

ORIGINAL ARTICLE

Risk Riding Behaviours of Young Motorcyclists Among Students in Univeristi Putra Malaysia, Serdang, Selangor

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ABSTRACT

Introduction: Road accidents involving young motorcyclists are one of the most concerning safety issues in Malaysia. Motorcyclists in Malaysia have a higher vulnerability towards risk and a higher possibility of involving in commuting accidents. Most of these risks are related to the motorcyclist's riding behaviour. Most of the youngster use motorcycles as their daily mode of transportation. However, less study has been conducted to analyze these young motorcyclists (university students) riding behaviour. Therefore, this study aims to determine the riding behaviours of this young motorcyclist. **Methods:** This study used a cross-sectional study design and a simple random sampling method. It was conducted among 184 respondents (92 males and 92 females) in Universiti Putra Malaysia, Serdang, Selangor. The respondents were given the self-administered Motorcycle Rider Behaviour Questionnaire (MRBQ) containing 59 items adapted from previous studies. **Results:** The males had higher crash involvement in both road accidents and near-miss accidents compared to female respondents. The traffic error ($p = 0.009$), speeding ($p = 0.001$), safety violations ($p = 0.001$), and safety equipment ($p = 0.003$) were significantly difference between both male and female students. Safety violation and precautions were the significant road accident predictors among UPM young motorcyclists. **Conclusion:** Thus, several prevention programs should be conducted to educate them on motorcycle safety riding. It is intended as an early prevention for this young motorcyclist, which in the long term will have a positive impact on reducing commuting accidents in the future.

Keywords: MRBQ, Risk riding behaviours, young motorcyclists, University students

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INTRODUCTION

In Malaysia, public universities are one of the most critical educational assets. Currently, there are 20 public universities in Malaysia enrolled by hundreds of thousands of students (1). University is a large sector and may have several hazards, especially physical risks like road traffic accidents. In 2020, road traffic accidents ranked the 4th most prominent factor of death of all ages in Malaysia (2). According to Transport Statistics Malaysia 2017, there were 108,221 motorcycles involved in road accidents which makes it the second-highest road transport after motorcar that contribute to

total number of road accidents in 2017(3). Therefore, motorcyclists in Malaysia have a higher vulnerability towards risk and are more likely to be involved in road accidents.

In 2017, the Social Security Organization (SOCISO) reported that the commuting accidents had reached the highest rate compared to 2013 until 2016, which was 49 rates per 10,000 employees (4). The data showed an incremental number in commuting accident cases. There was also an increase in the benefits paid in 2017 by RM324,658 million, with an 11.04% annual increment compared to the previous year (4). MIROS identified that more than half of the motorcyclists involved in fatal road accidents were below age 29, and half of the riders are between the ages of 20 to 29 (5). Young motorcyclists have traditionally been considered a high-risk population. According to DOSM, road traffic

accidents are the leading cause of death in children and adults aged 0 to 40 (2). Therefore, road traffic accidents involving young motorcyclists are considered as the most concerning safety issues in Malaysia.

Most people choose motorcycles as their mode of transportation because of their cost-benefit factor in terms of petrol, easy to handle and stress-free. Thereby, most young people used a motorcycle as their daily mode of transportation to move from one place to another. In 2020, there were 14,891,585 motorcycles registered with the Road Transport Department, which contributed to 45.99% of the total motor vehicles in Malaysia (6). Besides, according to the Ministry of Transport, there were 574,372 new registrations for the motorcycle in the year 2020. This statistic showed that the motorcycle is one of the main modes of transportations in Malaysia (6).

According to Shen (2018), there are significant relationships between human behaviours and the number of commuting accidents (7). Human factors are among the highest contributors to road traffic accidents and the most challenging aspects to control. However, there is still a lack of information about the behavioural factors contributing to road accidents and preventing the problems. One of the standard tools to identify the riding behaviour is using Motorcycle Rider Behaviour Questionnaire (MRBQ) (8–11).

However, less study has been conducted to identify the motorcycle riding behaviour among university students (motorcyclists) in Malaysia. A study was conducted in Malaysia using the MRBQ among young motorcyclists in Klang Valley, Malaysia (10). Nevertheless, the motorcyclist's riding behaviour may vary between university students and other populations as different community segments have different habits and behaviours. Through this study, it will be determined whether or not university students engage with risky riding behaviours. This study also will serve as fundamental data (baseline) for the Malaysian Institute of Road Safety (MIROS) for Nation Road Safety.

Thus, this study focused specifically on the 18–29-year-old age group using the Malaysian version of the Motorcycle Riding Behaviour Questionnaire (MRBQ) to determine young motorcyclists' riding behaviors among students in Universiti Putra Malaysia (UPM), Serdang, Selangor. There are five main factors used in MRBQ, namely, Safety Violation, Speeding, Safety Equipment, Traffic Error, and Precaution. On the other hand, there is also additional information, for example, demographic information, riding experience, and crash involvement. Therefore, this study aims to determine the riding behaviours of young motorcyclists among students in UPM.

MATERIALS AND METHODS

Study Design and Study Location

A cross-sectional study was carried out among 184 UPM students, and there were 92 male students and 92 female students. This study was conducted at UPM, Serdang.

Study Sample

A total number of 200 students were chosen by simple random sampling. The sample was selected based on the following criteria: UPM students, Malaysian, aged between 18 to 29 years old with experienced ride any motorcycles for more than one year.

Instruments and Procedures

A Malaysian version of the Motorcycle Rider Behaviour Questionnaire (MRBQ) from MIROS (10), which adapted from the original MRBQ (8) and Persian version MRBQ (9), were used to obtain data of the background of the respondents (Part A) and the riding behaviour of the respondents (Part B). There are 59 items used to measure the frequency of motorcyclists riding behaviour. A six-point Likert scale is used to assess how frequent the riding behaviour is – never, hardly ever, occasionally, quite often, frequently, and nearly all the time. There are five elements in the Malaysian version of MRBQ; safety violations, speeding, traffic errors, safety equipment, and precautions (10).

Data Analysis

The collected data from the questionnaire and measurement were analysed using IBM SPSS software (Version 25) to determine the riding behaviours of young motorcyclists among students in UPM, Serdang. The tests that were used in this study were descriptive analysis, Mann-Whitney U test, and Chi-Square.

Ethical Clearance

This study was approved by The Ethics Committee for Research involving Human Subjects of University Putra Malaysia (JKEUPM). Reference No. JKEUPM-2019-436. Ref: UPM/TNCPI/RMC/1.4.18.2 (JKEUPM).

RESULTS

Background of the respondents

A total of 200 respondents had participated in this study. After the screening process, 184 respondents were included in this study. The total of male respondents was 94, and the female respondents were 94. Table I shows the socio-demographic background of the respondents for gender, age, race, education, license, age obtain a license, and age of riding. The age range of the respondents was between 18 to 29 years old, and the result showed an average of 21.80 ± 1.308 . Most of the respondents were Malay, 94.6% of the respondents. However, only 2.2% were Chinese and Indian, the

remaining 1.1% of the respondents were Others. Most of the respondents were undergraduate students, and only 1.1% of respondents were postgraduate students. The respondents were comprised of several different types of

Table I: The socio-demographic background of the respondents (N=184)

| Variables | Frequency (N=184) | % | Mean±SD |
|---------------------------|-------------------|------|-------------|
| Gender | | | |
| Male | 92 | 50 | |
| Female | 92 | 50 | |
| Age | | | |
| | | | 21.80±1.308 |
| 20 | 30 | 16.3 | |
| 21 | 50 | 27.2 | |
| 22 | 55 | 29.9 | |
| 23 | 33 | 17.9 | |
| 24 | 10 | 5.4 | |
| 25 | 4 | 2.2 | |
| 26 | 1 | 0.5 | |
| 27 | 1 | 0.5 | |
| Race | | | |
| Malay | 174 | 94.6 | |
| Chinese | 4 | 2.2 | |
| Indian | 4 | 2.2 | |
| Others | 2 | 1.11 | |
| Education | | | |
| Undergraduate | 182 | 98.9 | |
| Postgraduate | 2 | 1.1 | |
| License | | | |
| B | 6 | 3.3 | |
| B1 | 3 | 1.6 | |
| B2 | 160 | 87.0 | |
| L | 2 | 1.1 | |
| No license | 13 | 7.1 | |
| Age obtain license | | | |
| | | | 16.30±4.716 |
| 16-18 | 143 | 77.8 | |
| 19-21 | 25 | 13.6 | |
| 22-24 | 3 | 1.6 | |
| No license | 13 | 7.1 | |
| Age of riding | | | |
| | | | 11.57±5.736 |
| 10-12 | 49 | 26.6 | |
| 13-15 | 64 | 34.8 | |
| 16-18 | 36 | 19.5 | |
| 19-21 | 2 | 1.1 | |
| 22-24 | 1 | 0.5 | |
| Never ride unlicensed | 32 | 17.4 | |

licenses. Most of the respondents had a B2 license (87%), B full license (3.3%), B1 license (1.6%), and the least were L license (1.1%). Only 7.1% of the respondents had no license. Almost 77.8% of the respondents obtained their license at age 16 to 18. The result of age obtain license shown an average of 16.30±4.716. Among the respondents, only 13.6% and 1.6% got their licenses at age 19 to 21 and 22 to 24, respectively. For the riding age, the result showed an average of 11.57±5.736, and only 17.4% of respondents never ride unlicensed. The result is present in Table I.

The crash involvement of the respondents

A total of 31% shows never involved in near-miss accidents, 37.5% of respondents engaged in near-miss accidents 1 to 2 times, followed by 3 to 5 times (22.8%), 6 to 10 times (3.3%), and more than ten times (5.4%). Contrast with road accident involvement, there are 69.6% of respondents never involved in road accidents, and the rest, 30.4%, engaged in road accidents 1 to 2 times (26.6%), 3 to 5 times (3.3%), and 6 to 10 times (0.5%) respectively. The crash involvement of the respondents in the study is shown in Table II.

Table II: The crash involvements of the respondents who were involved in this study (N=184)

| Variables | Frequency (N=184) | % |
|----------------------------|-------------------|------|
| Near-miss accidents | | |
| Never | 57 | 31.0 |
| 1 to 2 times | 69 | 37.5 |
| 3 to 5 times | 42 | 22.8 |
| 6 to 10 times | 6 | 3.3 |
| >10 times | 10 | 5.4 |
| Road Accidents | | |
| Never | 128 | 69.6 |
| 1 to 2 times | 49 | 26.6 |
| 3 to 5 times | 6 | 3.3 |
| 6 to 10 times | 1 | 0.5 |
| >10 times | 0 | 0 |

This study revealed that 82.6% of the male respondents were involved in near-miss accidents, and only 17.4% were never involved in near-miss accidents. On the other hand, for the female respondents, about 55.4% had been engaged in near-miss accidents, while the additional 44.6% had never been involved in near-miss accidents. Besides, only 38% of male and 18% of female respondents had been involved in road accidents in the past 12 months. In comparison, the other 54% of male and 74% of female respondents were never involved in road accidents in the past 12 months. The crash involvement of the respondents based on gender is shown in Table III.

Table III: The crash involvement of the respondents based on gender (N=184)

| Variables | Frequency (%) | |
|---------------------|----------------|------------------|
| | (N=184) | |
| | Male (n=92) | Female (n=92) |
| Near-miss accidents | | |
| Yes | 76 (82.6) | 51 (55.4) |
| No | 16 (17.4) | 41 (44.6) |
| Road Accidents | | |
| Yes | 38 (41.3) | 18 (19.6) |
| No | 54 (58.7) | 74 (80.4) |

Table IV shows the result for comparison of crash involvement of the respondents between gender. The result showed that there was a significant difference for road accidents ($p = 0.001$, $\chi^2 = 10.268$) and near-miss accidents ($p = 0.001$, $\chi^2 = 15.886$) between male and female respondents. The result also showed that male respondents had higher crash involvement in road accidents and near-miss accidents than female respondents.

Table IV: The comparison of crash involvement between gender among UPM students

| Variables | Study groups | | OR | 95% CI | p-value |
|---------------------------|----------------|------------------|-------|---------------|---------|
| | N=184 | | | | |
| | Male (n=92) | Female (n=92) | | | |
| Road Accident | | | | | |
| Yes | 38 | 18 | 2.893 | (1.493-5.606) | 0.001** |
| No | 54 | 74 | | | |
| Near-miss Accident | | | | | |
| Yes | 76 | 51 | 3.819 | (1.938-7.522) | 0.001** |
| No | 16 | 41 | | | |

**Significant at $p < 0.001$
N=184

The MRBQ rating

The mean MRBQ rating of respondents who were involved in this study is shown in Table V. The MRBQ rating is between 1 to 6 points of scale (Never, Hardly Ever, Occasionally, Quite Often, Frequently, and Nearly all the time). The results of this study revealed that the precaution (3.74 ± 0.835) had the highest mean of MRBQ rating, followed by Traffic Errors (2.91 ± 0.523), speeding (2.23 ± 0.251), and Safety Violation (2.23 ± 0.251). Meanwhile, the lowest mean of MRBQ rating

was recorded by Safety Equipment (1.82 ± 0.552).

Speeding factors showed the highest frequency of reported MRBQ followed by Traffic Error, Precaution, Safety Equipment. Meanwhile, the lowest frequency of reported MRBQ is recorded by Safety Violation.

Table V: The descriptive statistic of MRBQ rating of the respondents who involved in the study (N=184)

| Variables | Mean±SD |
|-------------------|--------------|
| Traffic Errors | 2.91 ± 0.523 |
| Speeding | 2.23 ± 0.251 |
| Safety Violations | 2.03 ± 0.621 |
| Safety Equipment | 1.82 ± 0.552 |
| Precautions | 3.74 ± 0.835 |

Comparison of MRBQ factors between gender

Table VI has shows the result of the comparison of MRBQ factors between gender. Mann Whitney-U test was performed since data distribution is not normal to determine a significant difference in MRBQ factors between male and female respondents. Based on table 4.6, the result showed that there was significant difference for Traffic error ($p = 0.009$), Speeding $p = 0.001$), Safety violations ($p = 0.001$), and Safety equipment ($p = 0.003$) between gender in this study.

Table VI: The comparison of MRBQ factors between male and female respondents

| Variables | Median (IQR) | | z | p-value |
|-------------------|--------------|------------|--------|---------|
| | Male | Female | | |
| | (n=92) | (n=92) | | |
| Traffic Errors | 37.00 (12) | 33.00 (14) | -2.627 | 0.009* |
| Speeding | 11.50 (7) | 10.00 (5) | -3.682 | 0.001** |
| Safety Violations | 50.00 (18) | 38.00 (12) | -6.068 | 0.001** |
| Safety Equipment | 14.00 (9) | 13.00 (5) | -2.989 | 0.003* |
| Precautions | 30.00 (12) | 31.00 (12) | -0.374 | 0.708 |

*Significant at $p < 0.05$
**Significant at $p < 0.001$
N=184

Significance Road accident predictors among UPM students

The result showed that speeding ($\chi^2=3.977, p=0.046$), Safety Violation ($\chi^2=6.778, p=0.009$) and Precaution ($\chi^2=7.479, p=0.006$) had a significant association with road crashes. From the result, it was concluded that most young motorcyclists who exercised precaution

were not involved with road crashes. Further analysis was conducted to determine the main predictors of road crashes among UPM young motorcyclists.

Table VII shows the significance of crash risk predictors among UPM students. Logistic Regression was performed for all MRBQ factors (traffic error, speeding, safety violation, safety equipment, and precaution). Based on the table, the result shows that safety violation factors (OR = 2.724, 95 % CI = 1.170 – 6.342) and precaution (OR = 0.329, 95% CI = 0.164 – 0.658) had significant difference with road crash.

Young motorcyclists who had any safety violation above the average was 2.724 times (95% CI = 1.170 - 6.342) were more likely to be exposed to road accidents. However, young motorcyclists who had exercised precaution above the average was 0.329 times (95% CI = 0.164 - 0.658) were less likely to be exposed to road accidents.

Table VII: Logistic Regression of the significant predictors of road crash among young motorcyclists

| MRBQ Factors | OR | 95% CI | | p-value |
|------------------|-------|--------|-------|---------|
| | | Lower | Upper | |
| Safety Violation | 2.724 | 1.170 | 6.342 | 0.020* |
| Precaution | 0.329 | 0.164 | 0.658 | 0.002* |

*Significant at p < 0.05

DISCUSSION

This study aimed to identify the riding behaviours of young motorcyclists among students in UPM. All objectives of this study were obtained by determining the respondent demographic information, riding experience, crash involvement, and the MRBQ rating.

Sociodemographic Characteristic and Riding Background of UPM Students

There were 184 students involved as respondents, and 50% were male and female, respectively. The students' age was in the range from 18 to 29 years old, and most of them were Malay. The mean age of the student was 21.8 years old. The respondents' age from the previous study conducted among young motorcyclists in Klang Valley was between 16 to 25 years old which most of them were Malay, and more than half of the respondents were male (10). MIROS also reported that, based on statistics, more than 50 % of the motorcycle riders involved in fatal road traffic accidents were aged below 29, and half of the riders were between ages 20 to 29 (12). According to previous studies, risk-taking behaviours and road accidents had been consistently associated with age, gender, and riding experience (13,14). Thus, young male and novice motorcyclists has highest risk-taking

behaviours and road traffic accidents involvement.

In this study, only 7.1% of the students had no license, but about 82.6% had ridden motorcycles without a license. The result showed that the average age of the students who obtain their license was 16 years old. However, the average age of riding a motorcycle was around 11 years old. Based on the result, most students started to ride a bike early and without a license. The result was consistent with previous studies, which found out that most of the young motorcyclists in Klang Valley rode a motorcycle without a license (15). According to Setoodehzadeh et. al (2021), there are significant relationship between riding behaviours and riding without license (14). Therefore, riding without a license might be related to the risk riding behaviour among the students.

The Crash Involvement of UPM Students

There are two types of crash involvement being studied in this study. The first type is the near-miss accidents, which refers to accidents' respondents had involved in within three months. The other type of collision involvement was the road accident which the respondents had engaged in within 12-month period. The percentage of involvement of respondents in near-miss accidents was higher compared to road accidents. This data was compared with the MRBQ factors in order to find out the significant road accident predictors. According to Sakashita (2013), the experience of crash involvement might have influenced the riding behaviours reported by the motorcyclists in the MRBQ (11).

Based on the result, male students had a higher frequency of being involved in near-miss accidents or road accidents than female students. In a previous study by Azman et al. (2017), young male motorcyclists were also more prone to be involved in road accidents than young female motorcyclists (10). The result also showed a significant difference in road accidents and near-miss accidents between male and female respondents. The result showed that male respondents have higher crash involvement compared to female respondents. The male motorcyclists had a higher tendency to be involved in risk-taking behaviour than female motorcyclists, which eventually led to road traffic accidents (13,16,17).

In road traffic accidents, there are three main factors: human, environment, and machine element (8). Human factors are the most difficult factors to be controlled—one of the main components of human factors in human behaviour. In the previous study by Sultan et al. (2016), the findings showed that human behaviour factors were the highest contributors towards motorcycle crashes in Malaysia, followed by the road and vehicle and finally the environmental factors (18). Young motorcyclists with unsafe riding had a higher tendency for risky riding behaviour (19). Other than that, immature skills and lack of experience might lead to a high accident rate

among young riders (20). According to Zainudin et al. (2011), motorcycle riders had a higher tendency to ride a motorcycle at risk, thus more prone to road accidents (21).

The MRBQ Rating

The purpose of developing the MRBQ is to measure motorcyclists' risk riding behaviour and analyse the types of behaviour that can predict the motorcycle rider's crash risk (8). There are five elements in the Malaysian version for MRBQ; safety violations, speeding, traffic errors, safety equipment, and precautions (10). In the MRBQ, safety violation, speeding, and traffic error are undesirable or negative behaviours from a road safety perspective. On the other hand, the safety equipment and precautions are considered positive behaviours.

Based on the result, the precaution factors had the highest mean of MRBQ rating followed by traffic errors, speeding, safety violation, and the lowest mean of MRBQ rating was safety equipment. For example, the question from the precaution factor, which had the highest mean, was "Give signal when changing lanes on the highway." The result showed that, on average, students always gave a signal when changing lanes while riding a motorcycle on the roads. This is one of the positive behaviours in the view of road safety.

The next focus was on safety equipment. The question that scored the highest mean in this factor was "Wear bright/fluorescent clothing?". It was clear that students always wore bright colour clothing while riding their motorcycle for safety purposes. This is also one of the positive behaviours in motorcycle safety riding perspectives. In other words, the use of safety equipment is to comply with the laws and an initiative to protect and prevent motorcyclists from any harm or possibly road crashes (22).

For the speeding factors, the question with the highest mean was "Ride above the speed limit in the motorcycle lane." Again, the result showed that, on average, the students had experienced riding a motorcycle above the speed limit on the motorcycle lane. Consistent with the previous study, Azman et al. (2017) also stated that most young motorcyclists in Klang Valley reported consistently exceeding the speed limit on a motorway (10).

Other than that, for safety violation factors, the highest mean was "Ride without wearing a helmet for a short trip," and for Traffic Error factors, the highest mean was "Have trouble with your visor or goggles fogging up." Again, the result indicated that, on average, students had experienced riding a motorcycle without wearing a helmet for a short trip (ex: At the residential area) and always had trouble with visor or goggles fogging up while riding a motorcycle. Most of the young motorcyclists were not oblivious to the traffic errors and

safety violations they had done and the effect of the risk riding behaviour (17). According to Harith and Mahmud (2018), motorcycle riders' behaviour was increasingly a leading factor contributing to road traffic accidents (23). When unsafe riding, speeding, or any risk riding behaviours become a habit, it will be difficult to change unless the person wants to change it himself, thus it will increase the risk to involve in road traffic accident.

Comparison of MRBQ Factors between Gender

In this study, the MRBQ factors were compared between male students and female students. Based on the results, four out of five elements showed a significant difference between both genders. The factors were traffic Error, speeding, safety violation, and safety equipment. From the results, male and female students showed a significant difference in negative aspects of MRBQ (traffic error, speeding, and safety violation) and positive factors of MRBQ (safety equipment).

The result revealed that the level of traffic error, safety violation, speeding, and safety equipment between the genders differed in road safety perspectives. Male motorcyclists rated traffic error, safety violation, speeding, and safety equipment more frequently than females. This finding is consistent with previous studies by Stephens et al. (2017), and Sakashita et al. (2014) stated that male motorcyclists reported speed violations and stunts more frequently than female motorcyclists (24,25). In addition, Ibrahim et al. (2012) mentioned that male motorcyclists and young adults were the major groups with high-risk riding behaviour (15).

In this study, the precaution factors did not show any significant difference between male and female respondents. Based on that, both genders might have the same level of precaution in road safety perspectives. This factor is one of the positive behaviours that both genders practice the same precaution behaviours while riding a motorcycle. For example, students always gave signals when changing lanes on the highway. According to Zainudin et al. (2011), the person who rides a motorcycle at risk had a higher tendency to be involved in road accidents (21). Therefore, practicing positive behaviour can help to reduce road accidents and casualties caused by accidents.

Significance Road Accident Predictors among UPM Students

This study revealed that safety violation, speeding, and precaution are significantly associated with road crashes among young UPM motorcyclists. From the result, it was concluded that most young motorcyclists who exercised precaution had not been involved in road crashes. Consistent with other previous studies, a logistic regression analysis was conducted to determine significant road crashes predictors among young UPM motorcyclists.

On top of that, the result showed that safety violation and precaution have significant differences with road crashes. Based on the result, young motorcyclists who had safety violations above the average were 2.724 times more likely to be exposed to road accidents. However, young motorcyclists who exercised precaution above the average were 0.329 times less likely to be exposed to road accidents. Despite that, Azman et al. (2017) reported in their study, traffic error was the significant predictor of crash involvement and 1.381 times more likely to be involved in road crashes (10). On top of that, a previous study by Sakashita (2013) reported errors and speed violations as the significant predictors for near-miss accidents and road accidents (11).

Moreover, in the study conducted by Elliot et al. (2007) and Chouhan et al. (2021), Traffic Error was found to be the significant predictor of road crash liability (8,26). Motorcyclists who were frequently committing traffic errors had a higher road crash liability than those who committed traffic errors less frequently. Different studies showed different results. This is due to the difference in terms of study population, age group, and study location. Thus, the result of this study is related only to the specific population, age group, and location taken in the context of the study.

Therefore, based on the finding, each significant predictor needs to be eradicated first in any road safety interventions to reduce road crashes and casualties. For example, safety violation and precaution factors can be combined to find the best intervention programs that will reduce undesirable riding behaviours. For certain age groups and gender groups, safety violation factors and precaution factors were found to impact and influence the crash risk. Thus, the road safety interventions for young adults will be best to focus on improving their riding skills, such as training programs on choosing the right speed selection, controlling the speed and traffic error, and managing hazard perception.

CONCLUSION

In conclusion, there are few critical findings from this study. First, most respondents (18 to 29 years old) were Malay and had experienced motorcycle riding for more than a year. Second, the prevalence of the students involved in road accidents was 30.4%. Next, the crash involvement showed a significant difference between both genders. Males had higher crash involvement in both road accidents and near-miss accidents compared to female respondents.

The precaution factor had the highest mean of MRBQ rating followed by traffic error, speeding, safety violation, and the lowest mean of MRBQ rating was safety equipment. However, this study showed that traffic error, speeding, safety violation, and safety equipment were significantly different between male

and female respondents. Moreover, the result showed that the Safety Violation and Precaution factor were the roads crash, significant predictors, among UPM young motorcyclists. Young motorcyclists who had safety violation above the average was 2.724 times more likely to be exposed road crash; however, young motorcyclists who exercised precaution above the average was 0.329 times less likely to be exposed road crash. Factors such as age group, gender, speed, and safety violation were found to impact the crash risk.

This study also provides baseline data. It will be helpful in the prevention and intervention programs that will be developed by road safety-related organizations such as MIROS. These programs will reduce and minimize the risk of road traffic accidents among young motorcycle riders. It is hoped that these trained young motorcyclists will turn into safe riders in the future. In the long term, it has the potential to reduce commuting accidents among workers in the future. Further study should be conducted on various groups (such as school students and young workers) of the population in Malaysia. Thus, baseline data can be generated based on the significant MRBQ factors to create several intervention programs (e.g., Motorcycle Safety Riding) for a specific population.

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