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Research Paper

Foreign Tourist Behavior and Perception of Motorcycle Accident Risk in Chiang Mai, Thailand

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ABSTRACT

Motorcyclists are one of the most vulnerable road user groups in developing world, especially Thailand. Due to its propensity to threats during traveling, tourism industry has some reservations on its quality and adequacy for travel. More specifically, traveling with motorcycles in unfamiliar route has been found to be a major risk for all motorcyclists. Thus, this study aimed to explore relationship this risk poses to the foreign tourists with respect to socio-economic, knowledge and perceptions of those motorcyclists, by conducting the site investigation together with a questionnaire survey. A total of 400 samplings of foreign tourists in Chiang Mai, Thailand was analyzed by applying logistic regression based on binary model. This research found the important factors influencing this risk behavior relatively in high proportional order as follows; 1) understanding of the traffic regulations and 2) possession of adequate and valid travel insurance. Therefore, safety knowledge training especially as it relates to traffic regulation for accident prevention could play a key role in prevention of motorcycle-related injuries and fatalities. This promising intervention in highly recommended in environments where road safety measures, particularly enforcement activities, are commonly limited.

1. Introduction

Currently, the number of deaths occasioned by road accidents in Thailand decreased to the 9th in the world, indicating an improvement on road safety. Going back to three years ago (2015 -2017), Thailand had an average of 24,326 deaths per year (ranked the 2nd in the world). Unfortunately, the number of deaths from Thai motorcyclists has been statistical showed to remain high with an average of 74 percent (World Health Organization, 2018a); contributing to causes of deaths recorded in road accidents. The mortality rate and accident rate are oftentimes found low and middle-income countries. While the death rate in the low-income group increased to 27 countries, middle-income group increased by 60 countries, and high-income countries by more than 17 percent (World Health Organization. 2018b). However, major vulnerable group are the vehicle's 2-3 wheels and pedestrians. For Thailand, tourism has been considered as major industry that generates a major income for the country. In 2017 for an instance, 35,381,210 foreign tourists traveled to Thailand, with a whopping 8.77 percent increase compared to previous year. As a result of this, the country was able to generate tourism revenue of approximately 1,824,042 million baht in 2018. Although the projection was that foreign tourists would be able to

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generate as much as 2 trillion baht in 2017 (Ministry of Tourism and Sports, 2017a).

However, vulnerability to threats especially when travelling on the road has continued to be a challenge to the tourism industry. For the purpose of this study, road safety in the main tourist attraction city, Chiang Mai province is the case study. This popular province amongst foreign tourists has the capacity to attract about 2.9 million people and generate income amounting to over 37.7 million baht for the country (Ministry of Tourism and Sports, 2017b). From the statistics of road accidents throughout the year 2017, there were 15, 256 deaths, 1,002,193 injuries in Chiang Mai with the most deaths ranking as presented in **Fig. 1**. Particularly, the number of injured people is ranked the 4th out of 77 provinces (Thai road safety collaboration: Thai RSC, 2017). Considering the accident statistics of foreign tourists in Chiang Mai, it was found that 7% of foreign tourists died in accidents and 9% got injured. Most of them were motorcycle riders, and 82% of the deaths were caused the by drinking and driving, speeding, not wearing seat belts and un-wearing helmet. These observed factors are found to be important variables creating security risks on the road crashes.

Therefore, this research aimed to study the relationship between socioeconomic status (SES), risk behaviors and attitude of foreign tourists in motorcycle accident by selecting Chiang Mai, Thailand as a case study. After which a final recommendation for road safety planning for the use of rental motorcycles for foreigners can be proposed.

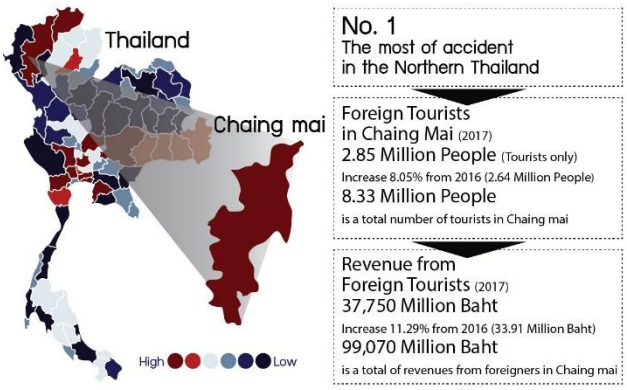

Fig. 1. Road safety situation in Chiang Mai, Thailand.
Source: Thairsc, 2019.

2. Literature review

Motorcycle riders have an increased likelihood of being involved in an accident compared with other motor vehicle drivers (Mannering & Grodsky, 1995; Plase`ncia et al., 1995). Therefore, to gain a better understanding of motorcycle riding behaviors, it is important to extend the focus of this research to the risk behavior of motorcyclists. The objective of this study is to study the relationship between socioeconomic status (SES) influence on behavioral factors of motorcyclists with respect to its risk inherent on foreign tourists, so as to identify the most vulnerable group of motorcyclists. Furthermore, the vulnerable group of motorcyclists has been identified based on their distinct personality combinations; which informed the propose road safety recommendation on risk planning, for appropriate usage of motorcycles rental for foreign tourists made in this research.

2.1 Road safety on motorcycle

Motorcycle riders are among vulnerable groups as far as road accidents is concerned (Peden et al., 2004) and it happened to be the most popular means of transportation in Southeast Asia. However, road traffic injuries, especially those emanating from motorcycles as means of transportation are mostly recorded in Thailand. Statistics showed that the number of deaths from Thai motorcycles is relatively high in ranking. Consequently, it was found that out of the deaths from road accidents 74 percent was caused by motorcycles. Use of motorcycle as means of transportation consistently led to the increase of road traffic injuries in Thai roads. Just like other motor vehicles, motorized of two-wheelers and three-wheelers also caused injuries to other road users as noted in their collisions with buses, cars and pedestrians. Motorcycles are 9.3 times more possibilities of causing road accidents than any other transportation means (Horswill and Helman, 2003; Naghavi et al., 2004). Similarly, the number of injured or killed in the cause of motorcycle and bicycle rides across many countries of the world is rapidly on the rise (Mangus et al., 2004). Therefore, more studies are suggested to be conducted in order to understand more vividly the effects of behaviors to this, and proffer preventive measures in terms of recommendation to reduce the risk of road accidents in life of this vulnerable group.

2.2 Risk behavior of motorcyclists

Road traffic accidents is currently among the most critical public health issues (Azetsop, 2010; Zamani-Alavijeh et al., 2009). These traffic accidents are usually caused by multiple factors: human, vehicle and environment (Haddon, 1972; Hijar et al., 2000; Lin and Kraus, 2009; Stella, Cooke and Spivulis, 2002). It has been observed that human agent is the main cause of accidents; contributing to 60% (Evans, L., 1996) especially the drivers' behavior which was rightly expressed with regards to the risk-taking behaviour of motorcyclists (Bellaby and Lawrenson, 2001; Clarke, Ward, Bartle &

Truman, 2007; Mullin, Jackson, Langley, & Norton, 2000; Rutter and Quine, 1996; Watson, Tunnicliff, White, Schonfeld & Wishart, 2007). This causal relationship between traveling behavior and attitudes is somewhat contentious though (Hendersen, 1991). Therefore, careful examination of this undeniable role of humans in the chain of events will definitely lead to exploration of the causes of the accident, and subsequent identification of relationships co-existing amongst these causative factors could be a valuable action in traffic safety (Shappell and Wiegmann, 2012).

2.3 Accident prevention

The prevention of road safety can be regarded as programs put in place to prevent or minimize risks or injuries from road crashes. These could be education or communication based, enforcement based, or engineering based simply to reduce the number of incidents during traveling. However, the focus on human factors is commonly aimed to enhance road users' safety through vehicle control skills, knowledge, attitudes, behaviors and perceptual skills (CARRS-Q final report, 2012).

3. Method of analysis

3.1 Study design

A research method was considered on casual factors of road accident by excluding vehicles, road and environment factors since the objective of the study was to perform explorative study among behaviors and attitudes of foreign tourists. Data was collected through individual motorcyclists with questionnaires survey. The questionnaires made it possible for more gainful insight about the socio-economic and risk behaviors of foreign tourists. Framework of analysis can be explained as shown in **Fig 2.**

3.2 Sample size

The sample size of this study comprised of 400 foreign tourists from Chiang Mai, Thailand with accidentally sampling. It was conducted through face to face interview survey of foreign tourists with a total population of 2,902,139 persons in 2016 (Chiang Mai Provincial Statistical Office, 2017). The sampling error was defined to be 0.01% (Yamane, T., 1973), and the minimum number of sample groups received was 400 samples.

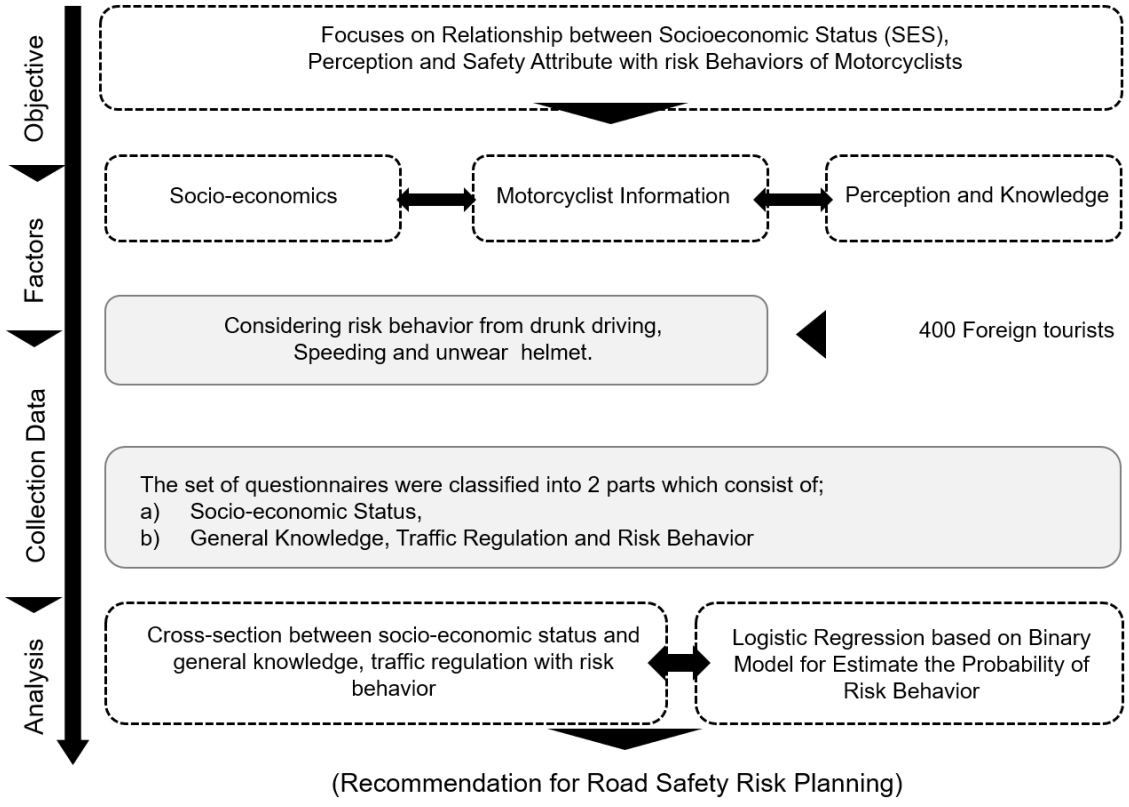

Fig. 2. Framework of study

A purposive sampling technique was adopted in this study by focusing only on foreign tourists who rented motorcycle for traveling in Chiang Mai (Dahlgren et al., 2007).

3.3 Data collection

This study applied the extended version of the questionnaires was used to measure risky driving behaviors of foreign tourists. The questionnaires were self-completed and the interviewers were able to clarify arising questions. The data collection was conducted both daytime and nighttime from 08.00 AM. – 10.00 PM. for 2 months between November to December 2017 since it was the most convenient and comfortable time and nice season for tourism in order to achieve sufficient number of respondents in Chiang Mai. It sought to obtain motorcyclists' opinions, socioeconomic status, experiences, and behaviors with regards to riding motorcycles, experience and level of satisfaction on motorcycle usage, as well as measures to improve current road safety problems. The questionnaires consisted of two parts. Part 1 were general information which attempts to assess the personal characteristics of foreign tourists on the basis of their socio-economic status and motorcyclists' information. Part 2 were general knowledge and risk behavior including details about behavior of motorcyclists as well as traffic regulations, safety measures and experiences of safety issues.

3.4 Measurement and analysis

This study designed the content of analysis comprising of contributory factors which can be classified into 3 parts as follows (**Table 1**):

- *Socio-economic*: Socio-economic variables, such as family socioeconomic status (SES) and family structure are known as contributing factors toward risk behaviors (Alamian, and Paradis, 2012; Ottova and Ravens-Sieberer, 2010). These socio-economic questions consist of 7 items as follows: gender (female and male), age (15-20 years, 20-25 years, 25-40 years, 40-60 years, >60 years), education (high school, technical college, bachelor's degree, master's degree, others), occupation (unemployed, government/state, business owner, company's employee, university student/staff, housewife, retirees and others), marital status (single, married, divorced, others), income (USD/month)(less than 500, 501-1,000, 1,001-2,000, 2,001-3,000, more than 30,000 and others), and possessing of international driving license.
- *Knowledge and perception about road safety*: The knowledge and perception questions consist of 4 items which includes: skill of riding the motorcycle, understanding about traffic accident risk in Thailand, understanding about traffic regulations (yes, it is must be the same as my country, no, I don't care, just want to enjoy traveling, no, I have no information before, no, I don't understand but I want to get more information, yes, I have known about Thailand traffic law and regulation), travel insurance for this trip (no, it is not necessary, the accident will not occur, no, it is over travel budget, no, it must be covered by the existing personal health insurance in possession, no, I have no problem for the medical service expenditure, yes, I bought before coming to Thailand by myself, yes, I bought after coming to Thailand, yes, it was included in the rental or tour package).
- *Risk behavior*: The risk behavior was classified into two groups: 1) risk group and 2) non-risk group. Different questions were employed to classify risk behavior which consisted of 9 items, as follows: experienced on traffic accident from motorcycle rental, speed limit in urban area, blood alcohol limit, helmet usage.

The statistical analysis was conducted to understand the most vulnerable group of motorcyclists by applying logistic regression based on binary model. Binary logistic regression estimates the probability when dependent characteristic is presented (e.g. estimate probability of "success") (Pennstate Eberly college of science, 2018).

Table 1. The factors for measurement and analysis.

Factor	Detail	References
Socio-economic status (SES)	Gender, Education, Occupation, Status, Income	Alamian and Paradis, 2012; Ottova and Ravens-Sieberer, 2010
Knowledge and perception about road safety	1) Understanding about situation of traffic accident risk 2) Understanding about traffic regulations travel 3) Insurance for this trip	Watson et al., 2007
Risk behavior	1) Speed limit in urban area 2) Blood alcohol limit 3) Helmet usage 4) International driving license 5) Skill of riding the motorcycle	Shankar and Varghese, 2006; Elliott, Sexton and Keating, 2003; Johnston et al., 2008; Haworth et al., 1997; Reeder et al., 1997

To estimate the probability of factors that affect the risk behavior, the input data of socio-economic status, knowledge, perception and general information of motorcyclists were used. The results of analysis was explained in the next section.

4. Results of analysis

Chiang Mai is a province with high road safety risk as a result of death rate emanating from road accidents; averaging 29.89 people per 100,000 population (Department of Disease Control, 2016). In addition to this, its a province located on the main road of the national highway and rural highway where accidents frequently occur, prompting the high ranking of the 9th in Thailand (Accident Prevention and Action Plan by the Office of Transport and Traffic Policy and Planning, 2017). More so, being the province with the highest rate of traffic violations in the northern region observed to be above national average, reflects the critical situation level of road safety in Chiang Mai and need to conduct this study. Based on this, Chiang Mai province is regarded as an area prone to accident risk from the threat related to travel quality problems. Based on results from collected data which was analyzed among independent components of social, economic, risky behavior of driving as well as preparing for traveling in Thailand, important cycle of road safety failures was highlighted. The situation has led to the risk of the unsafe travel amongst foreign tourists in the rental of motorcycles. All of which are the result of problem of road safety system involving several stakeholders, e.g. tourists, entrepreneurs and the public sector.

4.1 Data collection of motorcyclists in Chiang Mai

The 400 samplings used in this study were gathered and entered into the study using cross-sectional analysis between skill of riding the motorcycle and socio-economic as well as personal characteristics. These variables can be influenced by the increase in riding experience (Knight, P. J. and Harris M. F., 2012). The descriptive of data sets shown in **Table 2** are almost of equally sampling i.e. 57.3% of female and 41.5% of male. Most of the age of foreign tourists is 25-40 years (38.8%), followed by 20-25 years (33.6%) and 40-60 years (17.8%) respectively. For educational factors, it was found that most of respondents are educated up to bachelor's degree level (36.9%), followed by technical college (30.6%), respectively. Considering the occupational factors, it was found that most foreign tourists traveling to Chiang Mai province were university students / staff (23.8%), followed by company's employee (22.8%) and business owner (21.3%), respectively. In terms of average income per month, it was found the majority group of level of income is within the range of approximately 1,001-2,000 dollars per month (37.3%), followed by 2,001-3,000 dollars per month (19%) and 501 -1,000 dollar per month (13.5%), respectively. It also showed that most foreign tourists did not have their driver's license (52.8%). In terms of attitude and risk perception factors, it was found that 35% of tourists perceived the road risk situation in Chiang Mai while only 24.3 % said they are not aware of the road risk situation. However, tourists do not understand the traffic laws and the clear safety driving of motorcyclists in Thailand. More than 27% of tourists understand that traffic laws in Thailand are similar to their domestic traffic laws.

Followed by 22.8%, who do not understand the law and are not interested in understanding traffic laws because they think that is not important and only 14.1% understands the traffic laws for motorcyclists. More surprisingly, there are 42.9% with no skills of motorcycle riding reflecting the implications of the risk of quality travel in Chiang Mai. In terms of travel insurance, 64.8% have purchased insurance before traveling to Thailand, which is a good sign for travel preparation. For risk behaviors, about 47.49% of sampling reported that they do not ride a motorcycle without using a helmet, 26.82% ride over the speed limit, and 15.64% ever drunk driving.

4.2 Risk analysis

From **Table 3**, the estimation of the probability of associated factors that affect the risk behavior was clearly demonstrated. This study leveraged on input data of socio-economic status, knowledge, perception and general information of motorcyclists in considering the relationship between socio-economic, traffic knowledge, risk perception and riding behaviors among foreign tourist groups. The independent variable data for analysis was set using the criteria of Burns and Grove (1993) to explore the relationship of the independent variables which must not be related or have multicollinearity. The relationship value should not be more than 0.65 and the analysis was shown in **Table 3**.

Applying the variables into the model for analysis, the imported variables consists of independent variables: socio-economic and perception and safety attitude, while the dependent variable is the risk behaviors classified into two groups: 1) risk group and 2) non-risk group. Different questions were employed to classify risk behavior which consisted of 9 items, as follows: experienced on traffic accident from motorcycle rental, speed limit in urban area, blood alcohol limit, helmet usage. It was found that social and economic factors in this study were not statistically significant to the possibility of risky behavior of motorcyclists for tourism in Chiang Mai.

Table 2. The characteristics of socio-economic

Variable	Skill of riding the motorcycle, N (%)		p-value
	no	yes	
Socio-economic			
Gender (Missing data=5)			0.324
Female	103 (25.8%)	126 (31.5%)	
Male	67 (16.8%)	99(24.8%)	
Age (Missing data=2)			0.440
15-20 years	6 (1.5%)	12 (3.0%)	
20-25 years	57 (14.3%)	77 (19.3%)	
25-40 years	73 (18.3%)	82 (20.5%)	
40-60 years	27 (6.8%)	44 (11.0%)	
>60 years	8 (2.0%)	12 (3.0%)	
Education (Missing data=8)			0.013
High school	46 (11.5%)	40 (10.0%)	
Technical college	59 (14.8%)	63 (15.8%)	
Bachelor's degree	55 (13.8%)	92 (23.1%)	
Master's degree	6 (1.5%)	25 (6.3%)	
Others	2 (0.5%)	3 (0.8%)	
Miss data	3 (0.8%)	5 (1.3%)	
Occupation (Missing data=4)			0.017
Unemployed	13 (3.3%)	14 (3.5%)	
Government/state	18 (4.5%)	28 (7.0%)	
Business owner	27 (6.8%)	58 (14.5%)	
Company's employee	49 (12.3%)	42 (10.5%)	
University student/staff	35 (8.8%)	60 (15.0%)	
Housewife	12 (3.0%)	6 (1.5%)	
Retired	12 (3.0%)	12 (3.0%)	
Others	5 (1.3%)	5 (1.3%)	
Status (Missing data=13)			0.751
Single	102 (25.5%)	125 (31.3%)	
Married	61 (15.3%)	90 (22.5%)	
Divorce	3 (0.8%)	6 (1.5%)	
Other	5 (1.3%)	8 (2.0%)	
Income (USD/month) (Missing data=14)			0.045
Less than 500	4 (1.0%)	2 (0.5%)	
501-1,000	24 (6.0%)	30 (7.5%)	
1,001-2,000	70 (17.5%)	79 (19.8%)	
2,001-3,000	52 (13.0%)	78 (6.0%)	
More than 30,000	14 (3.5%)	24 (0.8%)	
Other	6 (1.5%)	3 (3.3%)	
International driving license			0.000
No	110 (27.5%)	101 (25.3%)	
Yes	61 (15.3%)	128 (32.0%)	
Knowledge and perception about road safety (Missing data= 81)			
Understanding about traffic accident risk in Thailand			0.000
Don't know	45(11.3%)	53(13.0%)	
Know	29(7.3%)	113(28.3%)	
Understanding about traffic regulations			0.090
Yes, It is must be the same as my country	52(13.0%)	56(14.0%%)	
No, I don't care, just want to enjoy traveling	43(10.8%)	50(12.5%)	
No, I have no information before	36(9.0%)	53(13.3%)	
No, I don't understand but I want to get more information	25(6.3%)	29(7.3%)	
Yes, I have known about Thailand traffic law and regulation	15(3.8%)	41(10.3%)	
Travel insurance for this trip			0.000
No, It is not necessary, the accident will not happen	6(1.5%)	20(5.0%)	
No, it is over travel budget	5(1.3%)	34(8.5%)	
No, it must be covered by the existing personal health insurance in possession	5(1.3%)	13(3.3%)	

Note: n=400.

Remarks: no= Have no skill of riding the motorcycle, yes= Have skill of riding the motorcycle

Table 2. The characteristics of socio-economic (continue)

Variable	Skill of riding the motorcycle, N (%)		p-value
	no	yes	
Travel insurance for this trip			0.000
No, it is not necessary, the accident will not happen	6(1.5%)	20(5.0%)	
No, it is over travel budget	5(1.3%)	34(8.5%)	
No, it must be covered by the existing personal health insurance in possession	5(1.3%)	13(3.3%)	
No, I have no problem for the medical service expenditure	12(3.0%)	20(5.0%)	
Yes, I bought before coming to Thailand by myself	141(35.3%)	118(29.5%)	
Yes, I bought after coming to Thailand	1(0.3%)	6(1.5%)	
Yes, it was included in the rental or tour package	1(0.3%)	18(4.5%)	
Risk behavior (Missing data = 6)			
Driving regulation (alcohol limit, speed over limit and wearing helmet)			0.000
No	140(36.5%)	170(44.3%)	
Yes	16(4.2%)	58(15.1%)	

Note: n=400.

Remarks: no= Have no skill of riding the motorcycle, yes= Have skill of riding the motorcycle

Table 3. Results of the relationship of the independent variables

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
A1	1.000	-.153**	.017	.182**	-.045	.010	-.206**	.023	-.031	.020	-.009	-.083
A2		1.000	.204**	-.052	.390**	.542**	-.041	-.009	.036	.067	.052	.053
A3			1.000	-.021	.326**	.265**	.277**	-.175**	-.008	-.131**	.151**	-.050
A4				1.000	-.033	.007	.036	.046	-.058	-.012	-.057	.043
A5					1.000	.432**	.015	-.094	-.027	.057	.030	.113*
A6						1.000	-.105*	-.053	.109*	.075	.133**	.042
A7							1.000	.019	.001	-.163**	-.003	-.038
A8								1.000	.180**	-.005	-.108*	.149**
A9									1.000	.116*	.152**	.172**
A10										1.000	.340**	.250**
A11											1.000	.049
A12												1.000

Remark=**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

A1=Gender, A2=Age, A3=Education, A4=Occupation, A5=Income (USD/month), A6=Marital status, A7=Possess international driving license, A8=Skill of riding the motorcycle, A9=Know about traffic accident risk in Thailand, A10=Obtain any information about road safety situation in Chiangmai, A11=Understand about traffic regulations, A12=Travel insurance for this trip.

However, from the analysis, it was found that perception and safety attitude factors had a statistically significant correlation with the occurrence of risk behavior for motorcycle rental. The analysis was shown in **Table 4.**

- Perception and safety attitude: The perception and safety attitude questions consist of 4 items which includes: skill of riding the motorcycle, understanding of traffic accident risk in Thailand, understanding of traffic regulations and travel insurance for this trip. It was found that two variables were statistically significant in this analysis. The safety information listed in Table 4 indicated that the understanding of traffic regulations is an important factor on the risk behavior due to its relatively high proportion of probability. Tourists who understands traffic laws which is similar to their countries (OR=0.242, 95% CI=0.075, 0.783) and don't understand but require to get more information (OR=0.220, 95%CI=0.051,0.953) have a greater probability of risk behavior than tourists who have understanding about Thailand traffic law and regulation. For the travel insurance for trip, it was found that the foreign tourists who prepared before visiting Thailand have a greater probability of motorcycle rental behavior risk (OR=0.213, 95% CI=0.064, 0.703).
- Risk travel behavior: In addition to consideration on skill of riding of the motorcycle of **Table 1**, 42.9% has no skills of riding the motorcycle which reflects the risk on this group.

Table 4. The estimation of the probability to factors that affect the risk behavior

Variable	Risk behavior		
	Sig.	Exp(B)	95% CI
Understanding about traffic regulations			
Yes, it is must be the same as my country	0.018	0.242*	[0.075, 0.783]
No, I don't care, just want to enjoy traveling	0.286	0.513	[0.150, 1.749]
No, I have no information before	0.839	0.894	[0.305, 2.621]
No, I don't understand but I want to get more information	0.043	0.220*	[0.051, 0.953]
Yes, I have known about Thailand traffic law and regulation	0.022		
Travel insurance for trip			
No, it is not necessary, the accident will not happen	0.323	0.493	[0.121, 2.002]
No, it is over travel budget	0.731	1.270	[0.325, 4.962]
No, it must be covered by the existing personal health insurance in possession	0.351	0.473	[0.098, 2.285]
No, I have no problem for the medical service expenditure	0.629	0.708	[0.174, 2.874]
Yes, I bought before coming to Thailand by myself	0.011	0.213*	[0.064, 0.703]
Yes, I bought after coming to Thailand	0.506	0.527	[0.080, 0.703]
Yes, it was included in the rental or tour package	0.004		
Constant	0.625	0.116	-

Remark *=The level of significance was set at $p < .05$ for the analyses, The number of cases=400, Missing data=18, Hosmer and Lemeshow Test with sig of 0.565.

A similar view showing that skillful riders can avoid road crashes has been reported by motorcyclists in other studies (Musselwhite et al., 2012; Harré N, Foster, S. and O'Neill M, 2005; Bellaby and Lawrenson, 2001). On considering the overall situation, it was found that the most influential factors affecting the risk behavior were 1) understanding about traffic regulations and 2) travel insurance for trip. Hence, this result reflects the basic travel behavior that may likely lead to a reduction in the risk of road accidents. Besides, the data from this analysis revealed that the possession of an international driving license, perception of road safety situations, obtaining information about the laws and regulations of motorcycles safety, including insurance would be essential for safety.

5. Conclusions

Although risk on motorcycle usage can be influenced by several factors (e.g. socio-economic, knowledge and perception of foreign tourists), the analysis of associated factor on risk behavior of motorcycle rental using logistic regression revealed that; 1) understanding of traffic regulations and 2) travel insurance for trip played a key role. Above factors have statistically significant impact on risky behavior of motorcyclists, whether they are drunk, over speeding, or not wearing a helmet. Furthermore, more than half of the respondents (80.8%) were risk groups by not follow the rules or regulation for safe driving. Particularly, this reckless group are lack of motorcycle driving skill (36.5%), thus they have no basic controlling skills and no good judgment on their wheels while traveling in any environment. The principles of a safe road system are important measures as the mistakes that could be caused by riders or traveler in the transportation system are inevitable. However, when they occur there should be system that can help to reduce the risk of serious injuries and deaths. Therefore, there should be a proactive management effort on elements that affects road accidents or road accident losses as a way of reducing the severity of accidents.

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7. References

Alamian, A. and Paradis, G. (2012). Individual and social determinants of multiple chronic disease behavioral risk factors among youth. BMC Public Health, 12:224.

Azetsop, J. (2010). Social justice approach to road safety in Kenya: addressing the uneven distribution of road traffic injuries and deaths across population groups. Public health ethics, 3(2):115–27.

Bellaby, P. and Lawrenson, D. (2001). Approaches to the risk of riding motorcycles: reflections on the problem of reconciling statistical risk assessment and motorcyclists' own reasons for riding. The Sociological Review, 49 (3): 368-388. Doi 10.1111/1467-954X.00337.

Burns, N. and Grove, S.K. (1993). The practice of nursing research: conduct, Critique and utilization. W.B. Saunders Company, Philadelphia.

Chiang Mai Provincial Statistical Office. (2017). Number of foreign tourists 2016. Retrieved from http://chiangmai.nso.go.th/

Clarke, D. D., Ward, P., Bartle, C., & Truman, W. (2007). The role of motorcyclist and other driver behaviour in two types of serious accident in the UK. Accident analysis and Prevention, 39: 974-981.

Department of disease control. (2017). Number and death rate from road accidents per hundred thousand people 2014-2016 Classified by province.

Elliott, M. A., Sexton, B., & Keating, S. (2003). Motorcyclists' behaviour and accidents. In: Behavioural Research in Road Safety: Thirteenth Seminar,139-152. London: Department for Transport.

Evans, L. (1996). The dominant role of driver behavior in traffic safety. Am J Public Health. 1996 Jun; 86(6):784-6.

Haddon, WJ. (1972). A logical framework for categorizing highway safety phenomena and activity. J Trauma, 12: 193-207.

Harré, N., Foster, S. and O'Neill, M. (2005). Self-enhancement, crash-risk optimism and the impact of safety advertisements on young drivers. Br J Psychol, 96 (2): 215-230. Doi 10.1348/000712605X36019.

Haworth, N., Smith, R., Brumen, L., & Pronk, N. (1997). Case-control study of motorcycle crashes (Contract report CR174). Canberra: Federal Office of Road Safety.

Hijar, MC., Carrillo C, Flores M, Anaya R and Lopez MV. (2000). Risk factors in highway traffic accidents: a case control study. Accid Anal Prev, 32: 702-709.

Horswill, M. and Helman, S. (2003). A behavioral comparison between motorcyclists and a matched group of non-motorcycling car drivers: factors influencing accident risk. Acid Anal Prev; 35(4):589-97.

Johnston, P., Brooks, C. and Savage, H. (2008). Fatal and serious road crashes involving motorcyclists. Road safety research and analysis report: Monograph 20. Australian Department of Infrastructure, Transport, Regional Development and Local Government: Canberra.

Knight, P.J. and Harris, M.F. (2012). Early driving experience and influence on risk perception in young rural people. Res. 775–781.

Lin, M. and Kraus, J. 2009. A review of risk factors and patterns of motorcycle injuries. Acid Anal Prev, 41:710-22.

Mangus, R., Simons, C., Jacobson, L., Streib, E. and Gomez G. (2004). Current helmet and protective equipment usage among previously injured ATV and motorcycle riders. Inj Prev. 2004 Feb; 10(1):56-8.

Mannering, F. L., and Grodsky, L. L. (1995). Statistical Analysis of motorcyclists' perceived accident risk. Accident Analysis and Prevention, 27: 21–31.

Ministry of Tourism and Sports. (2017a). Domestic tourism situation in 2017. Retrieved from https://www.mots.go.th/more_news.php?cid=414&filename=index.

Ministry of Tourism and Sports. (2017b). Income from Thai and foreign visitors in 2017. Retrieved from http://www.mots.go.th/ewt_dl_link.php?nid=9496.

Mullin, B., Jackson, R., Langley, J., & Norton, R. (2000). Increasing age and experience: are both protective against motorcycle injury? A case control study. Injury Prevention, 6, 32-35.

Musselwhite, C, Avineri, E., Susilo, Y. and Bhattachary, D. (2012). Public attitudes towards motorcyclists' safety: a qualitative study from the United Kingdom. Accid Anal Prev. 2012, 49: 105-113.

Naghavi, M., Jafary, N., Alaodini, F. and Akbari, M. (2004). Epidemiology of Injury Related to External Cause in IRAN. Vol. 1 Health Ministry; Tehran: 2004.

Ottova, V., Ravens-Sieberer, U. (2010). Social determinants in child health: Reflections from the Health Behaviour in School-aged Children survey. Int J Public Health. 55:525–6.

Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A. and Jarawan, E. (2004). World report on road traffic injury prevention. Geneva: World Health Organization; 2004.

Plase`ncia, A., Borrell, C., and Anto´, J. M. (1995). Emergency department and hospital admissions and deaths from traffic injuries in Barcelona, Spain: a one-year population-based study. Accident Analysis and Prevention, 27, 591–600.

Reeder, A.I., Chalmers, D. J., Marshall, S. W. and Langley, J. D. (1997). Psychosocial and social predictors of motorcycle use by young adult males in New Zealand. Social Science and Medicine, 45:1357-1376.

Rutter, D. R., and Quine, L. (1996). Age and experience in motorcycle safety. Accident Analysis and Prevention, 28(1): 15-21.

Shankar, U., and Varghese, C. (2006). Recent trends in fatal motorcycle crashes: An update. DOT Report HS 810 606. Washington; National Highway Traffic Safety Administration.

Shappell, S. and Wiegmann, D. (2012). A human error approach to aviation accident analysis: the human factors analysis and classification system. Burlington: Ashgate Publishing Ltd; 2012.

Thai road safety collaboration. (2017). Road accident statistics 2017. Retrieved from http://www.thairsc.com/

Watson, B., Tunnicliff, D., White, K., Schonfeld, C., and Wishart, D. (2007). Psychosocial and social factors influencing motorcycle rider intentions and behaviour. ATSB research and analysis report. Canberra: Australian Transport Safety Bureau.

World Health Organization. (2018a). World health statistics 2018. Retrieve from http://apps.who.int/iris/bitstream/handle/10665/272596/9789241565585-eng.pdf.

World Health Organization. (2018b). Global status report on road safety. 2018. Retrieved from https://www.who.int/violence_injury_prevention/road_safety_status/2018/en/

Yamane, T. (1973). Statistics: An Introductory Analysis New York: Harper and Row Publication.

Zamani-Alavijeh, F., Niknami, S., Bazargan, M., Mohammadi, E., Montazeri, A. and Ahmadi, F. (2009). Accident-related risk behaviors associated with motivations for motorcycle use in Iran: a country with very high traffic deaths. Traffic injury prevention.10(3):237–42. doi: 10.1080/15389580902822717.