

Factors Associated with Motorcycle Risk Behavior in Thai University Students, Khon Kaen

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ABSTRACT

The aim of this research was to assess motorcycle risk behavior (MRB) among Thai students in Khon Kaen University. The research used a cross sectional study. Fifty Thai students recruited using purposive sample technique and the chi-square test was used to analyze relationship between characteristic associated with MRB. The most common MRB were making U-turn (38%), sometimes driving above the speed limit (36%), driving with more than two passenger (48%) and sometimes not wearing helmet (36%). The result showed that sex and riding history associated with MRB ($P_{sex} < 0.05$; $P_{riding\ history} < 0.05$). Sex and riding history were significantly associated with MRB. Improving knowledge is important to decrease risky motorcycle driving behavior. Additionally, the need to provide intervention programs, promotion, and awareness related to student's safety riding behavior could be recommended, from this information.

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1. INTRODUCTION

Road crashes are the main cause of mortality of young people age 15 – 23 years [1]. In Thailand, motorcycles are involved in 73% of road accident deaths [1]. Teenagers and young adults are especially at risk for road traffic accident due to risk behaviors and factors related to higher road traffic incident [2].

Road traffic accidents result in many fatalities and injuries in Southeast Asia. Thailand has the highest road traffic fatalities (36.2 per 100,000 population) compared with other countries that are 10.5 – 24.5 per 100,000 population [1]. Motorcycles are the most common form of transport in general, particularly in most low or middle income Asian countries [3]. Motorcycle registered in Thailand are 32,476,977, of which 19,169,418 are motorized 2 – 3 wheeled vehicles [1].

In their latest analysis of motorcycle crash statistics, the National Highway Traffic Safety Administration (NHTSA) reports that, although there were fewer motorcyclists killed in 2014 compared to 2013, there was a 5% increase in the number of injures during that period. Factors such as protective equipment may contribute to the reduction in deaths, but more detailed research is necessary to investigate factors that might be related to an upward trend in motorcyclist injury. The injury rate (per 100 million vehicle miles traveled) increased from 434 (in 2013) to 459 (in 2014). Various agencies continue to emphasize the need for investigation into crash causation and related elements, including roadway, vehicle, drivers, riders, and rider-related factors [4].

Risk factors for serious injury include the vulnerability of the rider's exposed situation, speed, limited driving experience, risk-taking behavior [5] and driving under the influence (DUI) of alcohol [6] also the risk factor depends on the rider age, sex, mileage, type of road, characteristics of the motorcycle and

exposure [7]. The modifiable factor of accident is error behavioral (difficulties of control associated with high speed, or errors in speed selection) [2].

Khon Kaen University have a more than thirty three thousand student every year. Located in urban areas cause many transportation passed through in this university. Previous surveys reveal that university student have several risk behavior that related to road traffic accident according to their characteristic consisted age, sex, grade of term, riding history, and frequency of motorcycle driving [8].

This survey was conducted in Khon Kaen University students, to asses their charateristic associated with motorcycle risk behavior (MRB). The aim of this study to determine the sociodemographic factor related to MRB.

2. RESEARCH METHOD

2.1. Study Design, Data Analysis, Setting, and Participants

The research was conducted a cross-sectional questionnaire of Thai students in Khon Kaen University. All respondent were recruited using a purposive-sampling technique. Quantitative data was analyzed using descriptive and inferential statistics. Descriptive statistic consisted of frequency to categorical variable, mean and standard deviation for continous variable. Participants were categorized as low, moderate, or high risk if their cumulative risk score was less than, within, or greater than one standard deviation of the mean, respectively. The chi-square test was used to investigate relationship between characteristic and motorcycle risk behavior (MRB). A p -value <0.05 was considered statistically significant. Microsof Excel 2013 was used for all statistical analysis.

The respondent of the research is fifty students in Khon Kaen University. The inclusion criteria were (a) undergraduate student, and (b) regular motorcycle driver. Participants were excluding from study if (a) they under the influence of alcohol and (b) they requested that their participation be terminated. The study was conducted in 22th November 2016 and took place in Khon Kaen University campus both KKU Complex and KKU Library.

A questionnaire was adopted from Cheng, Liu, & Tulliani [9]. Additionally, all respondent get the pilot test question. The questionnaire consisted of two parts. Part 1 captured the demographic and characteristic of respondent's consisted of (a) age, (b) sex, (c) grade of term, (d) pocket money, (e) ride history, (f) frequency of motorcycle drive, (g) motorcycle accident, (h) residence (i) their history accident during the previous year, and (j) hometown. Part 2 of the questionnaire consist of an 18-item scale were asked to indicate how often they committed each of the risk behavior, using 5-point Likert scale where scale 1 (Never) to 5 (Very Often). The internal consistencies (Cronbach's alpha) of these scales are range from .876 to .914 [10]. The score were reversed for negative question; therefore, highrisk behaviors yielded higher scores. Motocycle risk behavior devided into three risk level: L (Mean - 1SD), M (Mean \pm 1SD), and H (Mean + 1SD).

The entire respondent gave informed consent to participate voluntarily in the research. The respondent filled out the questionnaire with their present condition and signed it. If individuals did not understand the point of questionnaire, researcher gave them an oral explanation.

3. RESULTS AND ANALYSIS

3.1. Demographic Characteristic of Respondents

Fifty university students were included in the study; 62% were female, with a mean age of 19.64 years (SD: 0.92). There are 54% of students were in second year, 32% were studying the public health major, and 94% resided on campus with 82% have pocket money lower than 8,000THB/month. Seventy percent reported driving motorcycle every day and 60% had one or two accidents during the previous year. Table 1 summarise these descriptive characteristics.

Table 1. Demographic and Personal Characteristics of Thai University Student

Variable	n (%)
Age (years)	
15 – 19	25 (50.0)
20 – 24	25 (50.0)
Sex	
Female	31 (62.0)
Male	19 (38.0)
Grade term of student (year)	
1	17 (34.0)
2	27 (54.0)
3	5 (10.0)
4	1 (2.0)
Pocket Money per month (Baht)	
< 8,000	41 (82.0)
8,000 – 15,000	9 (18.0)
Riding history (year)	
≤ 3	17 (34.0)
4 – 5	16 (32.0)
≥ 6	17 (34.0)
Frequency of motorcycle driving (days per week)	
1 – 2	5 (10.0)
3 – 4	1 (2.0)
5 – 6	9 (18.0)
7	35 (70.0)
Hometown	
Khon Kaen	7 (14.0)
Mahasarakam	3 (6.0)
Roi Et	3 (6.0)
Udon Thani	6 (12.0)
Other	31(62.0)
Motorcycle accident during the - - previous year	
No	18 (36.0)
Yes	
1 - 2	30 (60.0)
>2	2 (4.00)
Living on campus	
Yes	47 (94.0)
No	3 (6.0)
Major	
Public Health	16 (32.0)
Nursing	9 (18.0)
Education	6 (12.0)
Pharmaceutical Sciences	4 (8.0)
Engineering	4 (8.0)
Other	11 (22.0)

3.2. Motorcycle Risk Behavior

Eighteen motorcycle risk behaviors (MRB) were identified from the sampling of the university students. Table 2 shows that the most common MRB were making U-turn (38%), sometimes driving above the speed limit (36%), driving with more than two passanger (48%) and sometimes not wearing helmet (36%).

Table 2. Frequency of Motorcycle Risk Behavior

MRB	Frequency of reported behaviors					Total n (%)
	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Very Often n (%)	
sounded your horn to show your annoyance to another road user (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	21 (42.0)	21 (42.0)	6 (12.0)	2 (4.0)	0 (0.0)	50 (100)
made an U-turn (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	1 (2.0)	8 (16.0)	12 (24.0)	19 (38.0)	10 (20.0)	50 (100)
driven above the speed limit in order not to be late for an appointment (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	11 (22.0)	13 (26.0)	18 (36.0)	7 (14.0)	1 (2.0)	50 (100)
driven as fast on a wet road surface as on a dry one (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	13 (26.0)	28 (56.0)	6 (12.0)	3 (6.0)	0 (0.0)	50 (100)
driven through an amber light when it was about to turn red (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	9 (18.0)	27 (54.0)	10 (20.0)	4 (8.0)	0 (0.0)	50 (100)
imitated the postures and movements used in a motorcycle race while driving on the public road, such as touching the ground with a knee when turning (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	46 (92.0)	2 (4.0)	2 (4.0)	0 (0.0)	0 (0.0)	50 (100)
driven too close to the car in front (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	14 (28.0)	21 (42.0)	12 (24.0)	3 (6.0)	0 (0.0)	50 (100)
driven the wrong way down a street (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	18 (36.0)	26 (52.0)	5 (10.0)	0 (0.0)	1 (2.0)	50 (100)
crossed double yellow lines to overtake on a sharp bend (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	16 (32.0)	25 (50.0)	8 (16.0)	1 (2.0)	0 (0.0)	50 (100)
participated in unofficial races (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	46 (92.0)	4 (8.0)	0 (0.0)	0 (0.0)	0 (0.0)	50 (100)
given chase to another driver who angered you (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	42 (84.0)	8 (16.0)	0 (0.0)	0 (0.0)	0 (0.0)	50 (100)
crossed double yellow lines to overtake even though there were vehicles approaching in the opposite lane a short distance away (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	31 (62.0)	14 (28.0)	5 (10.0)	0 (0.0)	0 (0.0)	50 (100)
driven on the pavement when caught in a traffic jam (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	36 (72.0)	13 (26.0)	1 (2.0)	0 (0.0)	0 (0.0)	50 (100)
exceeded the speed limit in an urban road (by >20 km/h) (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	21 (42.0)	13 (26.0)	9 (18.0)	7 (14.0)	0 (0.0)	50 (100)
go through red light (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	25 (50.0)	22 (44.0)	3 (6.0)	0 (0.0)	0 (0.0)	50 (100)
driven after drinking alcohol (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	36 (72.0)	10 (20.0)	3 (6.0)	1 (2.0)	0 (0.0)	50 (100)
driven with more than two passenger (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	6 (12.0)	24 (48.0)	17 (34.0)	3 (6.0)	0 (0.0)	50 (100)
driven without wearing a helmet (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Very often = 5)	5 (10.0)	9 (18.0)	18 (36.0)	11 (22.0)	7 (14.0)	50 (100)

3.3. Factor associated with driving risk behavior

Motorcycle risk behavior (MRB) among participants was significantly associated with personal characteristic (sex) and one enabling factor (riding history). Male university student had significantly different MRB from their female peers ($p = 0.029$). More male (10%) engaged in high levels of MRB than female (2%), ($p < 0.05$). MRB also differed by riding history ($p = 0.01$). Those with ≥ 6 years of riding history (8%) engaged in high levels of MRB than those with 4 until 5 years (2%) and those with ≤ 3 years riding history (2%) ($p < 0.05$). Table 3 shows that MRB did not differ by grade of term, pocket money, frequency of driving, motorcycle accident during the previous year, and residence.

Table 3. Association between Personal Characteristics and MRB among Thai University Student

Variable	MRB relative risk level			Total n (%)	p - value
	Low n (%)	Moderate n (%)	High n (%)		
Age (years)					
15 – 19	3 (6.0)	20 (40.0)	2 (4.0)	25 (50.0)	0.590
20 – 24	4 (8.0)	17 (34.0)	4 (8.0)	25 (50.0)	
Sex					
Female	6 (12.0)	24 (48.0)	1 (2.0)	31 (50.0)	0.029*
Male	1 (2.0)	13 (26.0)	5 (10.0)	19 (50.0)	
Grade of term (years)					
1	1 (2.0)	14 (28.0)	2 (4.0)	17 (34.0)	0.922
2	5 (10.0)	18 (36.0)	4 (8.0)	27 (54.0)	
3	1 (2.0)	4 (8.0)	0 (0.0)	5 (10.0)	
4	0 (0.0)	1 (2.0)	0 (0.0)	1 (2.0)	
Pocket Money per month (Baht)					
< 8.000	6 (12.0)	30 (60.0)	5 (10.0)	41 (82.0)	0.954
8.000 – 15.000	1 (2.0)	7 (14.0)	1 (2.0)	9 (18.0)	
Riding history (year)					
≤ 3	6 (12.0)	10 (20.0)	1 (2.0)	17 (34.0)	0.0122*
4 – 5	0 (0.0)	15 (30.0)	1 (2.0)	16 (32.0)	
≥ 6	1 (2.0)	12 (24.0)	4 (8.0)	17 (34.0)	
Frequency of motorcycle driving (days per week)					
1 – 2	1 (2.0)	4 (8.0)	0 (0.0)	5 (10.0)	0.910
3 – 4	0 (0.0)	1 (2.0)	0 (0.0)	1 (2.0)	
5 – 6	2 (4.0)	5 (10.0)	2 (4.0)	9 (18.0)	
7	4 (8.0)	27 (54.0)	4 (8.0)	35 (70.0)	
Motorcycle accident during the - previous year					
No	5 (10.0)	13 (26.0)	0 (0.0)	18 (36.0)	0.089
Yes					
1-2	4 (8.0)	22 (44.0)	6 (12.0)	30 (60.0)	
>2	0 (0.0)	2 (8.0)	0 (0.0)	2 (8.0)	
Residence					
On campus	7 (14.0)	34 (68.0)	6 (12.0)	47 (94.0)	0.843
Off campus	0 (0.0)	3 (6.0)	0 (0.0)	3 (6.0)	

4. DISCUSSION

Our result showed MRB associated with risk level differed by sex and driving history. A sex difference is well described in the literature from Tay [11] and Cathcart & Glendon [12]. They show that male are more high risk in motorcycle driving behavior related with male behavior, which consists of speeding and drinking while driving motorcycle. DeJoy, studied an examination of gender differences in traffic accident found male driver are more likely to get into crashes than females [13]. Brandau and colleagues, studied the personality of young moped drivers in Austria and found female moped driver have a lower risk of having an injury [14].

Driving history was associated with MRB. The other studied by Mullin and colleagues, found increasing years of regular motorcycle reduce the risk of moderate to fatal injury [15]. Lin and colleagues, studied risk factors for motorcycle crashes from Taiwan and found operating experience had a lower risk of being involved in crash [16]. Additionally, accident involvement tended to decrease with increase experience [7]. Contrary to other studies, in this study university student had a more than 6 years history riding experience engaged in high level of relative risk, but it is unclear, if their risk injury and accident also increase.

The most common behavior of MRB was: made a U-turn, driven above the speed limit, driven more than two passengers, and driven without wearing a helmet. Made a U-turn (38%) are often in our study. The past studies reveal that safety at the U-turn which is influenced by the condition of uses deceleration lanes.

Particularly speed and maneuver, improper uses speed and maneuver increases the severity of the impact of a collision [17] and type of U-turn with median contribute to road traffic accident [18].

Driving above the speed limit (36%) is sometimes in MRB. Speeding had associated with risk of crashes [5][16]. Studied by Bjørnskau and colleagues, found that speeding are contributing to road traffic attitude [19]. Williams and colleagues, research studied that crash/ near-crash risk for motorcyclists are (1) riding maneuver (going straight, negotiating a curve, turning), (2) riding behaviour (exceeding speed limit, stop sign violation, illegal passing, failed to signal), (3) group riding, (4) passengers and (5) environmental (lighting, weather) [20].

Thirty-six percent of participants did not wear a helmet when driving. Number of days using helmet are positive association with risk of crashing [16]. In Malaysia, Ramli & Oxley, showed that motorcyclists with poorly fixed helmet were five and four times as likely to sustain head and severe head injuries compared to those with firmly fixed helmets [21]. The other studied by Ratanavara & Jomnonkwo, reveal that adult age group (more than 18 years) have a high percentage (54.57%) of use helmet better than other age group [22]. However, gender, age, frequency of riding were statistically significant predictor of helmet compliance and awareness of helmet law enforcement was found to be the contributing factor influencing the use of motorcycle helmets in Thailand [23].

Driving with more than two passenger was done rarely in 48% of participants. Peer passenger are associated on increase in risky driving behavior such as distracting the riders [24] and effect some problem include losing balance [8]. The other study by Moskal and colleagues, found that moped driver and motorcyclist involved in an accident while carrying a passenger [25].

5. CONCLUSION

This study shows that sex and riding history was significantly associated with motorcycle risk behavior (MRB). The most four common unsafe behavior of riding motorcycle in Thai student are risk factor of crashes. Nevertheless, improving knowledge is important factors to decrease risky motorcycle driving behavior. Additionally, the need to provide intervention programs, promotion, and awareness related to student safety riding behavior could be recommended, from this information.

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