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Research Report

A Case Study on Risk-taking Behaviours Among Motorcyclists in Klang Valley, Malaysia



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Abstract

Motorcyclists are amongst the highest risk group in traffic—contributing to 4,067 (60%) road fatalities in Malaysia in 2009. Risk taking behaviour is widely believed to contribute to most motorcycle crashes. A questionnaire was distributed among 540 motorcyclists in the vicinity of Klang valley in the state of Selangor to study their risk taking behaviour. We found that the level of risk taking behaviour of motorcyclists in Klang valleys is related to age, gender and income level. Teenagers were found to have a greater inclination to ride without a license and crash helmet as compared to other age groups. Male riders make up the majority of the group. A significant mean difference was observed in the lower income group for certain behaviours that are related to risk taking. The implications on road safety countermeasure are discussed therein.

1.0 Introduction

In Malaysia, motorcycle is one of the most popular modes of transportation among road users. Because of its relatively inexpensive price, maneuverability, and its economical use of petrol, motorcycle is widely used as a mode of transportation which makes it, the highest-selling vehicle in Malaysia. In 2007, out of the 16,368,923 vehicles which were registered with the Department of Transportation, 48% or 7,943,364 were motorcycles (RMP, 2008). However, motorcycle is also the riskiest vehicle to be used in Malaysia. In 2009, the total motorcyclist fatality figure was 4,067 or 60% of the total recorded road fatalities (RMP, 2010). This figure represents an increase of 9% in the number of fatalities from the 2002 data. Fifteen years before that, motorcyclists in Malaysia were reported to have an overall relative risk of 20 times greater than that of car drivers' (Radin Umar *et al.*, 1995).

Risk taking behaviours are one of the significant contributing factors in motorcycle crashes. Haworth *et al.*, (2009) analysed the data from police-reported crashes in Queensland, Australia and found that risk-taking contributes to the high fatality rate of moped riders. The researchers stated that risk-taking in motorcycling may include deliberately not following road rules (including excessive speeding and reckless riding), unlicensed riding, riding while being impaired by drugs and alcohol, and riding without a helmet (Haworth *et al.*, 2009). In a study by Ahmad Hariza *et al.* (1999), the researchers found that Malaysian motorcyclists practiced risky behaviours while on the road. Among the behaviours mentioned were (i) removing their helmets before reaching their destination, (ii) failure to use a helmet while riding in an area where there is minimal police presence or along a deserted road, and (iii) overtaking in an area where it is not allowed.

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This case study examined the relationship between socio-demographic factors and risk-taking behaviours of motorcyclists in the Klang Valley, Malaysia. The goal of the study was to find significant contributing factors that influence these risk taking behaviours.

1.1 Demographic Background of Motorcyclists and Risk-taking Behaviour

1.1.1 Gender

Male motorcyclists were found to have a higher risk of accident involvement as compared to female (eg: Chesham *et al.*, 1993; Maycock *et al.*, 1991; McKenna *et al.*, 1998). In general, young male drivers as a group behave more riskily than female and older drivers and are also worse at hazard perception than older drivers (McKenna *et al.*, 1998).

1.1.2 Age

It is well documented that adolescents are more likely than adults to engage in risky behaviours. For example, adolescents are more likely than adults to drive recklessly, to drive while intoxicated, to use illicit substances, to have unprotected sex, and to engage in both minor and more serious antisocial behaviours (Arnett, 1992). Most evidence suggests that risk-taking is the most important major factor in the high crash rates among teens (Finn and Bragg, 1986; Jonah, 1986; Williams, 2001). The tendency for young drivers to engage in high-risk driving activities has been well documented (e.g., Cooper, 1987; Evans and Wasielewski, 1983; Jonah, 1986, 1990). For example, risk-taking behaviours in young drivers have even been identified as a major factor in young drivers' basic motivation in not using seatbelts, which is one of the reasons that their fatal crash rates are higher than those of older age groups' (Begg and Langley

2000; Chliaoutakis *et al.*, 2000; Hodgdon *et al.*, 1981; Jonah, 1986; Mayhew and Simpson, 1999; Williams and Shabanova, 2002).

1.1.3 Personal Income

Some adolescent health risk behaviours appear to be disproportionately high among youths of colour, lower-income adolescents, and those living in poverty, but these demographic factors do not predict youth health risk behaviours well (Robert *et al.*, 2000). Helmet use varies from slightly over zero in some low-income countries to almost 100% in places where laws on helmet use are effectively enforced. In several low-income countries, helmet use has been found to be lower at night (Ichikawa *et al.*, 2003).

1.2 Personal and Social Factors of Motorcyclists and Risk-taking Behaviour

1.2.1 Crash Experience

Lin *et al.* (2003) showed that young motorcyclists with crash experience had higher risk-taking levels during the study period than those without previous crash experience. It seems that motorcyclists who perceive a higher risk after experiencing a crash do not adopt precautionary behaviours or curb their risk-taking behaviours. This finding is consistent with the results for all motor-vehicle groups who had been involved in an accident (Begg *et al.*, 1999; Slap *et al.*, 1999).

According to Haworth *et al.* (2000), many of the riders who were involved in crashes involving deficiencies in hazard perception or response were inexperienced. Inexperience is much more common among motorcyclists than car drivers. Inexperienced motorcyclists include riders who have little riding experience, those who ride infrequently and those who have

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not ridden frequently for a number of years. Thus there are many inexperienced motorcyclists who are not necessarily young or new riders.

1.2.2 Exposure Towards Action Movies

Job (1990) questions the effectiveness of media coverage of severe accidents in deterring risk taking. He suggests that this type of media coverage may instill overconfidence in young drivers, who believe they must be good drivers because they have not been involved in an accident. He also indicated that this may lead young motorcyclists to take greater risks, which can cause injuries and possible death.

1.2.3 Enforcement of Traffic Law

Enforcement is seen as a good measure in improving traffic order and to enhance the safety of motorcyclists (Hsu *et al.*, 2003). In Taiwan, motorcyclists who are caught not wearing crash helmets are fined the equivalent of US \$15 (Chiu *et al.*, 2000). The law is most strictly enforced in Taipei City, which by far holds the largest police force in Taiwan, and accidental injuries dropped from fourth place to fifth in the ranking of major causes of death (Taiwan Department of Health, 1998). Another reason for this positive result observed in Taipei City is a six-month helmet use campaign that educated Taipei citizens on the benefits of helmet use and the perils of riding a motorcycle without using a helmet.

1.2.4 Peer Influence

For teenagers, the motor vehicle is more than a mode of transportation. Driving provides not only a degree of freedom from parental surveillance, but also a sense of achievement and social status (a driver's license) that were previously unavailable to them as children and adolescents. Adults, however, seem to be

less aware of this, a factor that is pertinent especially when it comes to concerns about peer influences on teen driving. Researchers recognise that adolescents' driving behaviour depends on who is in the car with them. Teenagers drive faster and take more risks when carrying peers than when carrying adults as passengers, especially if their peers are young men (Allen and Brown, 2008).

1.2.5 Parental Guidance and Monitoring

Parental monitoring has received particular attention in relation to adolescent substance use, with a substantial body of literature consistently demonstrating that higher parental monitoring is associated with reduced risk of smoking and alcohol use, as well as other deviant and risky behaviours among adolescents (Barnes and Farrell, 1992; Chilcoat and Anthony, 1996; Steinberg *et al.*, 1994). In studies that have examined multiple dimensions of parenting, monitoring often has the strongest effect (Barnes and Farrell, 1992; Griffin *et al.*, 2000).

2.0 Method

2.1 Respondents and Procedure

The population of this study consisted of motorcyclists within the vicinity of the Klang Valley in Malaysia. The areas chosen for data collection were based on the accident statistics in the Klang Valley as presented in Table 1. Respondents consisted of 408 males (76%) and 129 females (24%). Data was collected for the duration of three weeks (one week for each area) from 8 March 2010 to 31 March 2010. Only motorcyclists were approached and surveyed. The participants' age must be at least 16 years old which is the minimum age to obtain a motorcycle license in Malaysia. It

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was a self-administered and drop-off method of survey where no personal interview was conducted. Respondents were assured of their anonymity and that all the responses would be kept strictly confidential. A total of 550 questionnaires were distributed.

Table 1 Districts with the highest number of motorcycle accidents in Klang Valley

	Fatal	Serious	Injury	Damage	Score
Klang	121	215	120	3521	5347
Jalan Bandar	70	24	13	4584	5126
Petaling Jaya	83	174	279	3221	4973

Source: MIROS Road Accident Analysis and Database System (M-ROADS) Year: Accident Data 2008

2.2 Sample

Using the G-Power analysis software, the minimum targeted sample size was set at 540 respondents. This sample size was considered to be feasible as well as being time- and cost-efficient. In selecting the respondents from these localities, convenience sampling was used to select the target respondents. Small tokens were given to the participants as a sign of appreciation for their participation.

2.3 Site of Data Collection

From each area, two localities which reported the highest number of accidents were chosen to represent the sampling pool. The locations of data collection are shown in Table 2.

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Table 2 Locations of data collection

Areas/ Localities	Klang	Jalan Bandar	Petaling Jaya
Klang Valley (Kuala Lumpur & Selangor)	Jalan Meru	Jalan Ampang	Lebuhraya Damansara Puchong
	Jalan Sg. Kapar Indah 3J	Jalan Tun Razak	Bt.16 Jalan Kuala Selangor-Sungai Buloh

Data was collected alongside the routes with the highest number of motorcycle accident occurrences. The lists of the routes are shown in the Tables 3, 4 and 5.

Table 3 Routes with the highest number of motorcycle accidents in Klang

Klang		
Route	Route no	Total Accidents
Jalan Sg. Kapar Indah 3J	F0003	319
Jalan Meru	B0001	240

Source: MIROS Road Accident Analysis and Database System (M-ROADS) Year: Accident Data 2008

Table 4 Routes with the highest number of motorcycle accidents in Jalan Bandar

Jalan Bandar		
Route	Route no	Total Accidents
Jalan Ampang	Z0004	217
Jalan Tun Razak	Z0230	177

Source: MIROS Road Accident Analysis and Database System (M-ROADS) Year: Accident Data 2008

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Table 5 Routes with the highest number of motorcycle accidents in Petaling Jaya

Petaling Jaya		
Route	Route no	Total Accidents
Lebuhraya Damansara Puchong	E0011	321
BT 16 Jalan Kuala Selangor-Sg. Buloh	F0054	198

Source: MIROS Road Accident Analysis and Database System (M-ROADS) Year: Accident Data 2008

2.4 Items

There were three main sections in the questionnaire. The first section of the questionnaire collected demographic factors namely gender, age, ethnicity, education level and personal income. Due to lack of balanced proportion of responses from different ethnic groups, the race factor was removed from factor analysis. The second section contained 14 items which were developed to gauge the level of risk-taking. A 5-point Likert scale varying from 'strongly agree' to 'strongly disagree' was used to record the responses. Respondents were presented with statements asking the likelihood and extent of risk taking (e.g., 'I always ride my motorcycle without using a crash helmet in a residential area' and 'While riding on motorcycle, I will indicate / signal to other vehicles behind me before turning left or right, etc.').

The third section presented 28 items that were developed to investigate personal and social factors which influence the likelihood of risk taking. These factors were peer influence (e.g., 'If my peers influence me to ride over the speed limit, I will do it'), exposure towards action movies (e.g., 'I enjoy watching movies with racing scenes'), parental guidance and monitoring (e.g., 'My parents always advise me on how to behave outside the home'), past crash experience (e.g., 'To be involved in a motorcycle accident is nothing new to me'), enforcement of traffic law (e.g., 'The risk of punishment in violating traffic law is very low'), greater precaution after experiencing an accident (e.g., 'After

getting involved in crash experience, I ride on my motorcycle more carefully') and confidence after experiencing an accident (e.g., 'When I am wearing a helmet, I can avoid crash experience'). All items were listed in Appendix I.

3.0 Results

Data analyses were divided into three main sections. The first section is the descriptive analysis of the demographic factors. Some of the factors such as age and ethnicity were compared with injured motorcyclists' data from RMP. The second section examines the items related to the level of risk taking and determines the score of each respondent. In the third section, exploratory factor analysis was conducted to determine the relation between personal and social factors to the likelihood of risk-taking behaviours.

3.1 Demographic Analysis

Figure 1 compares the respondents' age group to injured motorcyclists reported in 2008. Motorcyclists under the age of 15 were not captured in this study. The proportion of the age of the respondents is somewhat similar to that recorded by the crash database except for motorcyclists age 41 or over whereby the actual accidents involvement is higher.

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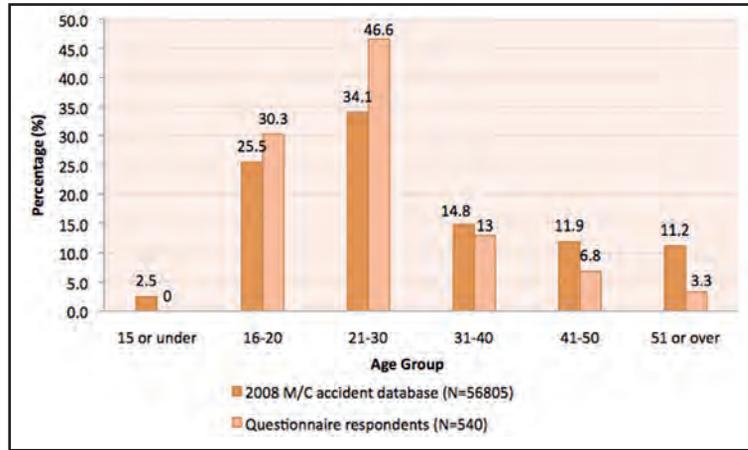


Figure 1 Bar graph comparing the age of questionnaire respondents and the age of injured motorcyclists in 2008 accident data

Figure 2 compares the ethnicity of questionnaire respondents with the injured motorcyclists reported in 2008. Chinese and Indian motorcyclists were poorly represented in our sample but the alarming fact is that more than two-third of Malay motorcyclists were injured in 2008. Tables 6 and 7 show the proportion of monthly income and education level of the respondents. Approximately 78.5% of the respondents earned a monthly personal income of below RM 1,999 per month. Malaysian motorcyclists are widely believed to come from the lower income category.

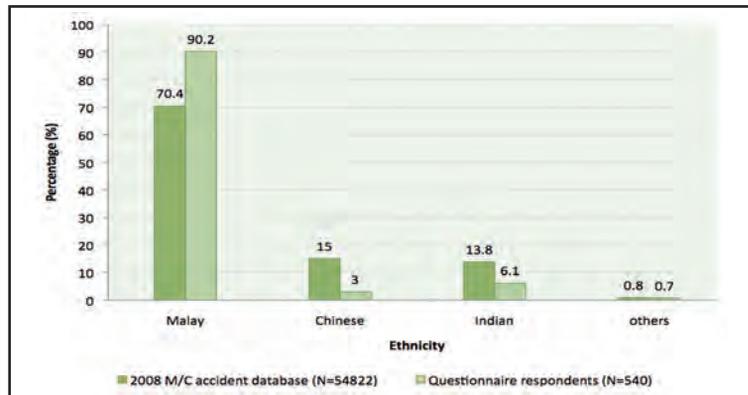


Figure 2 Bar graph comparing the ethnicity of questionnaire respondents and the ethnicity of injured motorcyclists in 2008 accident data

Table 6 Monthly income of questionnaire respondents

Monthly income	Percentage of questionnaire respondents (%)
Below RM 1,000	48.2
RM 1,000–RM 1,999	30.3
RM 2,000–RM 2,999	14.4
RM 3,000–RM 3,999	4.5
Over RM 4,000	2.6

Table 7 Education level of questionnaire respondents

Education level	Percentage of questionnaire respondents (%)
Primary school	5.8
High school	60.5
College/University	33.7

3.1.1 License to Ride

Respondents were asked if they have a license to ride motorcycle. Almost three-quarter of the respondents (71.9%) are motorcycle license holders while 28.1% do not have a motorcycle license. This shows that quite a significant number of respondents do not have a license to ride a motorcycle especially young motorcyclists aged 16–20 whereby more than half of them ride without a license (see Figure 3).

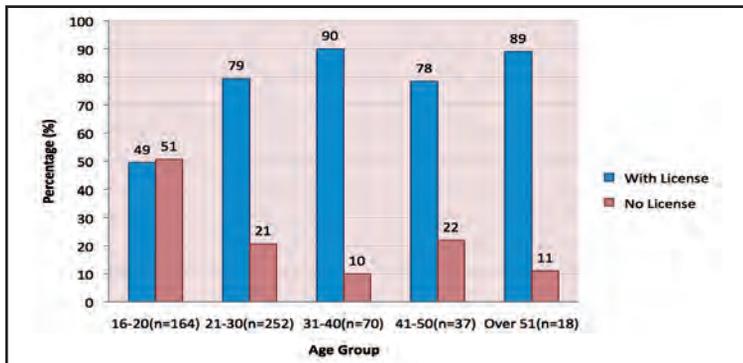


Figure 3 Licensed motorcyclists by age group

3.1.2 Riding Experience and Accident Involvement

The respondents were asked to state their experience in riding a motorcycle in terms of years. Almost two-third of the respondents (60.1%) stated 0–10 years, 23.6% answered 11–20 years and 9.4% had over 20 years of experience. 6.8% of the respondents did not give any answer to this question. On the involvement of the respondents in accidents, almost three-quarter of the respondents (74.1%) had been involved in a motorcycle accident. Of this figure, 10.5% of respondents had been involved in more than six separate accidents. Since more than half of the respondents had been involved in at least one accident, this indicates that motorcyclists are indeed a high risk group.

3.2 The Extent of Risk-taking Behaviours

A maximum score of 70 (5 points for each item) was given if any respondent answered 'strongly agree' to all 14 items in this section and a minimum score of 14 (1 point for each item) was given if any of them answered 'strongly disagree' to all the questions. The level of risk taking was determined by separating the scores into three equal ranges (e.g., non-risk taker = 14 to 32, medium = 33 to 51, risk taker = 52 to 70). Three original questions (items 1, 13 and 14) asked in the questionnaire were revised and the respective scores were reversed during analysis to match the setting of the original scale (e.g., 'When I ride my motorcycle, I always stop at a stop sign' in the questionnaire was coded as 'When I ride my motorcycle, I rarely stop at a stop sign'). Analysis revealed that 45.1% of the respondents were in the non-risk-taking group with most of them (49.5%) recorded medium score for the 14 risk taking related items (see Figure 4). Only 5.4% of the respondents scored more than 52 points (risk taking group).

Further analysis revealed that respondents mostly agreed (see Figure 5) on items 4, 5 and 10 ('I always ride my motorcycle along a deserted road without using a crash helmet', 'I

always ride my motorcycle without using a crash helmet in a residential area' and 'Sometimes I feel it is unnecessary to keep my motorcycle headlights on while I am driving in the daytime'). More than 30% of the respondents also agreed on item number 7 ('When I ride on motorcycle, I like to ride fast or over the speed limit').

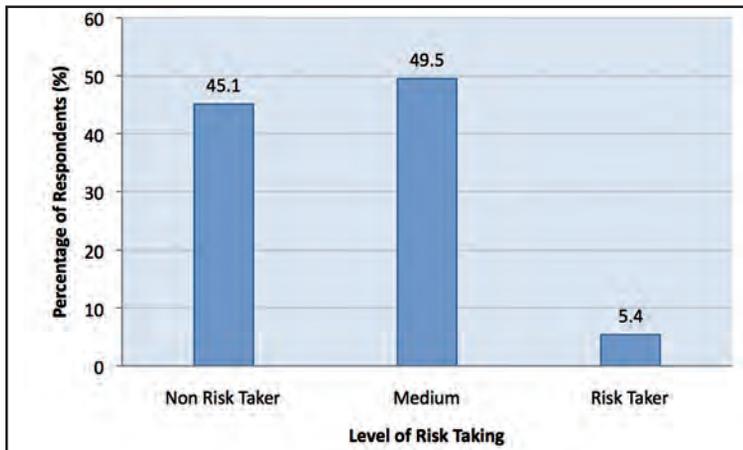


Figure 4 Level of risk-taking behaviours indicated by response in the questionnaire

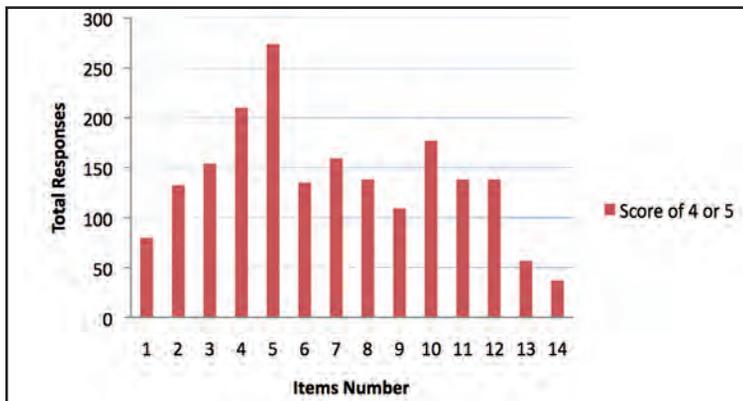


Figure 5 Risk taking items with score of 4 ('agree') or 5 ('strongly agree')

3.2.1 Gender, Age and the Extent of Risk-taking Behaviours

The cross-tabulation of gender and level of risk taking shows that there are more female motorcyclists in the non risk taking group

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as compared to male. The percentage of male is higher in the risk taking group (see Figure 6). Figure 7 shows the pattern of responses by age group. The percentage of risk takers is equally distributed across all motorcyclist age groups in the Klang Valley. In the non risk taking group, the percentage of those in the 16–30 age group is the lowest.

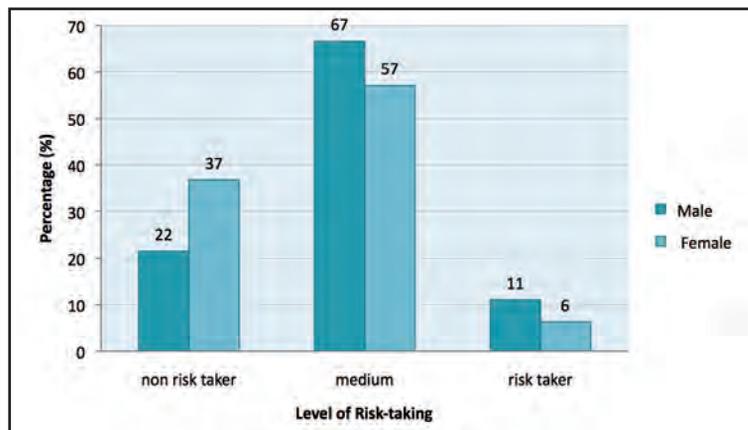


Figure 6 Level of risk-taking behaviours by gender

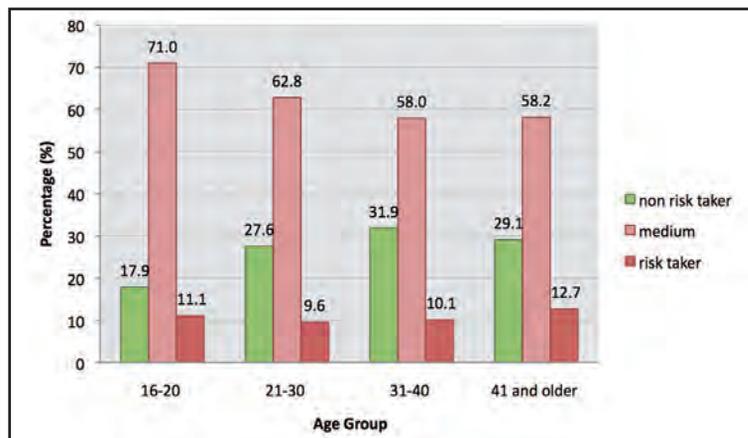


Figure 7 Risk-taking behaviours by age group

3.3 Items Related to Risk-taking Behaviours

The 14 items related to risk-taking behaviours were analysed using exploratory factor analysis with varimax rotation. The Barlett's test

of sphericity was conducted to test the intercorrelations among the items and the test yielded a significant result ($p < 0.001$). In addition, the Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy generated by SPSS was 0.842, which is well above 0.6 and considered excellent by Hair *et al.* (2006), thus indicating the appropriateness of using factor analysis. The final factor analysis included only 12 items from the original 14 items. Four factors (risk-taking behaviours) were identified using parallel analysis. These behaviours, the numbers of loaded items and each factor loadings are summarised in Table 8.

Table 8 Factors identified from items related to risk-taking behaviours

Factor (behaviours)	Items	Factor loadings
Riding over speed limit	Q2	.515
	Q3	.797
	Q7	.816
	Q8	.735
	Q9	.701
Riding without crash helmet	Q4	.788
	Q5	.816
	Q6	.660
Riding without using signal	Q13	.875
	Q14	.868
Riding without headlights on and not stopping at a three-way junction	Q10	.761
	Q12	.800

3.3.1 Gender and Risk-taking Behaviours

Independent samples t-test was conducted on the 14 items and effects of gender were found for the item *riding over speed limit* ($p < 0.001$) and *riding without crash helmet* ($p < 0.05$). Male respondents were found to be more inclined to ride above the speed limit and not using the helmet compared to female respondents. The results are summarised in Table 9.

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Table 9 The relationship between gender and risk-taking behaviours

Behaviours	Gender	N	Mean	t-value	p
Riding over speed limit	Male	408	13.11	5.365	.000
	Female	129	10.48		
Riding without crash helmet	Male	408	8.57	2.232	.026
	Female	129	7.83		
Riding without using signal	Male	408	8.37	-0.042	.966
	Female	129	8.38		
Riding without headlights on and not stopping at a three-way junction	Male	408	5.04	1.015	.310
	Female	129	4.80		

3.3.2 Age and Risk-taking Behaviours

Respondents were divided into four age groups and an ANOVA was conducted on the scores of the 14 risk-taking behaviour items. Significant differences were found in the scores for item *riding without crash helmet* ($p < 0.001$). Scheffe post hoc analysis revealed that younger (16–20 years old) and older (≥ 41 years old) respondents had higher tendency to not use crash helmet when riding a motorcycle compared to other age groups. Results are summarised in Table 10.

Table 10 The relationship between age and risk-taking behaviours

Behaviours	Age	Mean	F	p
Riding over speed limit	16–20 years old	12.97	1.211	.305
	21–30 years old	12.42		
	31–40 years old	11.81		
	≥ 41 years old	11.89		
Riding without crash helmet	16–20 years old	9.11	6.120	.000
	21–30 years old	7.98		
	31–40 years old	7.52		
	≥ 41 years old	9.02		
Riding without using signal	16–20 years old	8.32	1.352	.257
	21–30 years old	8.28		
	31–40 years old	8.75		
	≥ 41 years old	8.45		
Riding without headlights on and not stopping at a three-way junction	16–20 years old	5.27	2.379	.069
	21–30 years old	4.94		
	31–40 years old	4.4		
	≥ 41 years old	5.11		

3.3.3 Level of Education, Personal Income and Risk-taking Behaviours

An ANOVA on the risk taking items across different levels of education revealed no significant differences in the mean scores. On the other hand, when ANOVA was conducted on different levels of income, the main effect was observed on items *riding without crash helmet* ($p < 0.001$) and *riding without headlights on and not stopping at a three-way junction* ($p < 0.05$). Post hoc tests revealed that compared to other groups, respondents earning less than RM 1,000 were more inclined to ride without using crash helmet and having headlights on. They were also less likely to stop at a three-way junction. Results are summarised in Table 11.

Table 11 The relationship between personal income and risk-taking behaviours

Behaviours	Personal income	Mean	F	p
Riding over speed limit	Less than RM 1,000	12.79	1.269	.284
	RM 1,000–RM 1,999	11.98		
	RM 2,000–RM 2,999	12.42		
	RM 3,000 and above	11.58		
Riding without crash helmet	Less than RM 1,000	9.04	8.504	.000
	RM 1,000–RM 1,999	7.46		
	RM 2,000–RM 2,999	8.08		
	RM 3,000 and above	7.74		
Riding without using signal	Less than RM 1,000	8.27	0.982	.401
	RM 1,000–RM 1,999	8.52		
	RM 2,000–RM 2,999	8.25		
	RM 3,000 and above	8.63		
Riding without headlights on and not stopping at a three-way junction	Less than RM 1,000	5.31	3.857	.009
	RM 1,000–RM 1,999	4.60		
	RM 2,000–RM 2,999	4.61		
	RM 3,000 and above	4.95		

3.4 Items Related to Personal and Social Factors

The 28 items of personal and social factors in the third section of the questionnaire were subjected to an exploratory factor analysis with varimax rotation. On the suitability of factor analysis, the Barlett’s test of sphericity yielded a significant result ($p < 0.001$) and KMO index was 0.795, thus the data was deemed appropriate for factor analysis. Seven factors were identified using parallel analysis. Table 12 summarises the seven factors with respective number of loaded items and factor loadings.

Table 12 Personal and social factors identified by exploratory factor analysis

Factor	Item	Factor loadings
Peer influence (F1)	Q15	.755
	Q16	.731
	Q17	.738
	Q18	.802
	Q19	.755
	Q20	.732
Exposure towards action movies (F2)	Q21	.874
	Q22	.873
	Q23	.521
	Q24	.838
	Q25	-.583
	Q26	.818
Parental guidance and monitoring (F3)	Q27	.513
	Q28	.558
	Q29	.808
	Q30	.800
	Q31	.822
Past crash experience (F4)	Q32	.841
	Q33	.774
	Q34	-.737
Enforcement of traffic law (F5)	Q35	-.633
	Q36	.750
	Q37	.525
Greater precaution after experiencing an accident (F6)	Q38	.698
	Q39	.768
Confidence after experiencing an accident (F7)	Q40	.613
	Q41	.730
	Q42	.557

3.4.1 Relationship between Risk-taking Behaviours and Personal or Social Factors

Multiple regression analysis was conducted to test if personal or social factors significantly predicted the risk-taking behaviours. Four separate analyses were conducted on the risk-taking behaviours using personal and social factors as predictive variables. It was found that peer influence significantly predicted all of the risk-taking behaviours found in the questionnaire items. On the other hand, enforcement of traffic law significantly predicted the tendencies to not using helmet and to ride without headlights on while parental guidance and monitoring significantly predicted the tendencies to ride without using signal. Other findings are summarised in Table 13.

Table 13 Results of multiple regression analysis using personal and social factors as predictive variables of the risk-taking behaviours

Factors	Riding over speed limit	Riding without crash helmet	Riding without using signal	Riding without headlights and not stopping at a three-way junction
Peer influence	0.536***	0.303***	-0.171***	0.193***
Exposure towards action movies	0.040	0.083	-0.010	0.108*
Parental guidance and monitoring	0.025	0.020	0.229***	-0.005
Past crash experience	0.132***	0.034	0.009	0.029
Enforcement of traffic law	0.057	0.100*	-0.049	0.141***
Greater precaution after experiencing an accident	-0.076*	-0.023	0.136***	-0.151***
Confidence after experiencing an accident	0.022	-0.022	0.130**	0.039
<i>F</i>	42.562	11.799	16.916	10.711
ΔR^2	0.356	0.125	0.175	0.114
Sig.	.000	.000	.000	.000

* - significant at $p < 0.05$

** - significant at $p < 0.01$

***- significant at $p < 0.001$

4.0 Discussion

In conclusion, the findings on risk-taking behaviours of motorcyclists in the Klang Valley can be summarised into five key points. These points are the vulnerability of young and inexperienced motorcyclists, effect of gender in risk-taking behaviours, the issue of speeding and use of helmet, the effectiveness of enforcement, and social factors affecting the likelihood of risk taking. Risk-taking behaviours are always associated with young and novice riders due to their lack of skills and experience. Pang *et al.* (2000) finds that injured motorcyclists on Malaysian roads are mostly young, novice riders who have only been licensed to ride for less than three years and they are mostly male riders. They are also reported to have a poor attitude towards traffic rules and speed limit (e.g., Norghani *et al.*, 1998; Chang *et al.*, 2007). In the current study, the most striking finding is that more than half of young riders aged 16–20 in the Klang Valley ride without license. They are also found to be more inclined to ride without using helmet. These results mirror the findings of previous studies regarding their poor attitude towards traffic rules and safety. More importantly, this study indicates that many young riders in the Klang Valley do not have proper training to ride a motorcycle.

In investigating the relationship between the demography of motorcyclists and risk-taking behaviours, the study found that male respondents have a higher tendency to be involved in the acts of “riding over speed limit” and “riding without crash helmet” as compared to their female counterparts. Recent works (Mohd Khairul and Mohd Faudzi, 2011; Chang and Yeh, 2007) have also found age and gender as significant factors in differentiating motorcyclists who are prone to accidents. For example, Mohd Khairul and Mohd Faudzi (2011) use an instrumented motorcycle to study the effectiveness of Malaysian rider training in improving the riding skills of learner motorcyclists. The researchers find that

female and older (≥ 25 years old) participants are less adept to hazard perception and responses compared to male participants.

The results of this study show that “riding over speed limit” and “riding without crash helmet” are among the identified risk-taking behaviours most likely to be committed by the respondents. In Malaysia, head injury is still the leading cause of motorcyclist fatalities; killing more than 2000 motorcyclists annually for the past six years (RMP, 2010). The issue on use of helmet is still apparent in Malaysia and a recent trend shows an increase in head injury associated deaths among Malaysian motorcyclists. The rate of helmet use is still unsatisfactory especially in the rural areas. For example, Kulantayan *et al.* (2001) report that compliance in rural areas is as low as 30%. As such, future road safety campaigns should be conducted with more emphasis on the importance of using helmet. Stricter enforcement of traffic law must be done to ensure that motorcyclists follow the rules.

Other interesting findings of this study are on the significance of peer influence, enforcement of traffic law, and parental guidance in affecting the likelihood of committing certain risk-taking behaviours. It is found that these personal and social factors can predict the risk-taking behaviours among the respondents. These findings can be exploited to plan more effective countermeasures and campaign for motorcyclists’ safety in the future. Future research should also look at other risk-taking behaviours including the use of mobile phone while riding a motorcycle, performing dangerous stunts while riding, and smoking while riding which are becoming more prevalent in Malaysia.

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Appendix I

Forty-two items (1–14 are risk-taking behaviours, 15–42 are personal and social factors)

- Q1 'When I ride on my motorcycle, I always stop at a stop sign.'
- Q2 'When I ride on my motorcycle, I used to overtake another vehicle in an area where overtaking is not allowed.'
- Q3 'I always ride my motorcycle over the speed limit.'
- Q4 'I always ride my motorcycle along a deserted road without using a crash helmet.'
- Q5 'I always ride my motorcycle without using a crash helmet in a residential area.'
- Q6 'I always take off my crash helmet while riding motorcycle before reaching my destination.'
- Q7 'When I ride on motorcycle, I like to ride fast (over the speed limit).'
- Q8 'I will ride fast on motorcycle even though I am not late for an appointment.'
- Q9 'I like to beat the 'traffic light' when I ride on my motorcycle.'
- Q10 'Sometimes I feel it is unnecessary to keep my motorcycle headlights on while I am driving in the daytime.'
- Q11 'Wearing a crash helmet while riding a motorcycle is uncomfortable.'
- Q12 'When riding on motorcycle, I do not have to stop at a three-way junction if there are no vehicles coming from the right and left directions.'
- Q13 'While riding on motorcycle, I will indicate/signal to other vehicles behind me before turning left or right.'
- Q14 'While riding on motorcycle, as I am overtaking or turning into a junction, I will indicate or signal to the other drivers and ensure that it is safe to do so.'

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Peer influence (F1)

- Q15 'If my peers influence me to ride over the speed limit, I will do it.'
- Q16 'Peer influence can make me break the rules.'
- Q17 'I will get involved in unofficial races with other riders when influenced by my friends.'
- Q18 'If I am challenged by my friends to break the rules, I will accept the challenge.'
- Q19 'If I am challenged by my friends to get involved in unofficial races with other riders, I will accept the challenge.'
- Q20 'When I ride on my motorcycle with my friend, I will ride fast.'

Exposure towards action movies (F2)

- Q21 'I like watching movies with race content.'
- Q22 'I enjoy watching movies with racing scenes.'
- Q23 'I enjoy seeing a dead body that happened because of a motorcycle accident in movies.'
- Q24 'My favourite scene in a movie is the motorcycle racing.'
- Q25 'I do not like to watch racing scene and motorcycle scene in the movies.'
- Q26 'I like to watch someone racing in the movies.'

Parental guidance and monitoring (F3)

- Q27 'My parents always knew where I was.'
- Q28 'My parents always knew who I was with when I am away from home.'
- Q29 'My parents always advise me on how to behave outside the home.'
- Q30 'I am always close to my parents.'
- Q31 'When I misbehave, my parents will advise me appropriately.'

Past crash experience (F4)

- Q32 'I have experienced a number of motorcycle accidents personally in the past.'
- Q33 'To be involved in a motorcycle accident is nothing new to me.'
- Q34 'I have never been involved in a motorcycle accident.'

Enforcement of traffic law (F5)

- Q35 'I think the police are very strict in enforcing the traffic law.'
- Q36 'Our police are not effective in enforcing the traffic law.'
- Q37 'The risk of punishment in violating traffic law is very low.'

Greater precaution after experiencing an accident (F6)

- Q38 'After getting involved in crash experience, I ride on my motorcycle more carefully.'
- Q39 'I will be careful and make sure that motorcycle accident won't happen to me again.'

Confidence after experiencing an accident (F7)

- Q40 'When I am wearing a helmet, I can avoid crash experience.'
- Q41 'I feel that my riding experience is adequate enough to avoid a motorcycle accident.'
- Q42 'An experienced motorcycle rider will not be involved in road accidents.'



Research Report



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