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ORIGINAL ARTICLE

STUDY OF YOUNG MOTORCYCLISTS' RISK BEHAVIOURS TOWARDS ROAD ACCIDENTS IN KUANTAN

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ABSTRACT – In Malaysia, the number of motorcycle-related traffic accidents has gradually climbed over time. Road traffic accidents are typically caused by a combination of individuals and environmental circumstances.Young motorcyclists had significantly over-represented number of deaths in motorcycle road accidents. Many aspects, such as inexperience, lack of riding competence, and risky riding behaviour, have been linked to road traffic crashes among young adults aged 16 to 19 years old. However, less study has been conducted to analyze these young motorcyclists (high school students) riding behaviour. Therefore, this review aims to identify secondary school student's risk behaviours for road traffic accidents among motorcyclists in Kuantan with young motorcyclists being the main contributor to the road accidents. Most of the youngster use motorcycles as their daily mode of transportation. Methods: This study used a cross-sectional study design and a simple random sampling method. It was conducted among students in three different school in Kuantan area. This study used on-site behavioural observation survey which data observation forms are specifically designed to collect data on motorcyclists' risk behaviours by using a video camera in the school area. Results: The findings proved that the male students had higher frequency number that contribute to break the speed limits behaviour compare to the female students. Subsequently, breaking the speed limit and riding without crash helmets, failing to keep proper side to side movement with another vehicle and tailgating with another vehicle with unsafe distance are the most influenced risk riding behaviour factors among the students. Apart from that, riding while impaired, performing stunting acts, riding against traffic and riding without headlights on & traffic violation are the behaviours that less contributed to the number of motorcycle accidents. Conclusion: Each risky riding behavior factor has a different effect on road safety among young mototcyclists, especially the students in urban areas. Other than that, the estimated number of crashes can be a reference to authority to reduce the number of accidents in Malaysia.

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INTRODUCTION

In Malaysia, a total of 12,677,041 motorcycle have been registered in 2016, it is clear that motorcycle is an important method of transportation in Malaysia, particularly in the country's numerous urban regions. Over the course of the past decade, Malaysia has been facing an epidemic-level problem with the rise in the frequency of traffic accidents that include motorcyclists. According to the statistics gathered in 2016, there were 670,935 occurrences of motorcycle accidents that were reported. According to these statistics, there were 4,077 fatalities on the roads caused by motorcyclists in just the year 2016 [1].

According to report from the World Health Organization from 2013, Malaysia was ranked as the developing nation with the riskiest roads, coming in third after South Africa and Thailand. This ranking was based on the country's rate of death, which was 23 for every 100,000 people in the population. Despite the fact that the country is projected to have a population of 30 million people, the roads are responsible for the deaths of 7,000 to 8,000 people per year. Motorcycles have quickly become one of the most well-liked modes of transportation, particularly in a great number of developing and middle-income nations and they are the most common mode of transportation in Asian countries, particularly among the urban population of low-income countries.

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THEORETICAL BACKGROUND

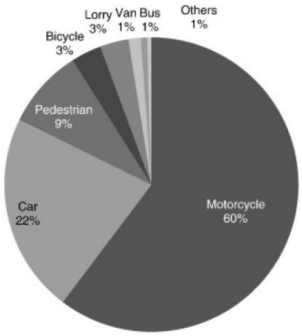

Figure 1. The fatality rate in accordance with the mode of transportation.
Source: [1]

Figure 1 shows that the fatality rate in accordance with the mode of transportation as a result of being involved in a motorcycle accident is three times higher than the number of people who died as a result of being involved in a crash involving another vehicle, six times higher than the mortality rate of pedestrians, and nearly 50 times higher than the mortality rate of bus passengers [3]. In addition, nearly 1.25 million people die in road traffic collisions every year according to the World Health Organization. Injuries sustained in motor vehicle accidents are the leading cause of death among young people aged 16 to 19 [4]. In 2018, nearly 1.25 million individuals suffered in traffic accidents.

Despite of many research and efforts that have been put into reducing the number of fatalities that occur on the roadways, the percentage of fatalities that occur on motorcycles has never fallen below 58 percent of the total number of fatalities that occur on roads. According to table 1, by the year 2020, it had reached an astonishing 67.29 percent. Because there is increased demand for the use of the road, the number of registered motorcycle ownership represents for over half of the total number of registered vehicles. This raises the risk of an crashes occurring because of the increased number of competing users of the road.

Table 1. The motorcycle fatality statistics in Malaysia from year 2010-2020.
Source: [4]

	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Motorcycle Fatal Accidents	4,036	4,169	4,178	4,249	4,179	4,203
Total Motorcycle Accidents	120,156					
Total accident deaths	6,872	6,877	6,917	6,915	6,674	6,705
% Of m/c total accident fatalities	58.73	60.62	60.4	62.1	62.62	62.68
No of m/c	9,441,910	9,985,310	10,589,820	11,087,880	11,629,260	12,094,790
No of registered vehicles	20,188,565	21,401,269	22,702,221	23,819,256	25,101,192	26,301,952
Motorcycle total vehicle	46.77%	46.66%	46.65%	46.55%	46.33%	45.98%
Population	28,910,000	29,000,000	29,300,000	29,947,600	30,300,000	31,190,000

	2016	**2017**	**2018**	**2019**	**2020**
Motorcycle Fatal Accidents	4,485	4,347	4,129	3,959	3,118
Total accident deadths	7,152	6,740	6,284	6,167	4,634
% Of m/c total accident fatalities	63	65	66	64	67
No of m/c	13,173,070	13,173,070	13,725,950	14,322,230	
No of registered vehicles	27,613,120	28,738,180	29,956,470	31,200,000	
Motorcycle total vehicle	45.91%	45.84%	45.82%	45.90%	
Population	31,660,000	32,022,600	32,382,300	32,523,000	32,657,300

Figure 2 shows that young riders between the ages of 16 and 20 have experienced the largest significant number of fatalities related to road traffic during the past ten years, with 1090 deaths occurring in 2017. Significant efforts have been made to find a solution to this problem by a number of organisations, the most notable of which are the Jabatan Keselamatan Jalan Raya (JKJR) and the Malaysian Road Safety Research Institute (MIROS). However, it seems as though the initiatives are not structured well enough to address the issue comprehensively. According to the findings of a study that was carried out by MIROS in 2016, it was found that motorcyclists who were between the ages of 16 and 25 years old had the highest number of fatalities, serious injuries, and minor injuries. These are the occurrences that have been reported however, it is possible that the actual amount of accidents will never be known because many less serious accidentss were not reported.

Research conducted by MIROS on 921 students attending 32 secondary schools revealed that 62.4% of the pupils have ridden a motorcycle without a valid licence at some point in their lives. More than eighty-nine point eight percent of them came clean and revealed that they had learnt to ride a motorcycle without a licence when they were as young as 12 years old. 88.2% of the 575 students who drove motorcycles without licences had never been given a warning or summons in the past. The survey also revealed that 62.6% of the respondents' parents did not prohibit or forbid their children from riding a motorcycle without a licence, even when they knew their children were doing it.

Individuals who are considered to be at a high risk, such as younger riders, are frequently thought to be the person most likely to be a contributing factor in a road traffic crashes[3]. According to the statistics provided by Malaysia's Road Safety Department, the most significant number of motorcycle-related traffic crashes occurred to individuals between the ages of 16 to 19 years old. According to the Malaysian Institute of Road Safety Research's (MIROS) status report, Figure 3 depicts a trend in road traffic deaths among Malaysian motorcyclists. These deaths were caused by automobile and other types of traffic accidents.

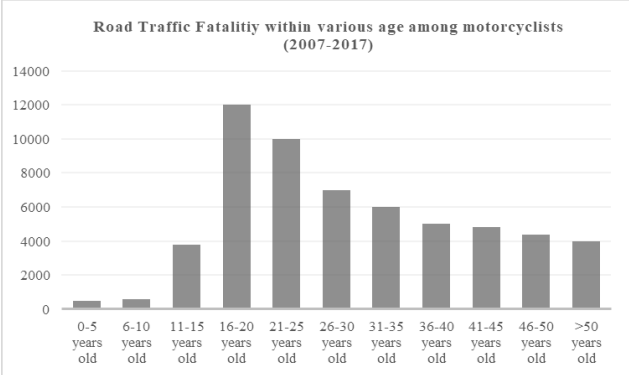

Figure 2. Road traffic accidents trend among motorcyclists
Source: [6]

The trend of the number of motorcyclists who were involved in road traffic accidents in Malaysia from 2007 to 2017 is depicted in Figure 2. As can be seen in the figure 2 that came before it, the age group of motorcyclists ranging from 16 to 20 years old has the highest number of fatalities related with road traffic accidents, with a total of 12,013 deaths between the years of 2007 and 2017. This statistic is derived from the total number of vehicle crashes that have taken place over the course of the last ten years. In addition, the recent rise in the number of accidents that occurred on the roads was attributable to issues with human behaviour, which have to be looked into. On the other hand, one possibility is to look into its part in the general growth in the number of individuals killed or injured in vehicle accidents

The National Highway Traffic Safety Administration found that metropolitan regions accounted for 60% of fatal motorcycle crashes whereas rural areas accounted for 40 % of such motorcycle crashes [8]. The higher number of collisions that occur in urban regions as opposed to rural ones may be caused by a number of different variables. For example, urban regions typically have a much higher volume of traffic compared to rural areas, which contributes to an increase in the number of motorcycle crashes [7]. Motorcyclists might have to brake suddenly or swerve to avoid pedestrians and cyclists in urban areas because there are likely to be more of both types of road users in these places. Conditions of the roads, such as potholes, construction, and debris, may be more common on urban streets, which may lead to an increase in the number of collisions. The presence of more emergency vehicles on the road also contributes to an increase in the number of collisions. The majority of fatal motorcycle accidents, regardless of whether they occurred in an urban or rural setting, took place on major routes that were not part of an interstate highway system.

One of the categories of drivers that are considered to be particularly dangerous is young motorcyclists. Younger generations have a higher tendency to be involved in a motorcycle crash [10], perhaps as a result of their limited riding experience, which may appear to be insubstantial. Previous research claimed that the high collision rate could be attributable to young riders' underdeveloped competence or their lack of experience. However, a number of studies have shown that even experienced young motorcyclists are at a substantial risk of hazard. The lack of experience of the driver was not the only factor that contributed to the accident; additional research is required to determine the other characteristics that set young drivers apart from other drivers [11]. According to the most recent research, improper riding techniques are responsible for the majority of collisions involving young motorcyclists who were involved in a motorcycle crash. These collisions include motorcycle overtaking and getting struck from behind by other motorcyclists. Because of this, the primary emphasis of this research will be placed on unsafe riding behaviours among students. These behaviours are caused by a lack of riding experience as well as bad riding technique among younger generations.

Nevertheless, considering that the factors that leading to road traffic crashes have been identified and as the leading cause of mortality worldwide, few factors related to the crashes were figured out. A few contributor factors such as the human, road environment, and vehicle factors caused road traffic crashes.

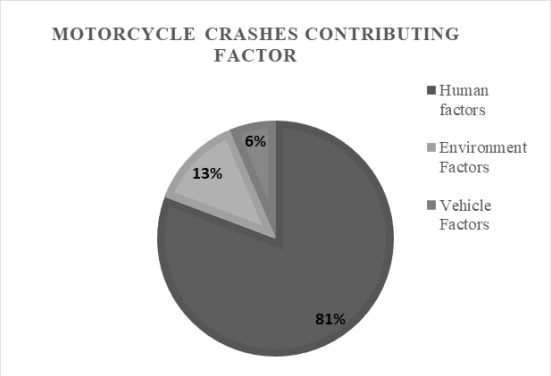

Figure 3. Motorcycle Crashes Contributing Factors.
Source: [12]

Figure 3 demonstrated that the human factor had the largest percentage of contribution (81.0%), while the environment factor had the second-highest impact followed by the human factor (13.0%). In addition, the vehicle component, which accounted for (6.3%) of the total was trailing very closely behind the environment factor. According to the research presented in [12], the human component was the most significant of the four factors that contributed to road traffic accidents. This is supported by [13], which asserted that the prevention of road traffic collisions should centre on human factors, as these accounted for around 90 percent of the whole road traffic collision intervention program.

Inadequate riding actions such as aggressiveness and disturbance were examples of risk-control behaviours that increased the likelihood of being required in a motorcycle accidents and can have significant repercussions for persons who were involved in the crash. Aside from the well-known and easily observable risk factors, such as riding while under the influence of alcohol, performing stunts while travelling at speeds that are in excess of the posted limit, failing to wear a crash helmet, using a phone while riding, failing to use the signal, and driving without their headlights turned on, which is a violation of a traffic law. In this study, a greater level of depth will be devoted to the risky riding behaviours exhibited by young motorcyclists.

According to the findings of the study, the majority of crashes involving motorcycles were caused by reckless driving, exceeding the speed limit, disobeying traffic signals, and making unsafe turns [4]. Since the establishment of the demerit points system for traffic offences (KEJARA) in 2017, the authorities ought to take the initiative to deal with suspended motorcycle licences. Infractions of traffic laws committed by motorcyclists should result in severe penalties, as recommended by the government. People have a propensity to disobey the law when they have cause to expect that they will likely get away with their crime or that the punishment will be relatively light During the first year of the Automated Enforcement System (AES) to catch red light violators, there was a decrease trend in the number of persons disobeying red lights. This study was carried out when it was determined that there was a decrease in the number of persons breaching red lights. However, during the ensuing years, there was an increase in the total number of offenders.

Riding while extremely fatigued, driving in a sensitive and aggressive manner, and riding while agitated and preoccupied are all examples of unsafe riding behaviours. For example, intent, illness, and fatigue are some of the key factors that contribute to collisions [6]. As a direct result of this, it is crucial to do research into the many distinct types of risk riding behaviours and characteristics. In addition to the well-known and clearly apparent risk factors, such as going faster than the posted speed limit, not wearing a crash helmet, using a phone while riding, failing to provide signals while riding, trying stunts, and riding against traffic.

There are substantial correlations between human behaviours and the amount of commuting fatalities, as stated in Shen's (2018) research [15]. The presence of human factors is one of the most significant contributors to motorcycle accidents and also one of the most difficult things to control. Despite this, there is still a paucity of understanding regarding the behavioural aspects that contribute to road traffic crashes and the ways in which these problems might be prevented.

On the other hand, not a lot of research has been conducted in Malaysia to determine the risky riding behaviours of young motorcyclists who are students in secondary schools. Something which needs to be done. For the goal of conducting research, a on-site behavioural observation was conducted on young motorcyclists in Kuantan [16]. Despite this, the level of risk-taking behaviour exhibited by motorcyclists may vary between secondary school students and other demographics due to the fact that different parts of the community have different routines and patterns of behaviour. In other words, different parts of the community have different demographics. As a result of this research, a conclusion will be drawn as to whether or not students engage in unsafe riding behaviours when they are riding their motorcycles. This research will also supply the Malaysian Institute of Road Safety (MIROS) with fundamental data in the form of a baseline for their work on improving road safety across the entire country.

In conclusion, the primary objective of this findings was to investigate the risk riding behaviours that were exhibited by secondary school students in Kuantan. This was followed by an assessment of the students' levels of comprehension with regard to risky riding behaviour, as well as an examination of the correlation between risky riding behaviours and road traffic accidents.

RESEARCH METHODOLOGY

The methodology for this study will be discussed in this section on how risk riding behavior of the students could affect the road crashes based on the their risk riding behaviour. Cross-sectional research is a sort of observational research. In a cross-sectional research, the investigator simultaneously evaluates the result and the exposures in the study participants. [2].

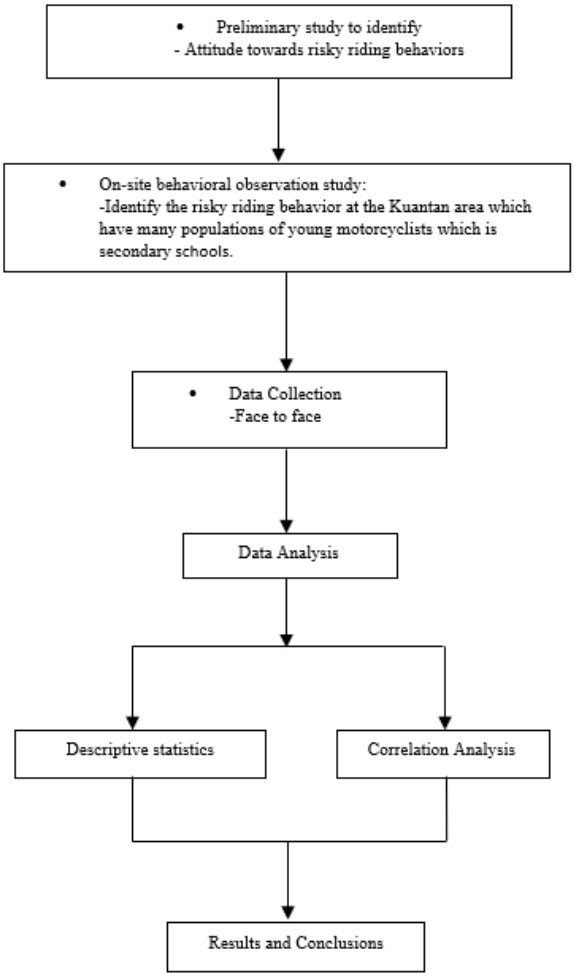

Figure 4. Flowchart of study methodology.

As shown in Figure 4, In order to determine the most dynamic risky riding behaviors in the urban area, a behavioral observation study was conducted. Following a discussion held with the local authority, a school area in the urban area of Kuantan was chosen. The local authority considered this site a black spot due to the number of recorded crashes, especially young riders. The types of risky riding behaviors were performed and identified for data collection by using a video camera in the school area. Figure 6,7,8 show the site conditions of the school area of SMK Seri Mahkota, SMK Paya Besar and SMK Padang Garuda.

Table 2. Risk Riding Behaviour.

No	Risk Riding Behaviour	Variable Code
1	Riding while impaired	RI
2	Breaking the speed limit	RB
3	Riding without wearing crash helmet	RCH
4	Using phone while riding	RP
5	Riding without giving signal	RS
6	Riding without headlights on and traffic violations	RH
7	Performing stunting acts	RPS
8	Riding against traffic	RO
9	Failing to keep proper side to side movement with another vehicle	RF
10	Tailgating with another vehicle with unsafe distance	RT

In order to determine the most dynamic risky riding behaviors in the urban area, a behavioral observation study was conducted. Following a discussion held with the local authority, a school area in the Kuantan was chosen. The local authority considered this site a black spot due to the number of recorded crashes, especially riders. The types of risky riding behaviors were performed and identified for data collection by using a video camera in the school area. Figure 5 shows the site conditions of the school area of SMK Seri Mahkota, SMK Paya Besar and SMK Padang Garuda.

Figure 6. The school compound at Sekolah Menengah Kebangsaan Seri Mahkota.

Figure 7. The school compound at Sekolah Menengah Kebangsaan Paya Besar.

Figure 8. The school compound at Sekolah Menengah Kebangsaan Seri Mahkota.

CORRELATION ANALYSIS

The kind of correlation analysis performed in this study was Pearson, Point-biserial, and Spearman rho correlations. The linear relationship between two quantitative variables was described using correlation analysis. It was also necessary to indicate the relationship's strength and direction. The strength and direction of a linear relationship between two variables may be measured using the value of r (Pearson's product-moment correlation/The Point-biserial/Spearman rho correlation) and its statistical significance.

According to Alias (2004), researchers can determine the link between independent and dependent variables by providing details on the strength of the association. The value of the correlation coefficient (r), which ranges from 1 to +1, determines the strength of the association (George & Mallery, 2006). The Pearson, Spearman, and Point-biserial correlation formulas are shown below.

$$r = \frac{Sxy}{\sqrt{Sxy\ Syy}}, -1 \leq r \leq 1 \quad (1)$$

where, r = Pearson product-moment correlation

$$Sxx = \sum_{i=1}^{n} Xi^2 - \frac{(\sum_{i=1}^{n} Xi)^2}{n} \quad (2)$$

$$Syy = \sum_{i=1}^{n} Yi^2 - \frac{(\sum_{i=1}^{n} Yi)^2}{n} \quad (3)$$

$$Sxy = \sum_{i=1}^{n} XiYi - \frac{(\sum_{i=1}^{n} Xi \sum_{i=1}^{n} Yi)}{n} \quad (4)$$

where,
x: independent variable
y: dependent variable
r: correlation coefficient

$$\rho = 1 - \frac{6\sum di^2}{n(n^2 - 1)} \quad (5)$$

where,
ρ= Spearman rho correlation
di = The difference between the ranks of corresponding variables n = Number of observations

$$r_{pb} = \frac{M_1 - M_0}{S_n}\sqrt{pq} \quad (6)$$

where,
rPB = The point-biserial correlation
Mi = Mean of the group that received the positive variable
Mo= Mean of the group that received the negative variable
Sn = Standard deviation for the entire test
p = Proportion of cases in the "0" cases
q = Proportion of cases in the "1" cases

Although, the Point-biserial correlation have difference equation with Pearson correlation, the analysis of Point-biserial correlation is conducted with the Pearson correlation in SPSS. The value of r which was strength of correlation coefficients is depicted in Table 3.7. Table 3.7 shows the explanation on r value based on the range which was from the value of −1 until +1.

EXPERIMENTAL RESULTS

Demographic Profile of students

A total of 24,234 students had been observed during 6 months on-site observation at three different types of school in this study which are SMK Paya Besar, SMK Seri Mahkota and SMK Padang Garuda. The age group of the students is around 16 to 17 years old which students who has valid riding liscene can ride their motorcycle to school area. This survey was conducted from Oct 2021 to Feb 2022. All the students were aware and notified about the on-site behavioural observation survey.

Table 3. The socio-demographic background of the students (N=24,234).

Variables	Frequency (N=24,234)	%	Mean±SD
Gender			8078±3447.1
Male	14,105	58.2	
Female	10,129	41.8	
Race			
Malay	22,053	91	
Chinese	1000	4.1	
Indian	727	3	
Others	453	1.9	

Table 3 shows the socio-demographic profile of the students for gender and race from three different schools. From the collected data, for the gender distribution of the participants that involved in the study, most of the participants were male with 58.2%, while female repondents were only 41.8%. As for the race distribution, Malay students were most likely involved in this study with 91% followed by Chinese, Indians and other races students with total only 9%.

Association of Risk Riding Behaviour with the students in SMK Paya Besar

Based on Table 4, The result showed the comparison of risk riding behaviour between gender in SMK Paya Besar.The result showed that "RB: Breaking the speed limit" behaviour had the highest frequency among 10 behaviours which is 18.9% contributed by male students. Followed by the female students contributed 18% by performing "RB: Breaking the speed limit" which is the highest among behaviours of female students while riding the motorcycle during the on-site observation survey. Subsequently, "RI: Riding while impaired" behaviour did not contributed any percentage number for

this study in SMK Paya Besar. Moreover, for the male students, about 16.8% had been engaged in "RF: Failing to keep proper side to side movement with another vehicle" behaviour while the female students had been less engaged which is only 10.6%. On the other hand, the female students, about 17% had been engaged in "RT: Tailgating with another vehicle with unsafe distance" behaviour while the male students slightly less engaged which is 15%. The comparison of risk riding behaviour based on gender in SMK Paya Besar for past 6 months is shown in Table 3.

Table 4. Comparison of gender of observed Risk Riding Behaviour in SMK Paya Besar.

Variables	Frequency (%)		Mean±SD
	Male (n=5095)	Female (n=3443)	
Riding while impaired	0	0	4269±1168.14
Breaking the speed limit	18.9	18	
Riding without wearing crash helmet	14.6	14.3	
Using phone while riding	7.7	5.5	
Riding without giving signal	6.0	13	
Riding without headlights on and traffic violations	2.6	3.6	
Performing stunting acts	3.4	4.8	
Riding against traffic	15	12.7	
Failing to keep proper side to side movement with another vehicle	16.8	10.6	
Tailgating with another vehicle with unsafe distance	15	17	

Association of Risk Riding Behaviour with the students in SMK Seri Mahkota

Based on Table 5, The result showed the comparison of risk riding behaviour between gender in SMK Seri Mahkota. The result showed that "RB: Breaking the speed limit" behaviour had the highest frequency among 10 behaviours which is 21.9 % contributed by female students. Followed by the male students contributed 19% by performing "RB: Breaking the speed limit" which is the highest among behaviours of male students while riding the motorcycle during the on-site observation survey. Apparently, "RI: Riding while impaired" behaviour did not contributed any percentage number for this study in SMK Seri Mahkota. Moreover, the male students, about 17% had been engaged in "RT: Tailgating with another vehicle with unsafe distance" behaviour while the female students slightly less engaged which is 15.2%. On the other hand, for the female students, about 16.7% had been engaged in "RCH: Riding without crash helmet" behaviour while the male students had been less engaged which is only 15.6%. The comparison of risk riding behaviour based on gender in SMK Seri Mahkota for the past 6 months is shown in Table 4.

Table 5. Comparison of gender of observed Risk Riding Behaviour in SMK Seri Mahkota.

Variables	Frequency (%)		Mean±SD
	Male (n=6391)	Female (n=4881)	
Riding while impaired	0	0	5636±1067.73
Breaking the speed limit	19	21.9	
Riding without wearing crash helmet	15.6	16.7	
Using phone while riding	6.8	5.12	
Riding without giving signal	11.8	7.5	
Riding without headlights on and traffic violations	2.4	2.5	
Performing stunting acts	3.6	6.0	
Riding against traffic	8.0	11.5	
Failing to keep proper side to side movement with another vehicle	15.4	13.6	
Tailgating with another vehicle with unsafe distance	17	15.2	

Association of Risk Riding Behaviour with the students in SMK Padang Garuda

Based on Table 6, The result showed the comparison of risk riding behaviour between gender in SMK Padang Garuda. The result showed that "RCH: Riding without crash helmet" behaviour had the highest frequency among 10 behaviours which is 20% contributed by male students. Followed by the female students contributed 15.7% by performing "RCH:

Riding without crash helmet". Subsequently, "RI: Riding while impaired" and "RH: Riding without headlights on and traffic violations" behaviour did not contributed any percentage number for this study in SMK Padang Garuda. Moreover, for the female students, about 16% had been engaged in "RF: Failing to keep proper side to side movement with another vehicle" behaviour while the male students had been less engaged which is only 12.4%. On the other hand, the female students, about 18% had been engaged in "RT: Tailgating with another vehicle with unsafe distance" behaviour which is the highest among behaviours of female students while riding the motorcycle during the on-site observation survey while the male students slightly less engaged which is 14.8%. The comparison of risk riding behaviour based on gender in SMK Padang Garuda for the past 6 months is shown in Table 6.

Table 6. Comparison of gender of observed Risk Riding Behaviour in SMK Padang Garuda.

Variables	Frequency (%)		Mean±SD
	Male (n=2619)	Female (n=1805)	
Riding while impaired	0	0	2212±575.6
Breaking the speed limit	17.5	13.7	
Riding without wearing crash helmet	20	15.7	
Using phone while riding	7.6	12	
Riding without giving signal	9.7	9.4	
Riding without headlights on and traffic violations	0	0	
Performing stunting acts	9.9	9.7	
Riding against traffic	8	5.5	
Failing to keep proper side to side movement with another vehicle	12.4	16	
Tailgating with another vehicle with unsafe distance	14.8	18	

Correlation of Risk Riding Behaviour with the students in the three different types of schools

In this analysis, Pearson and r correlations were employed. Pearson r was used to compare two continuous variables or one continuous variable and one dichotomous variable. Table 7 shows that only 6 out of 10 risk riding behaviours have a significant link with the student's past in terms of road accidents. Breaking the speed limit, riding without a crash helmet, using a phone while riding, riding without signalling, failing to maintain correct side-to-side movement with another vehicle, and tailgating another vehicle with an unsafe distance are all risky riding behaviours. Futhermore, only these six risk riding behaviour have been proven to have significant relationship with gender distribution among the students with a p-value of less than .05 ($p < .05$). On the other hand, Table 7 showed the six positive correlations and one negative correlation with the gender distribution among the students in three different types of schools.

Table 7. Comparison of gender of observed Risk Riding Behaviour in three different types of school.

Variables	Frequency (%)		*r*	ρ-value
	Male (n=14,105)	Female (n=10,129)		
Riding while impaired	0	0	0	0
Breaking the speed limit	19.8	19	0.827	0.002
Riding without wearing crash helmet	16	15.7	0.786	0.006
Using phone while riding	7.2	6.5	0.251	0.005
Riding without giving signal	9.3	9.8	0.002	0.015
Riding without headlights on and traffic violations	2.0	2.4	-0.120	0.003
Performing stunting acts	4.7	10.9	-0.082	0.004
Riding against traffic	10.5	10.9	-0.108	0.134
Failing to keep proper side to side movement with another vehicle	15.3	13	0.647	0.047
Tailgating with another vehicle with unsafe distance	16	14.33	0.815	0.034

Positively correlated between risk riding behaviour and the gender distribution among students

As mentioned in Table 7, risk riding behaviour that are having positive correlation with the gender distribution which are breaking the speed limit, riding without wearing crash helmet, using phone while riding, riding without giving signal,

failing to keep proper side to side movement with another vehicle and tailgating with another vehicle with unsafe distance behaviour. From the table 7, the values of correlation correlation coefficients (r) for those risk riding behaviour are shown in the table above.

A substantial medium correlation and positive correlation was reached based on the value of the correlation coefficient (r) and the p-value between the breaking the speed limit factor and the gender distribution (r =.827**, p.05). This discovery revealed that the greater the likelihood of young motorcyclists exceeding the speed limit, the greater the possibility of an increase in the frequency of accidents.Apparently, 19.8% of male students and 19% of female students contributed on performing this "RB: Breaking the speed limit" behaviour in these findings which had achieved the highest *r*-value (r = .827**, p < .05). On the other hand, a significant medium correlation and positive relationship was achieved (r = .815**, p < .05) which engaged with "RT: Tailgating with another vehicle with unsafe distance" behaviour. 16% of male students followed by 14.33% female students contributed performing this "RT: Tailgating with another vehicle with unsafe distance" behaviour.which had the second highest of *r*-value.

Negatively correlated between risk riding behaviour and the gender distribution among students

Based on table 7, risk riding behaviour that are having negative & no correlation with the gender distribution which are riding without headlights on and traffic violations, performing stunting acts and riding against traffic. Based on the value of correlations coefficient (r) and p-value between "RH: Riding without headlights on and traffic violations", "PS: Performing stunting acts" and "RO: Riding against traffic" and the gender distribution a non-significant small correlation and negative correlation relationship was achieved (r = -.0120**), p > .05), (r = -.082**), p > .05 and(r = -.0108**), p > .05 . This finding explains that d on the value of r as shown in above, it could be seen that this riding without headlights on and traffic violations, performing stunting acts and riding against traffic has a negative weak correlation with the gender distribution among young motorcyclist towards road crashes. Moreover, Table 6 depicts that the value of correlations coefficient (r) and p-value between "RI: Riding while Impaired" behaviour and the gender distribution, no correlation relationship was achieved (r = 0.00**, p > .05). This finding explains that d on the value of r as shown in above, it could be seen that "RI: Riding while Impaired" behaviour had no significant correlation with the gender distribution among young motorcyclist towards road crashes.

CONCLUSION

Many studies on risky riding behaviors were either conducted using multivariate regression analysis or structural equation modelling, where analyses were performed based on general risky riding behavior. In this study, a more detailed study was conducted to understand the perceptions and attitudes of these young riders on the risk riding behavior in Malaysia using descriptive statistics and correlation analysis. Many studies have shown that adolescents tend to perform risky behavior than adults. They have a greater chance to ignore the consideration of risk perceptions in the decision-making process. A recent study by [17] mentioned that the most vulnerable group regarding deaths due to road crashes is the young age group, aged between 15- 25. They stated that the young age group is usually related to a higher risk of being involved in a road crash, such as speeding, drunk riding, and a lack of observation in urban areas.

According to [8], young drivers are more prone to traffic-law violations, speeding, and more often engaging in risky behaviour. Furthermore, [18] mentioned those young riders are poor in engaging in safe riding behaviour. Therefore, in general, adolescent or young riders more frequently perform risky riding behaviours than adults or older riders. In general, the crosstabulation results between gender and risky riding behaviours revealed that male riders are more aggressive than female riders. This finding conforms with the conclusion by [18]. Many studies have shown that adolescents tend to perform risky behavior than adults. They have a greater chance to ignore the consideration of risk perceptions in the decision-making process.

Similarly, study by [12] found that nearly 60% of male motorcyclists displayed infractions, notably in speeding, which is greater than the statistical data of female riders (36.3%). Based on descriptive statistics gender were associated with risky riding behaviors, it found that male motorcyclists are more inclined to seek experiences and be impatient. Furthermore, a study by [19] discovered that the percent-age of female riders in the non-risk-taking category is higher than that of male riders. In other words, men motorcyclists are more prone to committing risky behaviours. Apparently, the r-value obtained in this research demonstrated that the value of correlations coefficient (r) and p-value between breaking the speed limit factor and the gender distribution, a significant medium correlation and positive relationship was achieved (r = .827**, p < .05). This finding explained that the higher the chances of young motorcyclist breaking the speed limit, the higher the possibilities of the number of crashes to increase.

As for risk riding behaviour that are having negative & no correlation with the gender distribution which are riding without headlights on and traffic violations, performing stunting acts and riding against traffic. Based on the value of correlations coefficient (r) and p-value between "RH: Riding without headlights on and traffic violations", "PS: Performing stunting acts" and "RO: Riding against traffic" and the gender distribution a non-significant small correlation and negative correlation relationship was achieved (r = -.0120**), p > .05), (r = -.082**), p > .05 and(r = -.0108**), p > .05 . This finding explains that the *r*-value that were obtained, it could be seen that this riding without headlights on and traffic violations, performing stunting acts and riding against traffic has a negative weak correlation with the gender distribution among young motorcyclist towards road crashes. Moreover, the value of correlations coefficient (r) and p-value between "RI: Riding while Impaired" behaviour and the gender distribution, no correlation relationship was achieved (r = 0.00**, p > .05). This finding explains that the value of r-value that were obtained it could be seen that "RI:

Riding while Impaired" behaviour had no significant correlation with the gender distribution among young motorcyclist towards road crashes.

Overall, this study provided perception of the consequences of risk-riding behaviours on motorcycle crashes among these young riders. The discovery of risk-riding behaviour among young motorcyclists in urban environments has been confirmed in this study. By concentrating on unsafe riding behaviours, these behaviours have been validated as factors that might result in immediate crash risk for young riders. Ini-tially, eight risky riding behaviours were needed to demonstrate actual secondary school student behaviour. According to crosstabulation, several behaviours are firmly and inversely associated depending on the demography of the respondents. To sum up, the determined results based on the investigation were outline in the subtitle below.

The selected Risk-Riding Behavior

The identification of a set of risk riding behaviors in the three different type secondary school area is the second objectives of this study. ten dangerous riding behaviors initially were found in earlier studies. Based on an earlier study, ten risk riding behaviors associated with road traffic crashes were identified. A list of inappropriate riding behaviors was listed, and these steps were carried out using a site reconnaissance approach that involved verifying all ten behaviors one by one at the school area.

The following are the main conclusions that can be derived from the findings:

1. Breaking the speed limits and riding without crash helmets, failing to keep proper side to side movement with another vehicle and tailgating with another vehicle with unsafe distance was the most common cause of motorcycle crashes among students in urban areas.
2. Performing stunting acts, riding against traffic and riding without headlights on and traffic violation are the behaviours had the most negligible impact on the incidence of motorcycle accidents.
3. The relationships of riding while impaired behaviour had no significant correlation with the gender distribution among young motorcyclist towards road accidents.

The purpose of this study is to determine which kind of risk riding behaviours contribute the most to motorcycle crashes and to assess the level of understanding that young motorcyclists have on the types of dangerous behaviours that they may engage in while riding a motorbike. The findings of descriptive statistics indicate that there is a significant connection between risk riding habits and demographic variables such as gender and race. The findings of this study have successfully contributed to a greater understanding of the role that risk riding behaviour plays in the occurrence of motorcycle crashes among younger motorcyclists in predominantly urban locations. The goal of these discoveries has been accomplished, and it was accomplished by determining a set of risk riding behaviours at the school area, as well as the association between those risk riding behaviours and the backgrounds of the students.

To generate an effective intervention, safety awareness training for motorcyclists in Malaysia should be implemented at the policy implementation level. This is owing to the fact that the majority of dangerous behaviours are caused by the human component. The results of this study can offer the relevant authorities with a foundation upon which to build a deeper understanding of the factors affecting rider behaviour in Malaysian motorcyclists, with the ultimate goal of improving road safety for these riders. In addition, the findings of this study can help authorities streamline their operations by systematically recording the causes of motorcycling crash occurrences. Previously, each incident was evaluated on its own merits, but this will no longer be necessary thanks to the findings of this study.

Additional research could augment this study by employing structural equation modelling that is more extensive in order to identify whether or not there is a correlation between the riders' demographic characteristics. In addition, secondary information such as crash data on frequency, type, and severity can be included in structural equation modelling to improve the prediction capability of the model and better anticipate factors that affect Malaysian motorcyclists. This will allow the model to better anticipate factors that cause crashes. The scalability of structural equation modelling can provide authorities with more knowledge to assist them in the decision-making process of producing an effective policy. This can help authorities generate more effective policies.

In a nutshell, to summarise, each dangerous riding behaviour component has a varied influence on road safety among young motorcyclists, particularly among the students who live in metropolitan areas. This is especially true for the students who ride their bikes to school. Aside from that, the predicted number of collisions can serve as a point of reference for authority while working to cut down on the number of collisions that occur in Malaysia.

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