are police who supervise and do not complete the SIM, STNK, do not use SNI standard helmets or use other PPE such as gloves, shoes, and masks for long and near travel[2]. According to Manurung et al., (2019), the factor related to the safety riding behavior factor of

online motorcycle taxi drivers (*Gojek*) in Medan City, North Sumatra is age. Age in this case was found to have a major influence on the incidence of traffic accidents[11]. Riders over 30 years of age will be more prepared and mature in riding a motorcycle than those under 30 years old. The period of riding, which is when someone has a long driving period, they will better understand how to ride a motorcycle safely. Productive age is the age span of a person who can produce something, where he is in the peak phase of his activity and is active in looking for sources of income to support and improve the welfare of his family[12]

Research by Tanriono, Doda, and Manampiring in 2019 found that a factor that has an important influence on the work accidents of motorcycle taxi drivers in Bitung is work fatigue that is not realized by motorists or often called the silent killer[14]. In addition, according to research conducted by Ruzain et al., (2020) regarding the correlation of safe driving knowledge with online-based two-wheeled transportation driver accidents in Pekanbaru City, it also found a significant correlation between safe driving knowledge and online-based two-wheeled driver accidents[15].

Another human factor that has a correlation with the incidence of traffic accidents according to research conducted is carelessness. Careless conditions make drivers who are in this condition experience a decrease in concentration so that their ability to predict possible hazards due to vehicle conditions and the traffic environment will be reduced. Sleepiness is also included in a careless condition, where the driver will lose concentration due to lack of rest due to overtime work. Other conditions are drunkenness, namely the condition of a person who loses self-control and is tired due to working overtime and working long hours in a day> 8 hours, not being skilled in driving, violations of discipline such as speeding and rushing so that they overtake other vehicles without orderly[16].

Based on, Undang-undang No.13 Tahun 2003, it has been discussed regarding working hours and the provisions of working hours that should be carried out, namely "seven hours one day and forty hours in one week for six working days in one week" and or "eight hours of work in one day and 40 hours in one week for five working days in one week[17]. The length of time workers do work will play a role in influencing work fatigue. Excessive working hours can result in decreased physical work efficiency and work endurance as well as all parts of the body[18]. This implies that there are quite a lot of work accidents among online motorcycle taxi drivers. The development of the online motorcycle taxi application has also led to a buildup of vehicles on the roads so that the risk factor for accidents is getting higher. As road users who mostly choose to go to work from morning to late at night, online motorcycle taxi drivers are prone to experiencing fatigue, boredom while driving, and health problems that can cause accidents while working. Companies that house online motorcycle taxi drivers must realize that thousands and even tens of thousands of drivers need. guarantees for health and safety while working, so companies are required to implement K3.

Based on the background described, researcher was interested in conducting research that aimed to determine the correlation between subjective fatigue, negligence, and compliance with the use of PPE with traffic accidents in online motorcycle taxi drivers who are members of the Association of Sidoarjo-Porong Online Driver basecamp in Sidoarjo Regency.

Materials and Methods

This study was an analytic observational study with a cross-sectional study design. This method was chosen considering that observations were made over a period of time or in a certain time where the cause and effect variables were collected at the same time[19]. This research was conducted on 1-15 January 2021.

The population used in this study were all online motorcycle taxi riders in the Sidoarjo regency and joined in the Sidoarjo-Porong Driver Online Association basecamp which consisted of 110 riders.

This study used total populated sampling so that there was no calculation regarding the size of the sample and how to determine the sample.The independent variables (independent variables) in this study include subjective fatigue, neglect, knowledge of safety riding, length of work. Meanwhile, the dependent variable (independent variable) in this study is the incidence of

traffic accidents on motorcycle online taxi riders who work in the Sidoarjo Regency area who are members of the Sidoarjo-Porong Driver Online Association basecamp. What was observed was whether or not they had had a traffic accident while working as an online motorcycle taxi.

The data in this study consisted of secondary data and primary data. Primary data was obtained through the distribution of google forms and telephone interviews with respondents to validate the data obtained. The data analysis technique is described in the statistical test table as follows.

Table 1. Statistical Test

No.	Objective	Statistical Test
1	Analyze the strength of the correlation between subjective fatigue (independent variable) and the incidence of traffic accidents (dependent variable).	Coeff (Cramer's V)
2	Analyze the strength of the correlation between negligence (independent variable) and the incidence of traffic accidents (dependent variable).	Coeff. (Phi)
3	Analyze the strength of the correlation between compliance with the use of PPE (independent variable) with the incidence of traffic accidents (dependent variable).	Coeff. (Phi)
4	Analyze the strength of the correlation between undue speed (independent variable) and the incidence of traffic accidents (dependent variable)	Coeff. (Phi)

Results and Discussion

The Correlation between Fatigue and Accidents

This analysis aims to determine whether there is a correlation between fatigue and accident. The results of the analysis is presented in Table 2 as follows.

Based on the data presented in the table 2 regarding the results of the chi-square test, it is known that the resulting p-value is 0.027 where this value is smaller than the α value, which is 0.05.

Table 2. Chi-Square Test on the Correlation between Fatigue and Accidents

		Accident		Total	P-value of Chi-Square Test	Coeff (Cramer's V)
		No	Yes			
Fatigue	Low	35	15	50	0.027	0.289
		31.81%	13.63%	45.48%		
	Moderate	16	18	34		
		14.54%	16.36%	30.9%		
	High	5	11	16		
		4.54%	10.0%	14.54%		
	Very High	5	5	10		
		4.54%	4.54%	9.08%		
Total		61	49	110		
		55.5%	44.5%	100.0%		

Because the p-value obtained is smaller than the α value, it can be concluded that there is a correlation between fatigue and accidents. On the other hand, based on the value of coeff (Cramer's) = 0.289, it is known that there is sufficient strength of correlation as well as a positive correlation between fatigue and the incidence of motorcycle online motorcycle taxi traffic accidents. The increasing fatigue of the rider, the higher the incidence of accidents experienced. This is in line with the research of Aulia et al., (2018) which states that workers who experience fatigue and are followed by a history of work accidents reach 75 workers. This large number indicates a higher role for human factors as the cause of work accidents in the company that is the research site[20].

Fatigue is a process of decreasing efficiency, work performance, and decreasing physical strength or endurance to continue the activities that must be done[21]. Physical fatigue that occurs indicates a heavy workload and inappropriate ergonomics experienced by workers in this company while working. One of the causes of physical fatigue that can be found in workers is that workers tend to work outside the main working hours or often referred to as overtime. Other causes of fatigue experienced by workers can be in the form of a heavier workload or length of work, hot weather in an open field, use of heavy work equipment and a faster target production time. These factors cause workers to experience fatigue[22]. Fatigue at work causes a decrease in alertness, concentration and motivation so that workers tend to engage in Unsafe Work Behavior (PKTS) and result in work-related accidents[23].

The Correlation between Negligence and Accident

This analysis aims to determine whether there is a correlation between negligence and accident. The correlation test was carried out using the chi-square test method. The analysis results is presented in Table 3 as follows.

Table 3 Chi-Square Test on the Correlation between Negligence And Accident

		Accident		Total	P-value Uji Chi-Square*Test	Coeff. (Phi)
		No	Yes			
Negligence	No	50	31	81	0.046	0.211
		45.5%	28.2%	73.6%		
	Yes	11	18	29		
		10.0%	16.4%	26.4%		
Total		61	49	110		
		55.5%	44.5%	100.0%		

It is shown that in the chi-square test results in Table 3, the resulting p-value is 0.046 which is smaller than the α 0.05 value. Because the p-value is smaller than the α value, it can be concluded that there is a correlation between negligence and accident. Furthermore, based on the value of coeff (Phi) = 0.211, it shows a weak correlation and the direction of a positive correlation between neglect and the incidence of online motorcycle taxi motorcycle accidents. The higher the driver's negligence, the higher the incidence of accidents experienced.

These findings are the same as findings in research conducted by Mahawati & Prasetya, (2013), which revealed that there is a correlation between cellphone use and traffic accidents as a result of cognitive

(mental) disorders that occur due to doing 2 activities simultaneously[25]. This means that when a rider uses a cellphone or hands-free while driving, they must divide their attention between operating the cellphone and still concentrating on riding a motorcycle. The behavior of drivers who operate their cellphones while driving can reduce their sensitivity to road conditions and reduce reaction time to events that occur while driving. This opinion is in line with the research of Marsaid et al., (2013) which found that a careless driver can cause an accident, because the driver has decreased concentration and responsibility in driving[16]. This will get worse if the driver is driving at high speed. Carelessness can cause drivers to less anticipate traffic situations and be less able to predict the dangers in front of them, thus allowing accidents to occur.

Operating a cell phone while driving is much more dangerous than driving while drunk. Using a cell phone while driving is 6 times more likely to cause accidents than when drunk[26].

The Correlation between Safety Riding Knowledge and Accident

This analysis aims to determine whether there is a correlation between knowledge of safety riding and accident events. The correlation test was carried out using the chi-square test method. The analysis results is presented in Table 4 as follows.

Table 4. Chi-Square Test on the Correlation between Safety Riding Knowledge and Accident Incidents

		Accident		Total	P-value of Chi-Square* Test	Coeff. (Phi)
		No	Yes			
Safety Riding Knowledge	Low	8	10	18	0.442	-0.169
		7.3%	9.1%	16.4%		
	High	53	39	92		
		48.18%	35.5%	83.6%		
Total		61	49	110		
		55.5%	44.5%	100.0%		

The results of the chi-square test presented in Table 4 show that the resulting p-value is 0.442 which is greater than the value of α 0.05. P-value that is greater than the value of α indicates there is no correlation between knowledge of safety riding on the incidence of accidents. The coeff value (Phi) = -0.169 indicates a very weak correlation and there is a negative correlation between compliance with PPE and the incidence of online motorcycle taxi motorcycle accidents. This is supported by research conducted by Ariwibowo (2013) which found no correlation between knowledge and safety riding practices[27].

However, knowledge also needs to be possessed by a worker. The higher a person's education level, the better his mindset will be in digesting the information that underlies that person's behavior pattern. The practice of safety riding is a safe driving behavior that requires knowledge of safety riding[11]. Knowledge is based on a good mindset. The level of education is not the only factor that supports a person's mindset, but a high level of education in a person will make that person more likely to accept good changes. Conversely, someone who does not have the basic level of continuing education will be closed and difficult to accept these behavior changes. This opinion is as stated by Maria & Erlisa (2015) which

states that a person's practice is based on perceptions that give rise to a real action or one's attitude in behavior where good or bad one's attitude can be influenced by how much a person's level of knowledge. Thus it is clear that a good attitude or action is needed in the practice of safety riding considering that fast and precise response capabilities are needed when driving so that drivers can be more responsive to the surrounding environment and avoid accidents[28].

The Correlation between Length of Work and Accident

This analysis aims to determine whether there is a correlation between the length of work in a day and the incidence of accidents. The correlation test was performed using the chi-square test method. The result of the analysis is presented in Table 5 as follows.

Table 5. Chi-Square Test on the Correlation between Length of Work and Accidents

		Accident		Total	*P-value* of Chi-Square* Test	*Coeff.* (Phi)
		No	Yes			
Length of Work in a Day	Less than 8 hours	8	15	23	0.045	0.214
		7.3%	13.6%	20.9%		
	More than 8 hours	53	34	87		
		48.2%	30.9%	79.1%		
Total		61	49	110		
		55.5%	44.5%	100.0%		

The results of the chi-square test in Table 5 present that the resulting p-value is 0.045 which is smaller than the α 0.05. This implies a correlation between length of work and the incidence of accidents. Meanwhile, based on the value of coeff (Phi) = 0.214, it proves that there is a weak correlation and the direction of a positive correlation between a day's work and the incidence of online motorcycle taxi motorcycle accidents. In other words, the higher the time spent driving, the higher the accident rate.Work that requires physical activity will affect the work of the muscles, cardiovascular, and respiratory system. If work goes on for a long time without rest, then the body's ability to do activities properly will decrease, which will cause body pain and the possibility of work accidents at work[29].

One of the factors that causes online motorcycle taxi drivers to work more than 8 hours is that online motorcycle taxi drivers want to pursue more targets so that their income can increase. Extending work time and capabilities without being accompanied by efficiency, effectiveness and optimal work productivity in the end only causes a decrease in the quality and results of work which, if carried out for a long time, will increase the risk of fatigue, health problems, illness and accidents[18].

Based on the overall results that have been analyzed by researchers, it is found that there are many effects of workload on the traffic experienced by online motorcycle taxis. The most risky effect on accidents based on the results of the analysis that has been carried out is fatigue during work. This fatigue is part of the human factor which is one of the basic causes of unsafe

work behavior. Based on the theory of work accidents, it is stated that work accidents may occur due to unsafe work behavior and unsafe working conditions. One of the basic causes of these two things is human factors, namely physical / physiological stress such as physical exhaustion of the workers of this company[30].

Conclusion

The conclusions obtained based on the results of the research analysis carried out are as follows:

1. There is a quite strong correlation between fatigue and the incidence of online motorcycle taxi accidents.

2. There is a weak correlation between negligence and the incidence of online motorcycle taxi accidents.

3. There is no correlation between knowledge of safety riding and the incidence of online motorcycle taxi accidents.

4. There is a weak correlation between the length of work and the incidence of online motorcycle taxi accidents.

The suggestions can be put forward are it is expected that motorcycle drivers to be more obedient and improve self-control during driving to avoid traffic accidents.

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References

1. Badan Pusat Statistik. Perkembangan Jumlah Kendaraan Bermotor Menurut Jenis, 1949-2018. 2020;1.
2. Dumanauw O, dkk. Studi Perilaku Pada Pengendara Ojek Online Tentang Safety Riding di Kota Manado. Kesmas [Internet]. 2018;7(5).
3. Djaja S, Widyastuti R, Tobing K, Lasut D, Irianto J. Situasi Kecelakaan Lalu Lintas Di Indonesia, Tahun 2010-2014. J Ekol Kesehat. 2016;15(1):30–42.
4. Kepolisian Republik Indonesia. Jumlah Kecelakaan Lalu Lintas Darat Berdasarkan Jenis Kendaraan. 2017;
5. World Health Organization (WHO). Global Status Report on Road. World Heal Organ [Internet]. 2018;20.
6. Nishitani Y. Alcohol and traffic accidents in Japan. IATSS Res. 2019;43(2):79–83.
7. Sari KDM. Model Hubungan Penyebab Kecelakaan Dan Angka Kecelakaan Lalu Lintas Sepeda Motor Di Kota Depok. Thesis. 2012;
8. Manuel JA, Wirawan IMA. Faktor Risiko Kelelahan pada Pengendara Ojek Daring di Jabodetabek dan Denpasar. Media Kesehat Masy Indones. 2020;
9. Kairupan FA, Doda DV, Kairupan BHR. Hubungan Antara Unsafe Action Dan Unsafe Condition dengan Kecelakaan Kerja Pada Pengendara Ojek Online dan Ojek Pangkalan di Kota Manado. J KESMAS. 2019;8(6):89–98.
10. Manurung J, Sitorus ME, Rinaldi. Faktor yang Berhubungan dengan Perilaku Safety Riding Pengemudi Ojek Online (GoJek) di Kota Medan Sumatera Utara. J STIKes Sitihajar [Internet]. 2019;1(2):91–9.
11. Manurung J. Faktor yang Berhubungan dengan Perilaku Safety Riding Pengemudi Ojek Online (GoJek) di Kota Medan Sumatera Utara. Cakrawala - J Hum. 2011;1(2):91–9.
12. Fadilah AN. Hubungan Antara Kepemilikan Sim C Dan Keikutsertaan Dalam Tes Pembuatan Sim Dengan Pengetahuan Berkendara Dan Kecelakaan Lalu Lintas Di Kabupaten Sidoarjo. Indones J Public Heal [Internet]. 2017;(September):Vol. 12 No. 2, Desember 2017: 167–178.
13. Tanriono Y, Doda DV, Manampiring AE. Hubungan Kelelahan Kerja , Kualitas Tidur ,

Perilaku Pengemudi Ojek Di Kota Bitung. J KESMAS. 2019;8(6):99–110.

14. Tanriono Y, Doda DV, Manampiring AE. Hubungan Kelelahan Kerja, Kualitas Tidur, Perilaku Pengemudi, dan Status Gizi dengan Kecelakaan Kerja pada Pengemudi Ojek di Kota Bitung. J KESMAS. 2019;
15. Ruzain RB, Herawati Y, Christofa D. Hubungan Pengetahuan Berkendara Selamat Dengan Kecelakaan Pengemudi Transportasi Roda Dua Berbasis Online Di Kota Pekanbaru. J Islam. 2020;
16. Marsaid, Hidayat M, Ahsan. Lalu Lintas pada Pengendara Sepeda Motor di Wilayah Polres. J Ilmu Keperawatan. 2013;1(2):98–112.
17. Undang-undang No.13 Tahun 2003. Undang-Undang Republik Indonesia No.13 Tahun 2003 tentang Ketenagakerjaan. Undang No13 Tahun 2003 [Internet]. 2003;(1):1–34.
18. Datu MMD, Kawatu PAT, Mandagi CKF. Hubungan Antara Lama Kerja dengan Kelelahan Kerja pada Pengendara Ojek Online Komunitas Manguni Rider Online Sario. J KESMAS. 2019;8(6):601–7.
19. Widarsa T, Putra IWGAE, Astuti PAS. 'Modul Analisis Data Untuk Variabel Outcome Berskala Nominal Dua Kategori (Binary Outcome)', pp. 2016;1–45.
20. Aulia, Aladin, Tjendera. Hubungan Kelelahan Kerja Dengan Kejadian Kecelakaan Kerja Pada Pekerja Galangan Kapal. J Kesmas Gizi. 2018;1(1).
21. Zanuardi A, Suprayitno H. Analisa Karakteristik Kecelakaan Lalu Lintas di Jalan Ahmad Yani Surabaya melalui Pendekatan Knowledge Discovery in Database. J Manaj Aset Infrastruktur Fasilitas. 2018;2(2):45–55.
22. Natadjaja L. Creating Community through Design: The Case of Go-Jek Online. IJCCI - Int J Cult Creat Ind. 2016;4(1):18–27.
23. Hidayati A. Analisis risiko kecelakaan lalu lintas berdasar pengetahuan, penggunaan jalur, dan kecepatan berkendara. J Berk Epidemiol. 2016;4(2):275–87.
24. Mahawati E, Prasetya J. Analisis penggunaan handphone saat berkendara terhadap potensial kecelakaan lalu lintas pada remaja di semarang. J Semant. 2013;2013(November 2013):435–42.
25. Mahawati E, Prasetya J. Analisis penggunaan handphone saat berkendara terhadap potensial kecelakaan lalu lintas pada remaja di semarang. In: Jurnal SEMANTIK. 2013.
26. Setyowati DL, Firdaus AR, Rohmah N. Factor Cause of Road Accidents at Senior High School Students in Samarinda. Indones J Occup Saf Heal [Internet]. 2018;7(March):329–38.
27. Ariwibowo. Hubungan Antara Umur, Tingkat Pendidikan, Pengetahuan, Sikap Terhadap Praktik Safety Riding Awareness Pada Pengendara Ojek Sepeda Motor Di Kecamatan Banyumanik. J Kesehat Masy. 2013;2(1).
28. Maria W, Erlisa. Kejadian Kecelakaan Kerja Perawat Berdasarkan Tindakan Tidak Aman. J Care. 2015;3(2).
29. Meirinda D, Suroto, Ekawati. Faktor – Faktor yang Berhubungan dengan Kecelakaan Lalu Lintas pada Karyawan Pengendara Sepeda Motor di Koperasi Simpan Pinjam (KSP) Sumber Rejeki Blora. J Kesehat Masy. 2017;5:240–8.
30. Pratama, Koesyanto. Kejadian Kecelakaan pada Pengemudi Ojek Online. Higeia J Public Heal Res Dev. 2020.