



Human and Vehicle Factor on Traffic Accidents in The City of Makassar in 2019-2021

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ABSTRACT

Background: Traffic accidents are a public health problem that affects all sectors of life. The purpose of this study is to describe the human and vehicle factors for traffic accidents in Makassar City in 2019-2021. **Methods.** This research is a descriptive quantitative research with a secondary data analysis (ADS) approach. **Results.** The highest accident factor was caused by the human factor as much as 96.48%. The perpetrators of traffic accidents were mostly male as much as 70.9% and the victims were female as much as 53.9%. Perpetrators aged 16-20 years were 39.1% and victims aged over 51 years were 22.2%. Based on the highest level of education, it occurs at the high school level, with 66.6% of perpetrators and 42.5% of victims. disorderly behavior of 90.2% which is the cause of accidents based on the human factor. Meanwhile, the vehicle factor is 1.07%. Every driver must comply with the applicable traffic regulations as a necessity in order to arrive safely at their destination. **Conclusion.** Penyebab kecelakaan lalu lintas di Kota Makassar dari tahun 2019 sampai dengan tahun 2021, terdapat 96,48% faktor manusia (human error). Kecelakaan lalu lintas berjenis kelamin laki-laki sebanyak 70,9%

Keywords: accident; traffic; vehicle

ABSTRAK

Latar Belakang: Kecelakaan lalu lintas merupakan salah satu masalah kesehatan masyarakat yang mempengaruhi semua sektor kehidupan. Tujuan dari penelitian ini adalah mengetahui gambaran faktor manusia dan kendaraan terhadap kejadian kecelakaan lalu lintas di Kota Makassar pada tahun 2019-2021. **Metode.** Penelitian ini merupakan penelitian kuantitatif bersifat deskriptif dengan pendekatan analisis data sekunder (ADS). **Hasil.** Faktor kecelakaan paling tinggi disebabkan oleh faktor manusia sebanyak 96,48%. Kecelakaan lalu lintas lebih banyak berjenis kelamin laki-laki sebanyak 70,9%. Pelaku yang berusia 16-20 tahun sebesar 39,1%. Berdasarkan tingkat pendidikan paling tinggi terjadi pada jenjang SMA sebanyak 66,6%, jenis pekerjaan yang mengalami kecelakaan lintas lalu paling banyak dialami oleh pekerja swasta sebanyak 61,0% pada pelaku. Perilaku tidak tertib sebesar 90,2% yang menjadi penyebab kecelakaan berdasarkan faktor manusia. Sedangkan faktor kendaraan sebesar 1,07% Setiap pengendara harus menjadikan peraturan lalu lintas yang berlaku sebagai kebutuhan agar selamat sampai tujuan. **Kesimpulan.** Penyebab Kecelakaan lalu lintas di Kota Makassar dari tahun 2019 sampai dengan tahun 2021, terdapat 96,48% faktor manusia (human error). kecelakaan lalu lintas berjenis kelamin laki-laki sebanyak 70,9%

Kata Kunci: kecelakaan; lalu lintas; kendaraan

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INTRODUCTION

Driving safety on the highway in this era of globalization is one of the problems that must be considered. The increase in the number of vehicles on the road is not proportional to the awareness of driving which is also increased, thus further exacerbating transportation problems. With the increase in vehicles operating on the road that is not proportional to the increase in driver awareness, it exacerbates transportation problems and causes many traffic accidents (Oktopianto and Pangesty 2021).

In the perspective of public health, traffic accidents are a very important issue because with high traffic accidents, it can cause deaths, minor injuries and serious injuries that can cause disability and can cause family burdens and decreased work productivity that occurs in victims who experience traffic accidents when experiencing mild or severe disability (Gito Sugiyanto 2017).

The number of road traffic fatalities continues to rise, reaching a high of 1.35 million in 2016. The road traffic fatality rate has remained fairly constant at around 18 deaths per 100,000 population for 15 years. The number of deaths caused by traffic accidents increases every year (WHO 2018), traffic accidents can affect all sectors of life, especially in the health sector. According to the World Health Organization (WHO), besides coronary heart disease and tuberculosis (TB), traffic accidents will be the third largest cause of death in the world in 2020 (Ulva 2019).

Every day, 1,000 children and adolescents between the ages of 10 and 24 die, mostly in car accidents. The number of people killed in traffic accidents varies according to the financial level of each country. Low-income countries have an incidence rate of 27.5 per 100,000 people, which is three times greater than high-income countries, where there is an average of 8.3 deaths per 100,000 people. While there are 18.2 road traffic deaths per 100,000 people worldwide, there is significant regional variation, with rates ranging from 9.3 to 26.6 per 100,000 people. The largest regional road fatality rates are in Southeast Asia and Africa, with 26.6 and 20.7 deaths per 100,000 people respectively, as well as Western Europe and the Eastern Mediterranean (WHO 2018).

Indonesia has the sixth highest number of deaths from traffic accidents. Of all disaster-related deaths, road accidents account for 53% of all deaths. The trend of traffic accidents has increased since 2015, and ranks second only to hypertension (Aning Isfandyari & Lutfan Lazuardi 2021).

The number of traffic accidents in South Sulawesi from 2019 to 2020 has decreased and then increased again in 2021, according to data from the Indonesian National Police, South Sulawesi Regional Traffic Directorate. It increased to 9,028 in 2019 with 956 deaths, 301 serious injuries, and 7771 minor cases. With 965 deaths, 238 serious injuries, and 6009 minor injuries in 2020, there were 7,212 cases. Traffic accidents increased again in 2021, reaching 8,600, with 1,032 deaths, 414 serious injuries, and 7,154 minor injuries (Ditlantas Polda Sulsel 2022).

One of the largest cities in South Sulawesi, Makassar City, has a large amount of traffic. The high accident rate is a result of the heterogeneous traffic situation in Makassar City, where cars crowd the roads without distinguishing their characteristics and functions. There will be 1,617, 1,280, and 1,376 traffic accidents from 2019 to 2021. In addition, the financial costs associated with traffic accidents amount to Rp. 4,696,460,700 (Ditlantas Polda Sulsel 2022).

Drivers are the main cause of accidents, accounting for 93.52% of them when they are drowsy, sleepy, or tired (Putra, Hariyani, and Akbar 2022). The second factor is road conditions, which account for 3.23% of all crashes, followed by vehicle conditions, which account for 2.76% of crashes and include flat tires, engine failure, and other technological flaws. Road conditions include slippery conditions, narrow roads, intersections, and other factors. In addition, the environment and weather are contributing factors to traffic accidents, with traffic conditions accounting for 0.49% of all accidents (Ulva, 2019). The purpose of this study is to determine the factors that cause traffic accidents based on human and vehicle factors.

METHODS

This research is a quantitative description research with a secondary data analysis approach (ADS), which is to provide an overview of the factors causing traffic accidents in Makassar city in 2019-2021 caused by human factors and vehicle factors. The population in this study is the number of traffic accidents that have occurred in Makassar City over the past three years, from 2019 to 2021.

The population of this study includes all cases of traffic accidents in Makassar City recorded in the Makassar Police Traffic Accident Unit in 2019-2021. The variables in this study are the variables of traffic accidents, human factors and vehicle factors that cause traffic accidents in Makassar city in 2019-2021.

RESULTS

Table 1

Distribution of Traffic Accidents by Number of Accident Cases 2019-2021

Year	Number of Traffic Accidentsc	%
2019	1.3	38,6
2020	973	29,9
2021	1.09	32,4

Table 1 shows that the number of traffic accidents that occurred in 2019-2020 decreased and increased again in 2021. The year with the highest number of traffic accidents, 2019, recorded 1,300 cases (38.6%) of traffic accidents, while the year with the lowest number, 2020, recorded 973 cases (29.9%), and increased again in 2021, with a total of 1,090 (32.4%) traffic accidents in Makassar City.

Table 2

Distribution of Characteristics of Individuals who Experienced Traffic Accidents in 2019-2021

Description of traffic accidents	Year			Total
	2019	2020	2021	
Gender				
Female	806	769	808	2383
Male	494	204	282	980
Age				
6-15 Year	43	17	28	88
16-20 Year	467	414	434	1315
21-30 Year	443	233	308	984
31-40 Year	137	128	111	376
41-50 Year	102	84	105	291
51 Year and Above	108	97	104	309
Education				
Elementary school	106	93	99	298
Junior high	88	80	103	271
Senior high	944	636	659	2239
Bachelor	161	150	229	540
Other	1	14	0	15
Jobs				
Armed forces	3	4	5	12
Police	14	13	14	41
Civil servants	28	21	32	81
Private	867	589	595	2051
Student college	105	64	116	285
Students	89	80	121	290
Merchant	6	43	40	89
Driver	53	35	57	145
Farmers	2	1	0	3
Labor	35	34	34	103
Other	98	89	76	263

Table 2 shows that the gender of those who experienced traffic accidents in Makassar City in 2019-2021 was mostly male with 2383 (70.9%) cases compared to female perpetrators with 980 (29.1%) cases. Based on age, the most experienced at the age of 16-20 years as many as 1315 (39.1%). Meanwhile, based on the occupation of those who experienced traffic accidents in 2019-2021, the highest was private work as

many as 2051 (61.0%). And the high school education level has the highest percentage of traffic accident perpetrators with 2239 (66.6%) cases, while the lowest is other education levels with 15 (0.4%) cases.

Table 3
Distribution of Causes of Traffic Accidents Based on Human Factors in 2019-2021

Physical Condition	Year			Total	%
	2019	2020	2021		
Drowsiness	40	2	44	86	2,65
Tired	21	1	4	26	0,80
Pain	0	0	1	1	0,03
Alcohol	8	6	15	29	0,89
Off guard	166	0	1	167	5,14
Disorderly	1.031	948	948	2.927	90,2
Speed	7	0	1	8	0,25
Other	1	0	0	1	0,03

Table 3 shows that in 2019-2021, the causes of traffic accidents based on behavior and physical condition of the highest cases were disorderly conditions with a total of 2,927 cases (90.2%), then careless conditions with 167 cases (5.14%), then drowsy conditions with 86 (2.65%), conditions under the influence of alcohol with 29 (0.89%), in a tired condition with 26 (0.80%), high speed with 8 (0.25%) and sickness and other conditions with 1 (0.3%) each. The highest careless condition occurred in 2019 with 166 cases.

Table 4
Distribution of Causal Factors of Traffic Accidents by Vehicle Factor in 2019-2021

Causes	Year			Total	%
	2019	2020	2021		
Vehicle	16	8	12	36	100

Table 4 shows that from 2019 to 2021 there were 36 traffic accidents involving vehicle factors. The number of traffic accidents caused by vehicle factors peaked in 2019 with 16 cases, decreased to 8 cases in 2020, and then increased to 12 cases in 2021.

DISCUSSION

The number of traffic accident cases over the past three years decreased from 2019 to 2020, then increased once again in 2021. Based on the results of the study, in 2019 there were 1300 cases (38.6%) of traffic accidents and a decrease in cases of 973 cases (29.9%), and experienced an increase again in 2021 with a total of 1,090 (32.4%) incidents due to the Covid-19 outbreak that year was very high so that people only carried out activities at home and limited interaction outside the home and at the end of 2020 entering 2021 it was set back to new normal so that people could carry out activities again outside the home. In addition, the facilities and infrastructure on the highway are not balanced with the rapid growth of vehicles. In addition to human factors, environmental factors and vehicle factors are also the cause of the increasing number of traffic accidents in Makassar City lately.

This research is in line with research (Adinda Vashia Oktegianda 2019) in 2018 the number of traffic accidents decreased to 61 cases compared to the previous year, namely in 2017 with 87 cases of accidents. In Makassar City, traffic accidents can cause both moral and material losses, which can traumatize victims and other people on the road. This research is also in line with research (Setyowati, Firdaus, and Rohmah 2018) that although there were fewer accidents in Samarinda City in 2012, there were more fatal accidents. All factors, whether human, environmental, or other factors, can have an impact on the occurrence of traffic accidents. If a driver applies the brakes on time, it will prevent imbalances that could have a negative impact.

Characteristics of individuals involved in traffic accidents

From the results of the study that the age of 16-20 years was 1315 (39.1%), then at the age of 21-30 years with a total number of cases of 984 (29.3%). This incident is caused because at the age of adolescence

the level of emotion is very unstable and is quite aggressive when driving at high speed is very large. In addition, the age above 30 years has a higher prudence compared to young age. Whereas at the age of over 51 years, drivers experience a decrease in physical function which can affect the level of response at certain times when driving.

This research is in line with research (Putra, Hariyani, and Akbar 2022) Teenagers and young adults, especially those aged between 15-29 years (44.8%), who all ride motorcycles, are the majority of accident perpetrators. And this research is also in line with research (Mariana, Mariana, and Dewi 2018) In the 45+ age range, road accidents are the most common victims. Adolescents have limited awareness of road hazards, which contributes to the high rate of traffic fatalities among young people. Due to their high level of involvement in RTAs (Road Traffic Accident) (Fahmi 2021).

In research (Gito Sugiyanto 2017) The majority of traffic accident perpetrators are aged between 22 to 30 years, followed by those aged between 31 to 40 years. In this age range, emotional stability is highest, dexterity and reflexes are highest, and mobility on the road is usually highest. This age group is also the most productive if those who cause traffic accidents are also the victims.

More traffic accidents were committed by male suspects with 2383 (70.9%) cases compared to female suspects with 980 (29.1%) cases. This is because the number of male drivers dominates on the highway compared to female drivers. In addition, the level of caution of women is higher than that of men. Women are more likely to become victims because women are usually only passengers or have less ability to drive than men.

The frequency of traffic accidents is influenced by education level. People with low education levels often have an indirect or direct impact on the behavior of others. They are less open to new experiences and find it difficult to accept change. In 2020, respondents with advanced education (SMP, SMA, and PT) accounted for 98.7% of traffic accidents in Indramayu Regency, while motorcyclists with insufficient education would account for 1% of accidents (Yulyanti 2019).

According to the results of research on the education level of the perpetrators and perpetrators of traffic accidents from 2019 to 2021, the highest level of education is the high school level (SMA) as many as 2239 cases. This is because the drivers are mostly young people who are not yet unstable in driving so that when driving they are reckless and violate existing signs.

This is in line with research conducted (Danielle, Kusumawati, and Husodo 2020) that high school students (SMA / SLTA) are the majority of perpetrators of traffic accidents, as many as 962 incidents in 2017 and 981 incidents in 2018, respectively. A person with a strong educational foundation will comply with relevant driving laws. According to the situation and the condition of the vehicle, the driver has the most control to react.

Based on the results of the study, private jobs had the most traffic accidents in Makassar City from 2019 to 2021 with 2051 cases, followed by student jobs with 679 cases and other workers with 622 cases. This is in accordance with research (Noni. 2021) Employees and private members accounted for 360 (61.86%) of the professional actors involved in traffic accidents because road users are dominated by workers who are self-employed.

Behavior and Physical Condition

As a human factor in traffic accidents, the physical and mental health of drivers can play a role. Driver or driver risk factors consist of behavioral factors, health-related factors, and immutable factors. Human behavioral risk factors are related to various factors (Buntara 2019).

Based on the results of the study, the cause of the most traffic accidents occurred due to driver disobedience, namely 2927 cases. This happens because of the behavior of many drivers who go against the flow and violate traffic lights. In addition, negligent or careless conditions as many as 167 cases are also one of the causes of traffic accidents such as reckless driving, smoking, using cell phones, or chatting with passengers.

Carelessness or lack of anticipation is the inability to predict potential hazards based on the state of the vehicle and the surrounding traffic environment, or not paying attention to the minimum distance between the vehicle in front of him at his speed so that it is less than the stopping speed distance, as well as not providing enough space for other vehicles to pass safely when overtaking (Utomo 2012).

Alcohol consumption while driving is a risky habit. Alcohol consumption increases the likelihood of road accidents (Hulwah et al. 2021) This is very consistent with this study that the physical condition of the body in 2019-2021 is also a cause of traffic accidents such as careless conditions with a total of 167 cases (53.9%), then drowsy conditions as many as 86 (27.7%), conditions under the influence of alcohol as many

as 29 (9.4%), in a tired condition as many as 26 (8.4%) and sick conditions and others as many as 1 (0.3%) each. This study is consistent with previous research (Raja Fauzi Siregar¹, Noni Paisah² 2022) High-speed vehicles (53.6%), negligence (36.6%), lack of anticipation (5%), and failure to maintain a safe distance (2.4%) are the main causes of traffic accidents. A major contributor to traffic accidents is the lack of discipline shown by other road users, particularly speeding drivers and careless pedestrians (Zanuardi and Suprayitno 2018).

Vehicle factors

When vehicles cannot be properly controlled, such as when they have technical problems that make them unfit for the road or when they are used improperly, they can contribute to traffic accidents. Traffic accidents can result from a variety of vehicle-related factors, including blong brakes, engine damage, damaged tires, poor steering, loose clutch, lights not on at night, incomplete mirrors, skidding, and others (PP RI No 80, 2012 in (Arfan 2018).

Based on the results of the study, only 36 traffic accidents involving vehicles occurred in Makassar City between 2019 and 2021. This is due to unfavorable vehicle conditions such as worn brakes or insufficient tire pressure that cause poor tire conditions when driving. Even though maintaining the safety of the vehicle system is the most important thing to prevent or minimize the impact of traffic accidents while driving, often drivers ignore the condition of their vehicles and dare to take risks. Vehicle factors can be a serious problem when driving and can cause traffic accidents.

According to the Enggarsasi survey, the following vehicle variables are the main causes of traffic accidents: First, vehicle equipment (e.g. brakes that do not work properly, poor steering system, damaged tires or wheels, broken front or rear). The second is auto lighting. Third, using vehicles that do not comply with the rules, such as those that are overloaded or loaded beyond their capacity (Enggarsasi and Sa'diyah 2017).

This research is also in line with Arfan & Wulandari's (2018) research, which found that non-routine vehicle maintenance (55.3%) and tire or wheel wear (69.01%) were the main contributors to traffic accidents involving vehicles. Blong brakes that occur when your foot steps on the brake pedal and the motorcycle brakes reach the floor but do not step on are one of the vehicle factors that can cause traffic accidents (Arfan 2018).

CONCLUSION

The cause of traffic accidents in Makassar City from 2019 to 2021, there were 96.48% human factors (human error). 70.9% of traffic accidents were male. Based on age characteristics aged 16-20 years, 39.1% experienced traffic accidents. While based on the level of education that experienced the highest traffic accidents occurred at the high school level as much as 66.6%, the type of work that experienced traffic accidents was mostly experienced by private workers as much as 61.0%. Meanwhile, based on behavior and physical conditions, the factors that cause traffic accidents occur mostly in disorderly behavior at 90.2%. Meanwhile, the vehicle factor from 2019 to 2021, as much as 1.07%, was a factor in causing traffic accidents in Makassar City.

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