Contributed articles

Road Safety Case Studies

Safe Pedestrian Behaviours among Children Aged 7 to 9 in Malaysia

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Key Findings

- Less than 30% of surveyed children aged 7 to 9 reported high levels of safe pedestrian behaviours as defined in the Malaysian Road Safety Education module.
- Less than 30% of the children aged 7 to 9 reported to 'always' wear bright clothes, walk against the traffic, and wave at the drivers to cross the road.
- More than 70% of children aged 7 to 9 reported to 'always' hold adult's hand when crossing the street and look left, then right, and then left again before crossing the street.
- A small percentage (9.9-13.6%) of children aged 7 to 9 reported to 'always' wear dark clothes at night, cross the street between parked cars, and run to cross the road.

Abstract

The present study examined safe pedestrian behaviours according to the Malaysian Road Safety Education module among 7-year-old to 9-year-old children in Malaysia. A survey was conducted with a relatively large (n = 1206) random sample of children aged 7 to 9 years old, drawn from 24 selected schools in six states in Malaysia based on the highest numbers of crash cases. Analysis of one-way ANOVA revealed a statistically significant difference in safe pedestrian behaviours between different ages. Post hoc comparisons using the Tukey HSD test indicated that the mean score of safe pedestrian behaviours for 7-year-old children was significantly higher than that of 8-year-old children (p = .004) and 9-year-old children (p = .021). No statistically significant difference was revealed between the 8-year-olds and 9-year-olds (p = .859) at the 0.05 level. Although many children reported safe pedestrian behaviours, low levels of certain safe pedestrian behaviours were also reported – less than 30% of the children aged 7 to 9 reported to 'always' wear bright clothes, walk against the traffic, and wave at the drivers to cross the road. In addition, a small percentage (9.9-13.6%) of children aged 7 to 9 also reported to 'always' wear dark clothes at night, cross the street between parked cars, and run to cross the road. These findings may inform programs to improve children's safe pedestrian behaviours.

Keywords

Safe Pedestrian Behaviour, Children, Malaysia

Introduction

In 2016, 1.4 million people died from road traffic crashes around the world (WHO, 2018). Road traffic injury ranked fourth for causes of death for children, and it was estimated that 186,300 children die from road traffic crashes yearly (WHO, 2015). Meanwhile in Malaysia, road traffic crashes recorded the third highest percentage (7.4%) for premature deaths (Department of Statistics Malaysia, 2017). A statistic from Royal Malaysia Police stated that 2,248 children aged below 15 were part of road traffic casualties in 2016 (Royal Malaysia Police [PDRM], 2016). Children who were affected by terrible crashes may experience unending suffering and misfortune that also trouble people surrounding them, especially family and relatives. Children are vulnerable on the road due to their limitation in terms of

physical, cognitive, and social development (WHO, 2015). Although children are not eligible to drive on the road, they are still part of the road users. Children use the road daily, especially to commute to school as pedestrians, putting them at risk of being a victim of road traffic crash.

With more than 30,000 children killed annually, child pedestrian injuries are an important issue worldwide (Toroyan & Peden, 2007). This trend is very worrying as it has not declined in recent years (WHO, 2008). According to National Centre for Injury Prevention and Control or NCIPC (2013), children in the 5-year-old to 10-year-old age range are at particular risk and account for a disproportionate number of pedestrian injuries. In 2016, a total of 1,040 school children had been involved in pedestrian road crash which was also the third leading cause of casualties in Malaysia (PDRM, 2016). A review revealed that most of the crashes and injuries happened in or near the house, or in few instances, at school (Khamsiah Ismail et al., 2016).

Given road safety is a significant issue for the young children, the objective of this study is to examine the level of safe pedestrian behaviour among 7-year-old to 9-year-old children in several selected districts in Malaysia, and to determine whether a significant difference exists in the pedestrian behaviours according to their age. The paper hypothesised that there will be a significant difference among the age groups, where the older children show better performance on safe pedestrian behaviours than the younger children. Apart from that, the research goal is to identify what kind of safe pedestrian behaviours should be improved in order to create prudent pedestrians among children. Identifying the weakness in the aspects of safe pedestrian behaviours among children is essential for developing effective prevention strategies.

Methods

Research Design and Sampling

This is a quantitative study in which two-stage sampling comprising purposeful random sampling and simple random sampling was applied to gather the data. During the first stage, six states were identified based on the road crash statistics from Royal Malaysia Police. The highest numbers of crash cases involving those aged 6 to 12 years old in six districts were shortlisted, with one district representing one state. During the second stage, four primary schools in each district were randomly selected. At each school, children were randomly selected by the school administrators according to low, medium, and high academic achievements. The study was conducted based on ethical regulation research involving school children and it was approved by Ministry of Education, Ministry of Transport, and other related departments. Consent of participation was obtained from parents of the children.

Participant

A total of 1,206 children were recruited from a total of 2 4 primary schools; 410 were 7 years old, 392 were 8 years old, and 404 were 9 years old.

Instrument

The researchers developed a questionnaire consisting of 9 questions aimed to assess safe pedestrian behaviours among children aged 7 to 9 years old (refer to items listed in Table 2). The questionnaire was developed by the researchers based on the literature review, the Bloom's taxonomy, and the children's psychological development. All of the items were constructed based on the content of the Malaysian Road Safety Education module which was related to children's pedestrian behaviours. Out of the nine items, six items measured safe pedestrian behaviour (Items 1 to 6), whereas three items measured unsafe pedestrian behaviour (Items 7 to 9). A three-point Likert scale of "never", "seldom", and "always" was utilised to measure the frequency of each behaviour. The total scores for this questionnaire ranged from 6 to 27 points, and higher scores indicated better and safer pedestrian behaviours. All items in the questionnaire were pictorially illustrated and the participants answered the questions in a face-to-face interview with the researchers.

Analysis

Data were processed and analysed using SPSS software, and the descriptive and inferential statistics were applied. Simple frequency and percentage were used in order to examine the level of safe pedestrian behaviours among children aged 7 to 9 years old. The extent of safe pedestrian behaviours was categorised into three levels, namely low, moderate, and high, based on the score and data distribution. Percentage was also utilised to present the distribution of data for each item. As for inferential statistics, one-way ANOVA was utilised to determine the mean difference of safe pedestrian behaviours among the children according to their age. The significance levels adopted were 0.01 and 0.05.

Results

Table 1 shows the levels of safe pedestrian behaviours among 7-year-old to 9-year-old children. Most of the 7-year-old children had either low level (37.6%, n = 154) or moderate level (33.7%, n = 138) of safe pedestrian behaviours. Only 28.8% (n = 118) of them showed high level of safe pedestrian behaviours. As for children aged 8 years old, half of them recorded low level (51.0%, n = 200) of safe pedestrian behaviours. Meanwhile, 25.0% (n = 98) and 24.0% (n = 94) of this age group displayed moderate and high levels of safe pedestrian behaviour respectively. Similarly, 47.8% (n = 193) of 9-year-old children reported low level of safe pedestrian behaviours and 28.5% (n = 115) of them demonstrated moderate level of safe pedestrian behaviours. Only 23.8% (n = 96) of them showed high level of safe pedestrian behaviours.

Table 1. Level of safe pedestrian behaviours among the children

Age (years old)	Level	Frequency (n)	Percentage (%)
7	Low	154	37.6
	Moderate	138	33.7
	High	118	28.8
	Total	**410**	**100.0**
8	Low	200	51.0
	Moderate	98	25.0
	High	94	24.0
	Total	**392**	**100.0**
9	Low	193	47.8
	Moderate	115	28.5
	High	96	23.8
	Total	**404**	**100.0**

Table 2 presents the mean differences of safe pedestrian behaviours among 7-year-old to 9-year-old children. One-way ANOVA (F (2,1203) = 5.828, p = .003) showed a statistically significant difference in safe pedestrian behaviours between different ages. Post hoc comparisons using the Tukey HSD test (Table 3) indicated that the mean score of safe pedestrian behaviours for 7-year-old children (M = 21.09, SD = 2.50) was significantly different from 8-year-old children (M = 20.28, SD = 2.87, p = .004) and 9-year-old children (M = 20.65, SD = 2.47, p = .021). However, no statistically significant difference was found between 8-year-olds and 9-year-olds (p = .859) at the 0.05 level. The 7-year-old children recorded the highest mean compared to 8-year-old and 9-year-old children. That is, 7 year old children reported better pedestrian behaviours than 8 and 9 year olds.

Table 2. Mean difference of safe pedestrian behaviours based on age group

Age	Mean	Std. Deviation	F value	Sig.
7 years old (n = 410)	21.0902	2.50264	5.828**	.003
8 years old (n = 392)	20.2781	2.86825		
9 years old (n = 404)	20.6510	2.47157		

*p<.05, **p<.01

Table 4 presents the overall percentage of responses to each item. It was found that less than 30% of the children aged 7 to 9 stated "always" on three out of six safe pedestrian behaviour items (items 1, 3, 6). However, for Items 4 and 5, 77.1% and 73.1% of children reported "always". More than half (53.1%) of the children always used the green man signal to cross the road (item 2).

As for the negative road safety behaviours, Item 7 showed the highest percentage of "never" with 65.0%, suggesting that a majority of children were aware that it is very dangerous to cross the road between parked cars. Only 13.6% of the children reported to "always" wear dark clothes at night, 10.3% to cross the street between parked cars, and 9.9% to run to cross the road.

Discussion

The present study was conducted to assess the level of safe pedestrian behaviours among 7-year-old to 9-year-old children in Malaysia and to identify the aspects of safe pedestrian behaviours that should be strengthened and improved among the children.

The present survey found that less than 30% of surveyed children aged 7 to 9 reported high levels of safe pedestrian behaviours as defined in the Malaysian Road Safety Education module. The possible explanation for this is that children have specific age-related limitations that lead to poor decisions as pedestrians. Their limitations include generally lower cognitive ability as proposed by Piaget's theory on cognitive development (Sandels, 1975); lack of domain-specific knowledge (Bongard & Winterfeld, 1977); perceptual disadvantages (Sandels, 1975); immature visual search strategies (Whitebread & Neilson, 2000); distractibility (Dunbar, Hill, & Lewis, 2001); and inferior physical and motor skills (Briem & Bengtsson, 2000). Studies found that individual children under the age of 9 years old were unable to identify dangerous locations when crossing the road (Dunbar, Lewis & Hill, 1999). The same authors also found considerable age-related variations in attention switching and concentration, both of which are essential for a safe road crossing, with older children being better at both (Dunbar, Lewis & Hill, 2001).

Table 3. Multiple comparisons of safe pedestrian behaviours based on children's age

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
7	8	.18260*	.05760	.004	.0474	.3178
	9	.15229*	.05716	.021	.0182	.2864
8	7	-.18260*	.05760	.004	-.3178	-.0474
	9	-.03031	.05781	.859	-.1660	.1053
9	7	-.15229*	.05716	.021	-.2864	-.0182
	8	.03031	.05781	.859	-.1053	.1660

*The mean difference was significant at the 0.05 level; Tukey HSD; Dependent variable: safe pedestrian behaviour

Table 4. The overall percentage of children's pedestrian behaviour items

Item	Behaviour	Scale	Average (%)
1	Wear bright or white clothes when walking at dusk	Never	30.7
		Seldom	47.1
		Always	**22.2**
2	Cross the street when the green man signal is on	Never	19.3
		Seldom	27.6
		Always	**53.1**
3	Walk down the street, facing the cars and traffic	Never	37.8
		Seldom	40.8
		Always	**21.5**
4	Hold adult's hand when crossing the street	Never	6.8
		Seldom	16.1
		Always	**77.1**
5	Looking left, then right, and then left again before crossing the street	Never	6.2
		Seldom	20.7
		Always	**73.1**
6	Wave at the drivers before crossing the street	Never	43.7
		Seldom	29.7
		Always	**26.6**
7	Crossing the street between parked cars	Never	**65.0**
		Seldom	24.7
		Always	10.3
8	Run when crossing a street to get to the other side fast	Never	**62.9**
		Seldom	27.2
		Always	9.9
9	Wear dark clothes when walking at night	Never	**44.2**
		Seldom	42.2
		Always	13.6

According to Schieber and Thompson (1996) children have not yet developed the necessary motor or complex cognitive skills required to cross a road safely or plan the safest route nor the ability to adequately judge the distance, movement, or speed of a vehicle. Children as young as 6 and 7 years old have been found to have difficulty in interpreting information on the direction and speed of moving vehicles (Joly, Foggin, & Pless, 1991). The Piaget's theory supports this notion by stating that due to cognitive and perceptual limitations of children, their adaptation to traffic before 11 years old is impossible, although they have been educated about road safety (Assailly, 2016).

The present survey also found that 7-year-old children reported safer pedestrian behaviours in their daily life compared to 8-year-old and 9-year-old children. One of the reasons for this finding may be the influence of environmental factors. According to the ecological theory by Bronfenbrenner (1979), child development tends to be influenced by the upbringing process in their environment. Children's interaction with different environments will produce different development for each child. Since 7-year-old children are younger and have limited skill and ability to take good care of themselves, parents and teachers may give more attention and guidance to them compared to 8-year-old and 9-year-old children. Furthermore, in Malaysia, children start to enter primary school at the age of 7. It is the first time that the children will be exposed to road hazard. Therefore, the parents may assume that it is necessary to regularly monitor and remind their 7-year-old children about their safety behaviours. For instance, parents may initiate holding hands with the children and keep reminding their children to be aware of the traffic. Special supervision and treatment given by the parents and teachers may lead the children to be

a safer and prudent road user. Researchers recognized that parental involvement is critical to children's behavioural change (Rothengatter, 1981). Moreover, children consider their mother and father as significant safety role models (Quraishi, Mickalide, & Cody, 2005).

Similar studies may be conducted in other educational settings such as preschools and secondary schools, various types of national schools, and higher learning institutions in order to further understand the extent of safe pedestrian behaviours among children in Malaysia. These studies combined may inform ways to improve children's safety on our roads.

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