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## The Influence of Social and Environmental Factors on the Behavior of Using Personal Protective Equipment (PPE) When Driving on Students of SMK Muammadiyah Aek Kanopan in North Labuhan Batu Regency: Cross Sectional Study

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### Abstract

Traffic safety is one of the important aspects in community life that is often ignored, especially by the adolescent age group. Students are a productive age group who often use motorbikes as their main means of transportation to school or other activities. This makes them one of the groups that are vulnerable to traffic accidents, especially when they do not use Personal Protective Equipment (PPE) when driving. To analyze the Influence of Social and Environmental Factors on the Behavior of Using PPE for Driving on Students of SMK Muammadiyah Aek Kanopan in North Labuhanbatu Regency, the type of observational study with a cross-sectional design, the population of all students in grades X and XI, as many as 330 people. From the population, a sample of 142 respondents was determined in 2025, the sampling technique used a non-probability sampling technique with a purposive sampling method, Peer Influence =  $p$  (0.001), Traffic Safety Education Received at School =  $p$  (0.001), Distance from Home to School =  $p$  (0.001), Access to Proper PPE =  $p$  (0.001) have an effect on the use of PPE while driving. While the most influential variable is traffic safety education received at school ( $Exp(b) = 7.984$ ). This study concludes that peers, traffic safety education, distance from home to school, and access to PPE have a significant effect on the use of PPE while driving, with traffic safety education as the most dominant factor.

**Keywords:** Traffic safety education received in schools, Environment, Influence of Social Factors, Personal Protective Equipment (PPE) Use Behavior.

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## INTRODUCTION

Road safety is an important aspect of community life that is often ignored, especially by the adolescent age group. Students are a productive age group who often use motorbikes as their main means of transportation to school or other activities. This makes them one of the groups that are vulnerable to traffic accidents, especially when they do not use Personal Protective Equipment (PPE) when driving (Permayasa et al. 2023).

According to a report by the World Health Organization (WHO), traffic accidents result in around 1.2 million deaths each year worldwide, while more than 50 million people are injured as a result of these incidents (Lastari et al. 2024). In Indonesia, the Ministry of Health of the Republic of Indonesia noted that in 2020, land transportation accidents were among the top ten causes of death for outpatients. Meanwhile, data from the Ministry of Transportation in the same year recorded 26,495 cases of traffic accidents nationally (Permayasa et al. 2024). Of this number, the majority or around 90.3% were caused by human factors, of which 86.8% were a direct result of driver negligence or error (Hadi et al. 2023).

Similar conditions also occurred at the provincial level, such as in North Sumatra, which recorded 6,083 cases of traffic accidents in 2020. From these incidents, 1,670 victims died, 2,046 people suffered serious injuries, and 6,511 people suffered minor injuries. Overall, the material losses incurred reached more than 13.8 billion rupiah, as reported by the Central Statistics Agency (BPS) in 2020 (Wardah, Lubis, and Aprilia 2022).

Based on data released by the Labuhanbatu Police, throughout 2024 there were 397 cases of traffic accidents that occurred in the jurisdiction Labuhanbatu Police, which covers Labuhanbatu, North Labuhanbatu, and South Labuhanbatu Regencies. Of the total accidents, 128 people died, 169 people suffered serious injuries, and 415 people suffered minor injuries (Lubis, Anhar, and Rogers

2023). Accidents involving transportation modes are often caused by driver behavior that does not comply with the use of Personal Protective Equipment (PPE) while driving. This non-compliance is one of the main factors contributing to the high risk of accidents, especially when drivers ignore the importance of self-protection. One of the dominant causes of this behavior is physical fatigue due to high activity loads, which has an impact on decreasing concentration and alertness, so that the use of PPE tends to be ignored (Salmen-Navarro and Schulte 2022). The number of traffic accidents in Indonesia is still quite high, with a significant proportion involving school-age adolescents. One of the main causes of the high risk of accidents is the low compliance in using PPE, such as SNI standard helmets, protective jackets, gloves, and closed shoes. PPE plays a vital role in reducing the fatal impact of accidents, but in reality, the use of PPE has not become a habit that is inherent in students (Wiraagni et al. 2023).

Many students ignore the use of PPE for various reasons, ranging from discomfort, wanting to look stylish, to a lack of understanding of the importance of personal safety. This behavior does not form suddenly, but is influenced by various factors, one of which is social factors. Peers have a major influence on adolescent behavior. When a student sees that his friends are not wearing helmets or other PPE, he is likely to follow that behavior in order to maintain social existence in his group (Huang, Puri, and Vipler 2023).

In addition, the role of parents cannot be ignored in forming safe driving behavior. Parents who provide supervision and education about the importance of driving safety can encourage children to be more disciplined in using PPE. However, in many cases, parents often do not set a good example or are not firm enough in implementing safe driving rules for their children (Kim, Ganga, and Kim 2023). Norms that develop in schools and the residential environment also shape students' driving habits. Schools that have strict regulations on driving safety, including requiring students who ride motorbikes to wear helmets, tend to have higher levels of compliance. Conversely, schools that do not have a monitoring or education system related to this often ignore student safety on the highway (Pobela, Fauzan, and Tutu 2023). On the other hand, the physical environment also influences the behavior of PPE use in students. Access to proper PPE, such as SNI helmets and protective jackets, is still an obstacle, especially for students from lower-middle economic families. In addition, the distance from home to school and inadequate road conditions also affect students' motivation to use PPE (Fitri, Hilal, and Sugiarto 2023). Exposure to driving safety campaigns in the surrounding environment also plays an important role. Students who live in environments with active safety education, such as banners, counseling, or school activities, tend to have a higher awareness of using PPE. Conversely, the lack of information and attention to safety in the residential environment can make students ignore the importance of self-protection when driving (Flowers et al. 2021). Therefore, efforts to minimize the risk of accidents while increasing awareness of driving safety are very important, including in the context of education. This study aims to analyze the Influence of Social and Environmental Factors on the Behavior of Using Personal Protective Equipment (PPE) for Driving on Students of SMK Muammadiyah Aek Kanopan in North Labuhan Batu Regency.

## RESEARCH METHODS

This study is an observational study using a cross-sectional research design, which aims to analyze the Influence of Social and Environmental Factors on the Behavior of Using Personal Protective Equipment (PPE) for Driving on Students of SMK Muammadiyah Aek Kanopan. The location of the study was focused on SMK Muhammadiyah Aek Kanopan in North Labuhanbatu Regency with a research population covering all students in grades X and XI, totaling 330 people. From this population, a sample of 142 respondents was determined in 2025, selected through a non-probability sampling technique with a purposive sampling method, based on certain criteria that have been determined by the researcher. Data collection using a research questionnaire. Data were analyzed

univariately, bivariate (chi-square), and multivariate (logistic regression) using the enter method.

## RESULTS AND DISCUSSION

**Table 1. Distribution of Characteristics of Students of SMK Muammadiyah Aek Kanopan in North Labuhan Batu Regency**

Characteristics of Students	n	Percentage
<b>Gender</b>		
Male	95	66,9
Female	47	33,1
Number	142	100
<b>Age</b>		
15 Years	31	21,8
16 Years	52	36,6
17 Years	40	28,2
18 Years	9	6,3
19 Years	10	7,0
Number	142	100
<b>Grade Level</b>		
Grade X	72	50,7
Grade XI	49	34,5
Grade XII	21	14,8
Number	142	100
<b>Peer Influence</b>		
No Influence	79	55,6
Influence	63	44,4
Number	142	100
<b>Traffic Safety Education Received at School</b>		
None	86	60,6
Yes	56	39,4
Number	142	100
<b>Distance from Home to School</b>		
Near	74	60,6
Far	68	39,4
Number	142	100
<b>Access to Proper PPE (e.g. SNI helmets, jackets, gloves)</b>		
Difficult	77	54,2
Mudah	65	45,8
Jumlah	142	100
<b>Behavior of Using Personal Protective Equipment While Driving</b>		
Poor	83	58,5
Good	59	41,5

Number	142	100
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Table 1 shows that of the 142 drivers, the highest male gender was 66.9%, the highest age of 16 years was 36.6%, the highest class X was 50.7%, the highest peer influence was 55.6%, no traffic safety education received at school was 60.6%, the distance from home to school was close was 60.6%, access to proper PPE (eg SNI helmets, jackets, gloves) was difficult at 54.2% and the behavior of using PPE while driving was lacking at 58.5%.

**Table 2. The Influence of Social and Environmental Factors on the Behavior of Using Personal Protective Equipment (PPE) for Driving in SMK Muammadiyah Aek Kanopan Students in North Labuhan Batu Regency**

Peer Influence No Influence	Use of Personal Protective Equipment (PPE) While Driving				Amount	X <sup>2</sup> (p)
	Not enough		Good			
	n	Persen	n	Persen		
Influence	57	72,2	22	27,8	79	13,764
Number of	26	41,3	37	58,7	63	(0,001)
Traffic Safety Education Received in Schools	83	58,5	59	41,5	142	
None						
Peer Influence	67	77,9	19	22,1	86	33,991 (0,001)
There is	16	28,6	40	71,4	56	
Number	83	58,5	59	41,5	142	
Distance from Home to School						
Near	54	73,0	20	27,0	74	13,419 (0,001)
Far	29	42,6	39	57,4	68	
Jumlah	83	58,5	59	41,5	142	
<b>Access to Proper PPE (SNI Helmets, Jackets, Gloves)</b>						
Difficult	59	76,6	18	23,4	77	22,874

					(0,001)
Easy	24	36,9	41	63,1	65
Number	83	58,5	59	41,5	142

Table 2 below shows that out of 79 drivers who stated that peers had no influence on the use of PPE, there was a behavior of using PPE while driving that was lacking by 72.2%. Meanwhile, out of 63 drivers who stated that peers had an influence on the use of PPE, there was a behavior of using PPE while driving that was lacking by 41.3%. The results of the statistical analysis obtained that the  $\chi^2$  count value (13.764) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that the influence of peers has an effect on the use of PPE while driving. Out of 86 drivers who stated that there was no traffic safety education received at school, there was a behavior of using PPE while driving that was lacking by 77.9%. Meanwhile, out of 56 drivers who stated that there was traffic safety education received at school, there was a behavior of using PPE while driving that was lacking by 28.6%. The results of the statistical analysis obtained that the  $\chi^2$  count value (33.991) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that traffic safety education received at school has an effect on the use of PPE while driving. Of the 74 drivers who stated that the distance from home to school is close, there was a behavior of using PPE while driving that was lacking by 73.0%. While of the 68 drivers who stated that the distance from home to school is far, there is a behavior of using PPE while driving that is lacking by 42.6%. The results of the statistical analysis obtained that the  $\chi^2$  count value (13.419) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that the distance from home to school has an effect on the use of PPE while driving and of the 77 drivers who stated that access to proper PPE was difficult, there is a behavior of using PPE while driving that is lacking by 76.6%. Meanwhile, from 65 drivers who stated easy access to proper PPE, there was a behavior of using PPE while driving that was less than 36.9%. The results of the statistical analysis obtained that the  $\chi^2$  count value (22.874) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that access to proper PPE has an effect on the use of PPE while driving.

**Table 3. Multivariate Analysis of the Influence of the Use of Personal Protective Equipment (PPE) While Driving on Students of SMK Muammadiyah Aek Kanopan in North Labuhan Batu Regency**

Variable	B	SE	Sig	Exp (B)	95% C for EXP (B)	
					Lower	Upper
Peer Influence	1,149	0,436	0,008	3,154	1,342	7,417
Traffic Safety Education Received at School	2,077	0,442	0,000	7,984	3,354	19,004
Distance from Home to School	0,059	0,503	0,907	1,061	0,396	2,841
Access to Proper PPE (SNI Helmets, Jackets, Gloves)	1,259	0,501	0,012	3,522	1,319	9,406
Constant	-6,977	1,198	0,000	0,001		

Table 3 below shows that the influence of peers (p value = 0.008), traffic safety education received at school (p value = 0.000), distance from home to school (p value = 0.907), and access to proper PPE (p

value = 0.012), of the four variables, the variable that has the most influence on the use of PPE when driving is the variable of traffic safety education received at school ( $\text{Exp}(b) = 7.984$ ).

## Discussion

The Influence of Peers on the Use of Personal Protective Equipment (PPE) While Driving The influence of peers on the use of personal protective equipment (PPE) while driving is very significant, especially among adolescents and young adults. Peers are often the main reference in decision making, including in terms of driving safety. When someone is in a social environment that tends to ignore the use of helmets or protective jackets, they tend to follow this habit in order to be accepted in the group. Conversely, if their friends consistently use PPE, they will also be encouraged to do the same (Syam 2024).

Social pressure and the desire to be different can influence an individual's attitude towards the importance of safety. This influence can be positive or negative depending on the norms that apply in the friendship environment. Therefore, education and the formation of peer groups that are aware of the importance of PPE are very important to increase awareness and reduce the number of accidents on the highway. Peers who behave positively can be effective agents of change in forming a safe driving culture (Kurniasih, Machfutra, and Nantabah 2022).

The results of the study showed that of the 79 drivers who stated that peers had no influence on the use of PPE, there was a behavior of using PPE while driving that was lacking by 72.2%. Meanwhile, of the 63 drivers who stated that peers had an influence on the use of PPE, there was a behavior of using PPE while driving that was lacking by 41.3%. The results of the statistical analysis obtained that the  $\chi^2$  count value (13.764) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that the influence of peers has an effect on the use of PPE while driving.

Traffic Safety Education Received in Schools Affects the Use of Personal Protective Equipment (PPE) While Driving Traffic safety education received in schools plays an important role in shaping students' awareness of the importance of using personal protective equipment (PPE) while driving. Through traffic education programs, students are equipped with knowledge about the risks of accidents and how to prevent them, including wearing helmets and other safety equipment. This knowledge fosters an understanding that the use of PPE is not just a legal obligation, but also part of an effort to protect oneself (Rubiati et al. 2025). In addition to providing information, education in schools can also form positive attitudes and habits from an early age. When safety values are consistently instilled and accompanied by real examples from teachers and the school environment, students tend to carry these habits into their daily lives. Thus, traffic education in schools has a long-term impact on improving a culture of safe and responsible driving (Afiansyah and Mindiharto 2023). The results of the study showed that of the 86 drivers who stated that there was no traffic safety education received at school, there was a behavior of using PPE while driving that was lacking by 77.9%. Meanwhile, of the 56 drivers who stated that there was traffic safety education received at school, there was a behavior of using PPE while driving that was lacking by 28.6%. The results of the statistical analysis obtained that the calculated  $\chi^2$  value (33.991) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that traffic safety education received at school has an effect on the use of PPE while driving. Distance from Home to School Affects the Use of Personal Protective Equipment (PPE) When Driving

The distance from home to school can affect the level of student compliance in using personal protective equipment (PPE) when driving. Students who travel long distances tend to be more aware of the risks on the road and are more likely to use PPE such as helmets or protective jackets to maintain safety. Longer trips generally involve denser traffic and higher vehicle speeds, thus encouraging students to be more careful (Kesumadinata and Susanti 2024).

In contrast, students who live close to school often consider their trips short and not dangerous, so they feel that using PPE is not very important. This attitude can reduce the level of compliance with safety rules, although the risk of accidents remains even at short distances. Therefore, it is important to instill awareness that the use of PPE must become a habit, regardless of the distance traveled (Sari and Lestari 2024).

The results of the study showed that of the 74 drivers who stated that the distance from home to school was close, there was a behavior of using PPE when driving that was lacking, as much as 73.0%. Meanwhile, of the 68 drivers who stated that the distance from home to school was far, there was a behavior of using PPE while driving that was less than 42.6%. The results of the statistical analysis obtained that the  $\chi^2$  count value (13.419) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that the distance from home to school affects the use of PPE while driving

#### Access to Proper PPE (SNI Helmets, Jackets, Gloves) Affects the Use of PPE While Driving

Access to proper PPE, such as SNI standard helmets, protective jackets, and gloves, greatly affects the habit of using it while driving. When students or drivers have easy access to quality PPE, both in terms of availability and affordable prices, they tend to be more motivated to use it routinely. The quality and comfort of PPE are also important factors, because comfortable equipment is more likely to be used in daily activities (Istiyanto et al. 2025).

On the other hand, limited access, whether due to economic factors or distribution of goods, can be a major barrier to the use of PPE. Many drivers end up using non-standard equipment or even not using PPE at all because it is difficult to get decent products. Therefore, there needs to be support from the government and schools in providing or facilitating access to PPE that is meet safety standards, so that a safe driving culture can be widely implemented (Prasetia and Mitoriana Porusia 2024). The results of the study showed that out of 77 drivers who stated that access to proper PPE was difficult, there was a behavior of using PPE while driving that was less than 76.6%. Meanwhile, out of 65 drivers who stated that access to proper PPE was easy, there was a behavior of using PPE while driving that was less than 36.9%. The results of the statistical analysis showed that the  $\chi^2$  count value (22.874) >  $\chi^2$  table (3.841) or p value (0.001) <  $\alpha$  (0.05). This means that access to proper PPE affects the use of PPE while driving.

## CONCLUSION

The results of the study indicate that all variables studied—peers, traffic safety education at school, distance from home to school, and access to PPE—have a significant effect on the use of PPE while driving ( $p = 0.001$ ). Of the four variables, traffic safety education at school is the most influential factor with an  $\text{Exp}(B)$  value of 7.984.

It is recommended that schools strengthen traffic safety education programs routinely and interactively. In addition, it is also important to encourage a positive friendship environment, expand access to appropriate PPE, and increase awareness of the risks of driving, regardless of distance traveled.

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