

*Original Article*

## Prevalence of safety equipment and helmet use among school students commuting to school in South Selangor, Malaysia

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### Abstract

A cross-sectional observational study was conducted on the use of helmets and other safety equipment for child pillion riders while going to a school in Sri Serdang, Selangor, Malaysia. The objective of this study was to analyze and report the proportion of children wearing helmets and other safety equipment while riding pillion on a motorcycle. The prevalence of helmet use among the students as pillion riders was low (47.88%) compared to the adults (75.21%). This was unsatisfactory. There is a distinct lack of awareness of the benefits of helmets in helping to save lives and reducing injuries. Hence, there is a need for other safety equipment to provide additional safety protection for child pillion riders to counter the lack of safety equipment use while riding pillion. The Malaysian Ministry of Transport could benefit from this study with the information gained for safety equipment use among school students.

**Keywords:** children, safety, motorcycles, Malaysia, observation, pillion

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### 1. Introduction

South East Asian countries have seen a massive increase in motorcycle riders (Roehler *et al.*, 2013). In the low to middle income countries, the popularity of the motorcycle has grown tremendously over the past decades (Li, Li, & Cai, 2008). However, there has been an increase in motorcycle related injuries, deaths, and casualties in tandem with increased motorcycle use in these countries because motorcycles are the leading mode of transport in these countries

(Sheikh Ibrahim, Stevenson, & Hariza, 2006).

Road traffic safety for children is increasing in importance in the public health arena of most countries due to the increase of child related road traffic injuries year on year (Yu *et al.*, 2012). Motorcycle related injuries and the resulting fatalities are increasing at an alarming rate in the developing world (Conrad, Bradshaw, Lamsudin, Kasniyah, & Costello, 1996). In Malaysia, transport related accidents were one of the main causes of death in 2017 for the 0–14 and 15–40 age groups (Department of Statistics Malaysia, 2018). Many studies have shown that the use of helmets saves lives. The motorcyclist's head is the most vulnerable part of the body susceptible to serious injuries in the case of an accident (Yang, Dai, & Zhuang, 2009). Helmets have been proven to

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reduce the risk of brain and head injury by 70–80% and facial injury (mid and upper face) by 65% (Pinnoji & Mahajan, 2007).

In Malaysia, children are taken to school in various ways that include cars, motorcycles, or the children are accompanied by foot to school by their parents. Despite the availability of safety equipment like helmets, parents have shown to not use them for their children due to ignorance despite the safety advantages outweighing the non-use (Blomquist, 1991).

The objective of this study was to analyze and reveal the proportion of children wearing helmets compared to children not wearing helmets while riding pillion on a motorcycle where the proportion of children riding pillion on the way to school is high. Besides the use of helmets, the use of other forms of child protection equipment such as safety belt (harnesses) and elbow guards will also be noted.

## 2. Materials and Methods

An observational study of school children wearing helmets was conducted at a National Primary School in Seri Kembangan, Selangor, Malaysia. Our study was limited to the school children who rode as pillion riders. A typical primary school child is 12 years old or younger. A primary school was purposefully chosen for this study because children aged 7–12 years are vulnerable while riding pillion on motorcycles. The outcome of this study intended to show the proportion of children wearing helmets compared to children not wearing helmets while riding pillion on a motorcycle. This study was conducted over a period of 1 day in the month of September 2014. Observations were conducted from a distance over 3 times on the day of the observation because this primary school had one morning session and one afternoon session. The afternoon session would start once the morning session had finished and hence there was an overlap of students entering and leaving the school in the afternoon. The observation times were from 6:45 am to 7:30 am, 11:45 am to 1:30 pm, and 6:30 pm to 7:15 pm. The sex of the children riding pillion and the sex of the motorcyclist were also noted. In addition to the use of helmets, the use of other forms of child protection devices was also noted. The data were manually recorded using a pre-set form and then tabulated in a Statistical Package for the Social Sciences (SPSS) software data base. Frequencies were calculated and cross-tabulation

was performed and calculated. The prevalence of helmet use for both riders and pillion riders was calculated (Ackaah & Afukaar, 2010; Ariffin, Soid, Borhan, & Sukardi, 2014).

## 3. Results

Children come to school in various modes of transport: walk on foot, ride on a motorcycle, ride a bicycle, or ride in a school bus or car. Our observations strictly observed the parents who brought their children on motorcycles. From the observation done over the course of one day, a total of 121 parent/adults sent and picked up their children by motorcycles. Also, eight older students (aged >16 years who are legally allowed to ride motorcycles according to Malaysian law) sent and picked up children from school. All of the eight older students were males. The number of male parents/adults was 92 and the number of female parents/adults was 29. The numbers of helmeted students were 41 males and 38 females. The numbers of helmeted parents were 71 males and 20 females. None of the eight older students wore a helmet and their pillion riders also did not wear helmets.

The prevalence of helmet use among the students (47.88%) was low compared to the observed adults (75.21%). Pillion riders were less likely to wear helmets compared to the adults who they were riding with. Although, when an older student rides a motorcycle with another student, the observation was that the pillion rider was more likely to follow the fellow student rider in front. There were instances where some parents transported more than one child as pillions. Two parents used additional safety equipment for themselves and their children. This additional equipment was a safety belt like harness for the child and elbow guards for themselves and the child (Tables 1-3).

## 4. Discussion

The prevalence of helmet use was very unsatisfactory among the parents and students alike. It is very clear

Table 1. Students being sent by motorcycle to school.

	Male Students	Female Students	Total
Motorcycle only (Pillion Only)	109	56	165

Table 2. Helmet use among students and parents.

	Rider		Pillion rider		Total	
	n	Helmeted	n	Helmeted	n	Helmeted
Students	0	0 (0.00%)	165	79 (47.88%)	165	79 (47.88%)
Other students	0	0 (0.00%)	0	N/A	0	0 (0.00%)
Parents	121	91 (75.21%)	0	N/A	121	91 (75.21%)

Table 3. Other protective equipment use among students and parents.

	Rider		Pillion rider		Total	
	n	Other equipment	n	Other equipment	n	Other equipment
Students	0	0.0%	165	2 (1.21%)	165	2 (1.21%)
Other students	0	0.0%	0	N/A	0	0.0%
Parents	121	2 (1.65%)	0	N/A	121	2 (1.65%)

that the parents are not taking the safety of their children seriously. The unsatisfactory rate of helmet use can be partly attributed to the mind-set in place with regards to helmets (Ratanavaraha & Jomnonkwao, 2013). There is a perception that motorcyclists do not really understand the importance of helmets. Instead, they behave as if the only reason to use a helmet is to avoid detention or arrest by the police but not as a form of protection of their lives.

Children are more at risk of suffering head injuries due to their larger head size compared to their body mass. This coupled together with their younger developing brain being susceptible to lasting damage is a situation that has to be avoided by responsible adults. During an accident, children lack the judgment and experience to be able to avoid or reduce the impact to themselves (Robertson, Lang, & Schaefer, 2014). Hence it should be the responsibility of the adult to properly ensure the safety of the child in their care while on a motorcycle. The parent who does not ensure that their child at least wears a helmet while riding a motorcycle is not being responsible and is teaching the child irresponsible behavior as this child will most likely follow the same example when the child starts riding a motorcycle.

People should feel responsible for the safety of children under their care even when they are in/on motor vehicles such as motorcycles (Zamani-Alavijeh *et al.*, 2009). According to Sabahiah and Sukor (2014), motorcycle safety cannot be tackled by only focusing on certain issues. The combinations of policy, education, inputs from mass media, support from the community, and also research that combines engineering practice and behavioral studies is obviously needed (Sabahiah & Sukor, 2014). The low uptake of using safety equipment in developing countries is a worrying trend and represents a need for a form of intervention. A strategy of three approaches is needed to increase the use of protective devices when riding in or on a motor vehicle. The three approaches are 1) education, 2) legislation, and 3) engineering intervention (Floerchinger-Franks, Machala, Goodale, & Gergerding, 2000). The engineering intervention approach includes a device or devices capable of providing some sort of child protection while riding pillion and should be designed and developed for underbone motorcycles.

## 5. Conclusions

The prevalence of helmet use is low among the students. There is a distinct lack of awareness of the benefits of using a helmet to help save lives and reduce injuries. Children should be unceasingly taught safety from a young age and the perils while riding motorcycles as pillion. These education programs should not be limited only to schools but should carry on to colleges and universities so that it will stick with these children until they are adults. The government and relevant agencies should stop the sale and availability of non-standard helmets that are available in the market and instead encourage the use of only standard helmets, especially for children. A possible review of the Malaysian law pertaining to the suitability of children riding pillion with a set age limit should be carried out for the benefit of this vulnerable group. Engineering countermeasures should be implemented to create a safer and more crashworthy travel environment for child pillion riders. A device capable of providing some sort of

protection to the child while riding pillion should be designed and developed for underbone motorcycles. The communities that surround schools can also help by educating parents on the need for safety equipment, especially helmets. They could organize educational programs specifically for the parents. Further studies should be carried out at more schools to gauge the prevalence of helmets and the use of safety equipment.

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