Journal of Health Education

Road Safety for Motorcycle Users among High School Students

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Article Info

Abstract

Background: Safety riding aims to prevent traffic accidents. The number of traffic accidents in Wonosobo Regency, the age group most frequently involved in accidents is 16-25 years old. Accidents in the 16-25 year age group in 2021 were 34% and will increase to 43% in 2022.

Methods: This research uses descriptive analytical methods with a cross sectional approach. The population in this study were students at Mojotengah Public High School 1, totaling 837 students with a sample of 271 respondents. Samples were taken from 3 classes using proportionate stratified random sampling. Data were collected using a questionnaire and data were analyzed using the Chi-Square test and multiple logistic regression.

Results: Research shows that there are 3 variables that are statistically related to safety riding: knowledge, perception and driving experience.

Conclusions: Knowledge, perception and driving experience are related to safety riding and can increase safe driving in students by 50.9%.

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INTRODUCTION

Safe driving is a behavior of driving safely that can help drivers avoid traffic accidents related to how to drive safely, equipment that must be worn while driving, and the condition of the vehicle used (Wulandari et al., 2017) and has the aim to prevent traffic accidents (Irawan et al., 2022). The risk of traffic accident injuries is usually higher in motorcycle riders and motorcycle passengers, mainly due to the lack of protection provided by the physical structure of the motorcycle (Wedagama, 2017).

Traffic accidents are a serious problem in Indonesia. According to the Indonesian Police data in 2021, 2 people die every hour due to traffic accidents (Korlantas Polri, 2021). The number of land traffic accidents in Indonesia reached 103,645 cases in 2021, an increase of 3.62% or 100,028 cases compared to the previous year. As many as 25,266 people died as a result of accidents in 2021, up 7.38% from the previous year, which was 23,529 deaths. In 2021, there were 21,463 motorcycle accidents. This makes motorcycles the vehicle that most often has accidents, which is 73% (Karnadi, 2022).

Humans have a great potential to take unsafe actions when driving, such as driving at high speeds, going against the direction, or violating traffic rules. Common violations are not wearing a helmet while driving, incomplete documents such as a driving license (SIM) and vehicle registration certificate (STNK). These violations are due to a lack of understanding about safety riding (Evariana et al., 2022). Safe driving is carried out to make drivers aware of all possibilities when driving on the highway (Danielle et al., 2020). According to Permenhub Number PM 12 of 2019, riders are required to ride a motorcycle reasonably and with full concentration without doing other activities that disturb concentration (Joddy et al., 2022). Another study found that 67.7% of students do not use helmets, 43.3% of students use cell phones while driving, and ride with 3 passengers as much as 70% (Wahyuningsih & Ramdana, 2021), 66.2% of riders do not have a SIM C and most are male students (Nastiti, 2017).

According to police reports, there were 30,571 accidents in Central Java Province, resulting in 3,309 deaths, 187 serious injuries, and 35,307 minor injuries (Pojok Polda Jawa Tengah, 2022). Wonosobo District is one of the districts in Central Java that has a high accident rate. The Wonosobo District Police Traffic Unit recorded that the age group most involved in traffic accidents in 2021 ranged from 16-25 years old, with 490 traffic accidents. In 2022, the number of accidents increased by 23.50% to 605 accidents. Motorcycle accidents continue to be the major cause of accidents, with 480 accidents. This year, the 16-20 age group is the most involved, with 164 accidents or 34% of all motorcycle accidents. This increase poses a serious problem for traffic safety in Wonosobo District, especially for students.

Mojotengah 1 Public High School is a school in Wonosobo District with a total of 837 students, where 80% (670 students) commute by motorcycle every day. This high school has a high level of motorcycle use among students and results in 1 to 3 accidents every week. Based on a preliminary study conducted on January 31, 2023, on 40 students of Mojotengah 1 Public High School, 19 students (47.6%) had accidents while traveling to, from, and/or returning to school, resulting in minor injuries. The causes of accidents vary greatly, 24 students (60%) drive at high speeds, 12 students (30%) use non-standard motorcycles, 2 students (5%) turn without turning on the turn signal. This study aims to determine the factors that influence the safety of motorcycle users among students.

METHODS

Population and Sample Design

The study uses a cross-sectional approach with the target population being students of Mojotengah 1 Public High School (a total of 837 students). In determining the sample, Slovin's formula is used to determine a minimum sample size of 271 respondents, while the sample used in this study amounts to 273 respondents. Samples are taken from grades XI and XII using proportionate stratified random sampling and the number of samples produced are as follows: 1) XI Female=80 samples, 2) XI Male=59 samples, 3) XII Female=58 samples, and 4) XII Male=76 samples, so the total sample is 273 respondents. The sample provision with

inclusion criteria is 1) Registered as an active student of Mojotengah 1 Public High School in grades XI and XII, 2) Riding a motorcycle to the school environment, 3) Willing and having the time and opportunity to be a respondent. While the exclusion criteria are informants who are not in a state of illness.

Research Instrument

Safe driving in this study is based on favorable and unfavorable questionnaires. The questionnaire consists of favorable answers, namely always=5, often=4, sometimes=3, almost never=2, never=1, and vice versa with the unfavorable questionnaire. The result is considered unsafe if X ≤ median, and safe driving if X > median. The research questionnaire was adapted and modified from the questionnaire (Owsley et al., 1999) titled Older drivers and cataract: Driving habits and crash risk. Validity and reliability tests were conducted on students of Selomerto 1 Public High School because the condition of the area is similar to the condition of the research location with at least 30 respondents. The statements in the questionnaire resulted in r_calculated > r_table so the questionnaire was declared valid and reliable for research. Then, the data were analyzed using the chi-square test and multivariate analysis with logistic regression. This research has been approved with ethical permission from Semarang State University with number: 337/KEPK/EC/2023.

RESULTS AND DISCUSSIONS
Univariate Analysis
Respondent Characteristics

The characteristics of the respondents in this study include: age, gender, knowledge, perception attitudes, driving training, driving experience, SIM C ownership, use of Personal Protective Equipment (PPE), and the role of peers can be seen in Table 1.

Table 1. Frequency Distribution of Respondents

Characteristics of Safe Driving Factors		n=273	%
Age	<17 years old	83	30.4
	17 years old	190	69.6
Sex	Male	76	27.8
	Female	197	72.2
Knowledge	Sufficient	55	20.1
	Good	218	79.9
Attitude	Not good	120	44
	Good	153	56
Perception	Not good	121	44.3
	Good	152	55.7
Driving Training	Never	258	94.5
	Ever	15	5.5
Driving Experience	<1 year	38	13.9
	1 year	235	86.1
Ownership of a C Driving License	Do not have	221	81
	Have	52	19
Use of PPE	Not good	111	40.7
	Good	162	59.3
Role of Peers	Not good	138	50.5
	Good	135	49.5
Safe Driving	Not safe	115	42.1
	Safe	158	57.9

Based on Table 1, it is known that the majority of students are aged ≥ 17 years, the age of the driver greatly influences the occurrence of traffic accidents (Yeheskiel et al., 2019). The gender characteristic is dominated by females at 72.2%, while the highest rate of traffic accidents occurs in male drivers (Susanto et al., 2020). The study is dominated by students

with good knowledge at 79.9%, 56% of students have a good attitude, students who have driving experience ≥1 year as much as 86.1%. SIM C ownership is only 19%. Most students do not have a SIM C (81%), students who use good Personal Protective Equipment (PPE) as much as 59.3%, and 49.5% of students have good peers.

Bivariate Analysis

Table 2 Bivariate Analysis

Safe Driving Factors		Safe Driving					PR (95% CI)
		Not Safe		Safe		P value	
		n	%	n	%		
Age	<17 years old	39	47,0	44	53,0	0,282	1,330 (0,791-2,236)
	17 years old	76	40,0	114	60,0		
Sex	Male	21	27,6	55	72,4	0,003	0,418 (0,235-0,744)
	Female	94	47,7	103	52,3		
Knowledge	Sufficient	40	72,7	15	27,3	0,000	5,084 (2,639-9,797)
	Good	75	34,4	143	65,6		
Attitude	Not good	63	52,5	57	47,5	0,002	2,147 (1,315-3,505)
	Good	52	34,0	101	66,0		
Perception	Not good	66	54,5	55	45,5	0,000	2,522 (1,540-4,133)
	Good	49	32,2	103	67,8		
Driving Training	Never	110	42,6	148	57,4	0,478	1,486 (0,494-4,472)
	Ever	5	33,3	10	66,7		
Driving Experience	<1 year	30	78,9	8	21,1	0,000	6,618 (2,903-15,086)
	1 year	85	36,2	150	63,8		
Ownership of a C Driving License	Do not have	93	42,1	128	57,9	0,976	0,991 (0,538-1,826)
	Have	22	42,3	30	57,7		
Use of PPE	Not good	59	53,2	52	46,8	0,002	2,148 (1,311-3,519)
	Good	56	34,6	106	65,4		
Role of Peers	Not good	69	50,0	69	50,0	0,008	1,935 (1,188-3,151)
	Good	46	34,1	89	65,9		

Association between Age and Safe Driving

Age is one factor that can influence a person's life. The older a person gets, the more it will influence their daily life. Age can determine a person's driving ability (Muryatma, 2018). Age also becomes one of the inseparable things from safe driving in this case the risk of accidents when driving (Haryanto, 2017). Table 2 shows a p-value of 0.282, which means there is no association between age and safe driving with a PR value of 1.330. This research is in line with a study stating that there is no significant association between age and safe driving (Muryatma, 2018).

The research results state that students under the age of 17 who are unsafe in driving amount to 39 students (47.0%) and those who are safe in driving amount to 44 students (53.0%), which means almost half of them have unsafe actions. According to field observations, this is because young age tends to pay less attention to risks and potential accidents and feels capable of driving motor vehicles. According to an interview with one student who uses a motorcycle to school, they have been riding a motorcycle since the 10th grade. This is supported by their parents who allow and trust them to ride a motorcycle to school even though in the 10th grade they do not yet have a SIM C.

Students under the age of 17 drive unsafely as much as 47%, which means almost half of them engage in unsafe behavior. According to field data, this is because young age tends to pay less attention to risks and potential accidents and feels capable of driving motor vehicles. A person's age can affect safe driving behavior. If a motorcycle rider is over 30 years old, they will be more mature and have more experience in terms of motorcycle riding behavior compared to riders who are under 30 years old (Irawan et al., 2022).

Association between Sex and Safe Driving

Males are more at risk of traffic accidents because males drive more often than females (Evariana et al., 2022). The influence of gender shows that compared to females, males are more likely not to prioritize and violate traffic signs (Wedagama, 2017). Based on Table 2, a p-value of 0.003 was obtained, meaning that there is an association between gender and safe driving with a PR value of 0.418. This was obtained based on the analysis that 21 male students (27.6%) drive unsafely and 94 female students (47.7%) drive unsafely. Therefore, male motorcycle riders at this school are more likely to be involved in accidents and traffic violations compared to females.

The results of this study are in line with research stating that the analysis of these two variables shows a significant association between gender and safe driving behavior among students of the Faculty of Social and Political Sciences, Universitas Muhammadiyah Jakarta (Aeni et al., 2020).

Association between Knowledge and Safe Driving

One factor that can influence safe driving is knowledge. A person's behavior can be influenced by knowledge; if the knowledge is good, it will produce good actions, and vice versa, if the knowledge is lacking, it will result in bad behavior (Siagian et al., 2023). From the analysis results, it shows there is an association between knowledge and safe driving of high school student motorcycle users.

Based on the chi-square test results, respondents who have a good level of knowledge amount to 218 people (79.9%), meaning the majority of respondents have a high level of knowledge about safe driving. However, high-knowledge students still have unsafe driving as many as 75 people (34.4%). Meanwhile, the PR result = 5.084 means respondents with good knowledge have a 5.084 times chance of driving safely compared to respondents who have sufficient knowledge (95% CI 2.639-9.797). This shows that not everyone has good knowledge, but people who have good knowledge also have not applied it when driving. People with a good level of knowledge will influence how to make decisions appropriately. The higher the level of knowledge, the wiser in making decisions and

actions related to behavior in driving (Fanny & Romdhona, 2022).

This research is in line with research that mentions that knowledge is a risk factor for safe driving behavior, where drivers with low knowledge have a 2.14 times higher risk and behave unsafely compared to high-knowledge drivers (Arianto & Feriana, 2021).

Association between Attitude and Safe Driving

There is an association between attitude and safe driving with a p-value of 0.002. This is because the research results show that 44% have a negative attitude towards safe driving and the PR result = 2.147 means students with a good attitude have a 2.147 times chance of driving safely compared to students who have a less good attitude with unsafe driving (95% CI 1.315-3.505). This research is in line with research that states that there is an association between attitude and safe driving behavior, where there are 70.2% of respondents have a good attitude towards safe driving, while a less attitude is 47.6% of respondents (Salmawati & Puspita, 2020).

According to field data, many students do not have an attitude that is not obedient to traffic regulations. For example, by not having a SIM and or not carrying a vehicle registration every time they travel using a motorcycle, using a mobile phone when driving, not doing routine/periodic service, not turning on the turn signal when going to turn, not using a jacket or shoes and not using a helmet on the grounds that they only go with a relatively close travel distance. In addition, there are also attitudes such as not keeping a distance, reckless driving, and overtaking in the wrong lane also often occur when driving (Wedagama, 2017). This shows that there needs to be the development of attitudes about safe driving culture in the school environment so that students can act more safely when driving and can minimize the risk of accidents (Nugroho et al., 2021).

Association between Perception and Safe Driving

The analysis results show an association between perception and safe driving among high school motorcycle users. This is in line with Lawrence Green's theory stating that perception can influence a person's behavior,

not excluding the younger generation who often get trapped in dangerous conditions such as driving at high speed, running red lights, etc. (Arifin et al., 2017)

The research results show that 54.5% of students with poor perception related to safe driving drive unsafely, and 45.5% of students drive safely. Meanwhile, the PR result = 2.522 means students with good perception have a 2.522 times chance of driving safely compared to students with poor perception who drive unsafely (95% CI 1.540-4.133). This research is in line with Salsabilah, which states that there is a significant association between perception and safe driving behavior (Mokoginta et al., 2022). Based on the results of the Structural Equation Model (SEM) calculation, the influence of perception on safe driving behavior can be seen to be 0.477. In this research result, students have a good perception related to safe driving and only have a slight difference with students with poor perception (Wiranatha et al., 2021).

Association between Participation in Driving Training and Safe Driving

Based on the analysis results, there is no association between participation in driving training and safe driving with a p-value of 0.478, and PR=1.486, which means respondents who participate in driving training have a 1.486 times chance of driving safely. According to field research, as many as 258 students (94.5%) have never attended a safe driving course, and there are only 15 respondents (5.5%) out of the total respondents who have ever participated in driving training. Of the 15 respondents who have participated in driving training, there are 10 respondents (66.7%) who are declared to behave safely while driving, while 5 respondents (33.3%) are declared to behave unsafely. In this research, the school also does not facilitate its students in implementing safe driving, so almost all students in grades XI and XII have never participated in driving training.

It is necessary to provide material on the development of driving skills and can have a positive influence on driver behavior. This can provide safer driving habits and can reduce the accident rate (Pamungkas, 2014). Participating in driving training can be beneficial for someone's knowledge of the risks of driving on the highway so that drivers understand how to drive well and safely (Nugroho et al., 2021).

Association between Driving Experience and Safe Driving

Driving experience is calculated from the first time respondents ride a motorcycle until this research was conducted. The results show that the majority of students have been riding motorcycles for more than a year, with 235 students (86.1%), while students with new driving periods number 38 students (13.9%). The above bivariate analysis results show that there is an association related to driving experience with safe driving. Meanwhile, the PR result = 6.618 means that students with driving experience ≥1 year have a 6.618 times chance of driving safely compared to students who have driving experience <1 year with unsafe driving (95% CI 2.903-15.086).

How long one drives can be influenced by a person's behavior in riding a motorcycle, and if someone has a long driving experience then they will ride a motorcycle safely, and vice versa, if someone is new to riding a motorcycle then they will have a risk to perform unsafe actions (Notoatmodjo, 2010).

Association between Ownership of a C Driving License and Safe Driving

Ownership of a C driving license is one proof of competence in driving and is a standard of ability in safe driving. If one does not have a driving license, it means they do not yet have a standard ability in driving and often do not meet the requirements for owning a driving license (Salmawati & Puspita, 2020).

The statistical test results between the ownership of a C driving license and safe driving obtained that 30 students (57.7%) have a C driving license with safe driving, while those who do not have a C driving license are as many as 93 students (42.1%) with unsafe driving. The Chi Square test results obtained a P value of 0.976, so it can be concluded that there is no significant association between the ownership of a C driving license and safe driving. This is very unfortunate because a driving license is proof that someone is considered capable and has the capacity to ride a motorcycle. According to Law No. 22 of 2009, the minimum age to be able to get a C driving license is 17 years. Meanwhile, the average age of high school students ranges from 15 to 18 years.

Age <17 years does not qualify for making a driving license, and age ≥17 years should already have a C driving license, but in reality, many students at this school do not yet have a C driving license. Riders who do not yet have a C driving license are not legally allowed to drive motor vehicles and do not yet know how to drive safely properly and correctly so that the behavior of high school students when driving is not appropriate (Danielle et al., 2020).

The bivariate analysis results show that there is no association between the two variables, namely the ownership of a C driving license and safe driving. Indeed, the majority of respondents do not have a C driving license but assume they meet the requirements to ride a motorcycle without taking a test to have a C driving license (Mokoginta et al., 2022).

Association between the Use of Personal Protective Equipment (PPE) and Safe Driving

The minimal use of PPE by some respondents is due to a lack of implementation and understanding related to safe driving, resulting in individuals feeling uncomfortable wearing PPE and a lack of supervision in the use of PPE (Qamara & Widowati, 2022). The bivariate analysis results from the variable use of PPE with safe driving obtained a significant value of $p=0.002$, which means there is an association between these variables. Meanwhile, PR=2.148, students with good use of PPE have a 2.148 times chance of driving safely compared to students who use PPE poorly with unsafe driving (95% CI 1.311-3.519). There are no riders who have complete driving equipment that behaves safely while driving. This also affirms Green's statement that the availability and use of PPE are one of the factors that support a person's behavior (Manurung et al., 2020).

Students at this school still pay little attention to the PPE they use. Because the distance from home to school is still relatively close, therefore some riders do not use helmets and jackets when driving. There are also some students who carry helmets but do not wear them, instead, they are only hooked on the luggage hook on the seat of their motorcycle. Driving equipment is regulated in the Republic of Indonesia Law Number 22 of 2009 concerning Traffic and Road Transportation (LLAJ) which regulates driving equipment, namely SIM and STNK, Indonesian national standard helmets (SNI), jackets, face protectors, long pants, and shoes that cover the heel (Manurung et al., 2020).

Association between the Role of Peers and Safe Driving

Peers or friends are people who have the same age and level of maturity, friends are one of the closest people especially for teenagers besides their parents. If in this friendship group they have already realized the risk of safety in driving, usually other group members are also influenced to realize the risk of safety in driving (Mokoginta et al., 2022). The bivariate analysis results from the variable role of peers with safe driving obtained a significant value of $p=0.008$, which means there is an association between these variables with a PR value of 1.935 meaning students with good peers have a 1.935 times chance of driving safely compared to students who have a less good role of peers with unsafe driving. The role of peers can be seen from the age level and maturity that is almost the same as the respondents (Lumente et al., 2021).

In the statement of the role of peers, most students admit that they have never been reminded to check the condition of their vehicle before use and have not been reminded to use PPE, do not ask about daily driving activities, do not remind routine motorcycle maintenance, and sometimes just let it go if they make mistakes while driving. This shows that the role of peers here has not fully contributed to safe driving practices in students.

Multivariate Analysis

Multivariate analysis is used to determine the association of independent variables consisting of age, gender, knowledge, attitude, perception, driving training, driving experience, ownership of a C driving license, use of personal protective equipment (PPE), and the role of peers related to safe driving in high school students. The results of the bivariate analysis found seven independent variables that have a significance value ($p<0.25$), namely gender, knowledge, attitude, perception, driving experience, use of PPE, and the role of peers. Therefore, these seven independent variables can be continued for multivariate analysis.

Table 3 Mutivariate Analysis

Variables	P-value	OR	95%CI
Knowledge	0,000	4,121	1,095-8,915
Perception	0,002	2,556	1,419-4,605
Driving Experience	0,017	2,994	1,212-7,392
Constan	0,000	0,509	

Based on Table 3, there are three variables that influence safe driving: knowledge, perception, and driving experience, which are related to safe driving of motorcycle riders at Mojotengah 1 Public High School. Based on this analysis, it can be interpreted as follows: there is an association between knowledge and safe driving, where students with good knowledge have a 4.1 times greater chance of applying good safe driving compared to students with less good knowledge. In perception with safe driving, students with good perception have a 2.5 times greater chance of applying good safe driving compared to students with less good perception. Also, driving experience with safe driving where students who have experience ≥1 year have a 2.9 times greater chance of applying safe driving compared to students who have driving experience <1 year. If there are students who have good knowledge and perception, longer experience then it will increase the likelihood of safe driving occurring by 50.9%.

CONCLUSION

Based on the research results, it can be concluded that perception, knowledge, and driving experience influence safe driving with a significance value of 0.000 and will increase the likelihood of safe driving occurring among students by 50.9%. It is hoped that the school can collaborate with local police to hold socialization programs related to the importance of safe driving for students by utilizing various information media in the school.

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