FACTORS RELATED TO PREVENTIVE BEHAVIOR ON ROAD TRAFFIC INJURIES OF STUDENT MOTORCYCLE RIDERS AT HANOI MEDICAL UNIVERSITY IN VIETNAM

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Nguyen Manh Cuong

FACTORS RELATED TO PREVENTIVE BEHAVIOR ON ROAD TRAFFIC INJURIES OF STUDENT MORTOCYCLE RIDERS AT HANOI MEDICAL UNIVERSITY IN VIET NAM

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ABSTRACT

This cross-sectional descriptive study aimed to identify the factors associated with preventive behavior on road traffic injuries (RTIs) of student motorcycle riders at Hanoi Medical University in Vietnam. The association between the socio-demographic factors, knowledge about RTI prevention, perceptions towards hazards of RTI, perceptions towards benefits of and barriers to RTI prevention, and cues to action with preventive behavior on RTIs of respondents was indentified. The sample size was 240 students who were motorcycle drivers. Data was collected using a self-administered questionnaire. Data was analyzed using descriptive statistics with percentage, mean, standard deviation. The Chi-Square test was used to find the association between independent variables and the dependent variable.

Results revealed that the factors that were significantly related to the preventive behavior regarding RTI were gender ($p = 0.02$), previous road traffic injuries ($p=0.008$), knowledge about RTI prevention ($p = 0.028$), perceptions towards hazards of RTIs ($p = 0.011$), and family members' influence ($p = 0.026$).

In order to reduce road traffic injuries, the School-based Educational Program should be applied and the public awareness campaign should be improved by the National Traffic Safety Committee (NTSC) to be more effective. Family members were the most influential in stimulating preventive behavior of the respondents. Therefore, family leaders should provide more information about RTI prevention, discuss the hazards of RTIs, and encourage young drivers to implement preventive behavior, especially young male drivers.

KEY WORDS : ROAD TRAFFIC INJURIES / PREVENTIVE BEHAVIOR / STUDENT MOTORCYCLE RIDERS

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LIST OF ABBREVIATIONS

BAC	:	Blood Alcohol Concentration
BrAC	:	Breath Alcohol content
CI	:	Class Interval
EDR	:	Eastern Development Region
GBD	:	Global Burden of Diseases Survey
GNP	:	Gross National Product
HBM	:	Health Belief Model
MOH	:	Ministry of Health
MOT	:	Ministry of Transportation
MWDR	:	Mid-Western Development Region
NTSC	:	National Traffic Safety Committee
RTI	:	Road Traffic Injury
RTIs	:	Road Traffic Injuries
RTA	:	Road Traffic Accident
SAVY	:	Survey of Attitudes of Vietnamese Youth
UNICEF	:	United Nations International Children's Emergency
US	:	United States
US$	:	American Dollar
VND	:	Vietnam dong-currency of Vietnamese
WHO	:	World Health Organization

CHAPTER I
INTRODUCTION

1.1 Rationale and justification of the study

Every day thousands of people are killed and injured on our roads. Men, women and children walking, biking or riding to school or work, playing in the streets or setting out on long trips, will never return home, leaving behind shattered families and communities. Millions of people each year will spend long weeks in hospital after severe crashes and many will never be able to live, work or play as they used to do. Current efforts to address road safety are minimal in comparison to this growing human suffering. (1, 6)

Road traffic injuries (RTIs) are a major public health problem and a leading cause of death and injury around the world. Each year nearly 1.2 million people die and millions more are injured or disabled as a result of road crashes, mostly in low-income and middle-income countries. As well as creating enormous social costs for individuals, families and communities, RTIs place a heavy burden on health services and economies. The cost to countries, possibly already struggling with other development concerns, may well be 1 to 2 percent of their gross national product. As motorization increases, road traffic crashes are becoming a fast-growing problem, particularly in developing countries. (1, 6, 8)

RTIs are a growing public health issue, disproportionately affecting vulnerable groups of road users, including the poor. More than half the people killed in traffic crashes are young adults aged between 15 and 44 years – often the breadwinners in a family. Furthermore, RTIs cost low-income and middle-income countries between 1 and 2 percent of their gross national product – more than the total development aid received by these countries. (1)

According to the WHO Global Burden of Disease project, in 2004 nearly 1.3 million people of all ages were killed in road traffic crashes around the world and up to 50 million more were injured or disabled. The South-East Asia and the Western Pacific regions of WHO together accounted for two thirds of all road traffic deaths. However, the highest rates of road traffic deaths were in the African and Eastern Mediterranean Regions. Globally, 21 percent of road traffic deaths were children. There have been downward trends in the numbers of road traffic deaths and injuries over the last couple of decades in several developed countries. Globally, though, the outlook is disturbing. By the year 2020, RTIs are predicted to be the fifth leading cause of death worldwide and the seventh leading cause of disability adjusted life years lost. The South-East Asia, African and Western Pacific regions are expected to see the most significant increases in RTIs. Of particular concern is the fact that in India and China, each with more than a sixth of the world's population, the number of road traffic deaths is predicted to increase, by 2020, by approximately 147 percent and 97 percent, respectively (42).

The Vietnamese National Traffic Safety Committee (NTSC) reported more than 12,800 deaths and a further 10,546 injuries from road traffic crashes in 2007. This represents more than 35 deaths per day and a mortality rate of more than 15 per 100,000 population. Despite the magnitude of this burden, other national sources of data suggest that the incidence of road traffic mortality is actually much higher than represented by official figures. Official data is reported to underestimate the true burden by at least 30 percent. The majority of deaths and injuries on the roads are confined to the 15 to 49 years age group the group that makes up 56 percent of total population, and the most economically active group. WHO estimates that RTIs are the leading cause of death for those aged 15-29 years in Vietnam. The Survey of Attitudes of Vietnamese Youth (SAVY) estimated that 42 percent of Vietnamese youth aged 22-25 had sustained at least one road traffic injury (RTI). (43)

There are many contributors and causes of RTIs in Vietnam. There is a strong association with the explosive growth in motorization. Of the more than 26.8 million registered vehicles as of December 2008, 95 percent were motorized two

wheelers. New registrations in 2008 averaged 482 new cars and 7680 new motorcycles each day. (42, 43)

Despite the predominance of motorized two-wheelers, growth in four wheeled motor vehicles exceeds 15 percent per year and is associated with Vietnam's rapid economic development. Other contributors include inappropriate road designs, low awareness, and low adherence and enforcement of proven risk factor reduction strategies such as wearing helmets, and preventing speeding and drink driving.

To deal with RTIs in the world, the WHO and the World Bank jointly launched the world report on RTI prevention, 2004. This document stressed the role of many sectors in the prevention of RTIs. It also described the fundamental concepts of RTI, the magnitude and impact of RTIs, the major determinants and risk factors, and effective intervention strategies. The world report concluded with six recommendations to improve the road traffic safety in all countries of the world. The six recommendation were :(7)

1. Identify a lead agency in government to guide the national road traffic safety effort.

2. Assess the problem, policies and institutional settings relating to RTI prevention in each country.

3. Prepare a national road safety strategy and plan of action.

4. Allocate financial and human resources to address the problem.

5. Implement specific actions to prevent road traffic crashes, minimize injuries and their consequences and evaluate the impact of these actions. These actions include measures to reduce excessive and inappropriate speed; to reduce drink-driving; and to increase the use of motorcycle helmets, seat-belts and child restraints.

6. Support the development of national cooperation.

The word report promoted a comprehensive approach to road safety which involves identifying the interactions between the road user, vehicle and the road environment. This approach recognizes that the human body is highly vulnerable to

injury and that humans make mistakes. (Figure 1.1) A safe road traffic system is therefore one that accommodates fallibility.

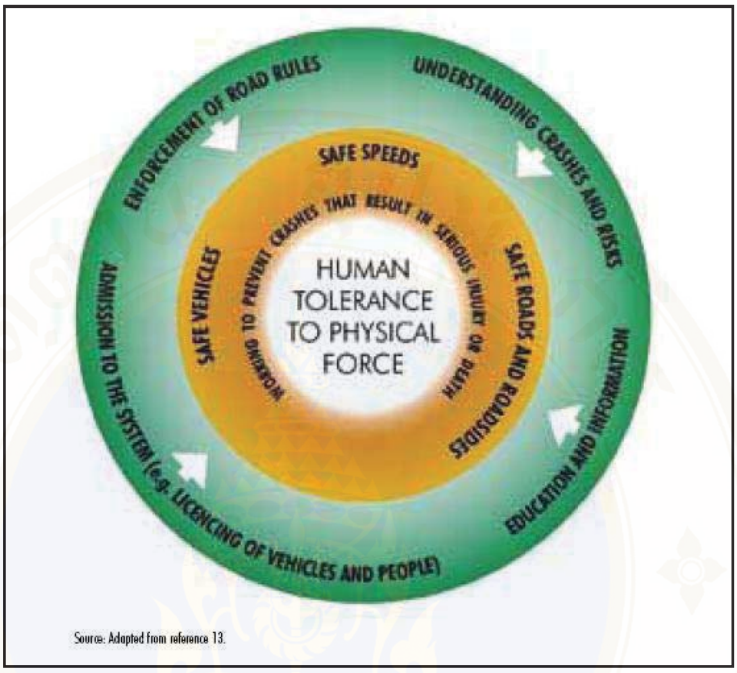


Figure 1.1 The systems approach Road safety

Source: WHO, Global status report on road safety, 2009 (7)

Recent research (January 2002) at Nguyen Dinh Chieu general hospital in Ben Tre province, Vietnam, (50) showed that in 165 respondents , the highest number of injured patients came from the 15- 29 years age group, and most of them (69.7%) were male. It also found that 44.8 percent of respondents were students. On preventive behavior, the majority of injured motorcyclists had had accidents at a speed of 40 km/h, and 36.7 percent of injured motorcyclists had taken alcohol before their accidents.

In 2007, the number of deaths and injuries in Hanoi were 457 and 712 respectively. About 40 percent of RTIs were suffered by people aged 20 to 29 years old, and 78 percent were associated with motorcycles. (53) Documents indicated that many factors related to preventive behavior of young riders on RTIs.

The role of the health sector should be focused on health promotion, along with its regular clinical and curative services. Doctors can act as role models especially fresh young graduates, for the factors related to preventive behavior regarding RTIs.

Doctors can work as society leaders in by applying their expertise to preventive, promotive and curative health services. In their day to day activities they are in direct contact with ordinary people with different problems as patients their advice is sought regarding other health problems and they have knowledge regarding the latest health problems in the society. So the individuals in the families and communities gain knowledge and adopt that knowledge to behaviour which enables them to achieve optimum well being and preventive behaviour on RTIs.

In Vietnam, doctors comprise a large group of health professionals. In 2008, the proportion of doctors per 10,000 populations was 57.3. (54) These doctors are very helpful and influence in counselling and making people feel working to implement preventive behaviour for RTIs. People believe that doctors have a vital role in providing essential health services, so they listen to what the doctor says. There is a paucity of research about the factors related to preventive behaviour regarding RTIs, which should encourage the medical students to work on RTIs in Vietnam.

Therefore, this study will be helpful to young medical graduates working on identifying factors related to preventive behaviour regarding RTIs of student motorcycle riders at Hanoi Medical University, and developing particular behavioural roles of traffic safety, in Hanoi, Vietnam.

1.2 Research question

1. What is the preventive behavior on RTIs of student motorcycle riders at Hanoi Medical University in Vietnam?

2. What are the factors related to preventive behavior on RTIs of student motorcycle riders at Hanoi Medical University in Vietnam?

1.3 Research Objective

1.3.1 General objective

To study the factors related to preventive behavior on RTIs of student motorcycle riders at Hanoi Medical University in Vietnam

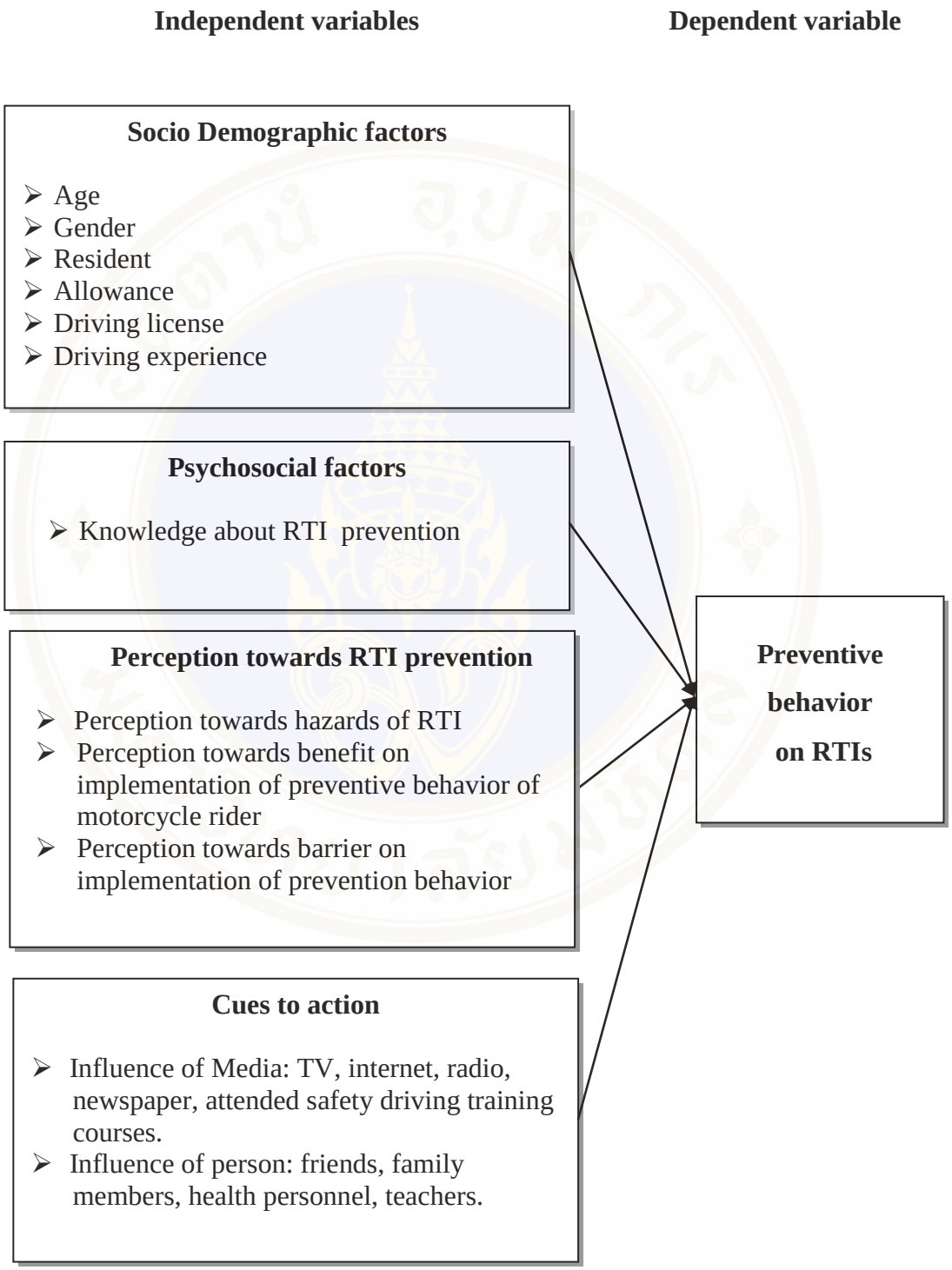
1.3.2 Specific objectives

1. To describe the preventive behavior on RTIs of students motorcycle riders at Hanoi Medical University in Vietnam.

2. To describe the socio-demographic characteristics, psychosocial, and cues to action of student motorcycle riders at Hanoi Medical University in Vietnam.

3. To identify the relationship between the preventive behavior on RTIs with the socio-demographic factors, the psychosocial factors, the cues to action respectively of student motorcycle riders at Hanoi Medical University in Vietnam.

1.4 Conceptual framework



Figures 1.2 Conceptual framework

1.5 Operational definition

1.5.1 Independent variables:

Age: refers to age of respondent at the time of data collection.

Allowance: refers to how much money each respondent received per month.

Residence: refers to the type of accommodation where each respondent was staying during the semester, and was categorized into: dormitory at university, outside of a university, or with their family.

Driving license: is defined as a permit which a driver has to obtain according to the law. In this study was concerned to ascertain whether the respondents had or did not have a driving license.

Driving experience: means the length of the respondent's experience in riding a motorcycle.

Knowledge about RTI prevention: means knowledge of a respondent about causation, and risk factors of RTIs; safe driving, and traffic law.

Perception towards hazards of RTI: refers to a respondent's perception about the consequences of RTIs on the material and metal heath and the economic.

Perception towards benefits on implementation of preventive behavior of student motorcycle riders: means perception of the aggregation of all gains, and cost benefit of actually engaging in particular preventive behaviour.

Perception towards barriers to implementation of prevention behavior means the burden and lack of profit perceived by one engaging in the prevention behavior.

Influence of Media refers to from what source of media (TV, internet, radio, newspaper) the respondent's get information about RTI prevention.

Influence of Person refers to from to what source of person (Family members, Friends, health workers, teachers) the respondent's received information about RTI prevention.

1.5.2 Dependent variable (outcome)

Preventive behaviour on RTIs in this study refers to any activity undertaken by a respondent for the purpose of preventing RTIs. This included wearing a helmet (both riders and passengers); controlling speed; Drinking and driving; using drugs and driving; driving while feeling sleepy, driving after five hours of sleep, driving between 02:00 and 05:00; and using mobile phone, iPod while driving.

1.6 Limitation of the study

1. The data in this study was collected by using a self-administered questionnaire. The questionnaire was distributed to the respondents in class and took s about 15-20 minutes to complete. Therefore, while the respondents answered the questions, it was difficult to control discussion among them. This might affect the quality of the data.

2. The data collected were answers to a questionnaire. Actual preventive behavior of the respondents was not actually observed. Therefore, bias cannot be prevented.

3. The data collected in this study was provided by a randomly selected sample at Hanoi Medical University. Therefore, the results have limited generalization and may not be representative of all the university students in Vietnam, or all young drivers.

CHAPTER II
LITERATURE REVIEW

This research focused on preventive behavior of student motorcycle riders regarding RTIs. This chapter is divided into parts as the follows.

2.1 RTI prevention
- 2.1.1 Global RTI situation
- 2.1.2 RTI situation in Vietnam
- 2.1.3 RTI prevention

2.2 Theoretical model
- 2.2.1 The Health Belief Model
- 2.2.2 The HBM and RTI behavior change

2.3 Related study

2.1 RTI prevention

2.1.1 Global RTI situation

RTIs are a major but neglected global public health problem, requiring concerted efforts for effective and sustainable prevention. Of all the systems that people have to deal with on a daily basis, road transport is the most complex and the most dangerous. Worldwide, the number of people killed in road traffic crashes each year is estimated at almost 1.2 million, while the number injured could be as high as 50 million – the combined population of five of the world's large cities. The tragedy behind these figures regularly attracts less media attention than other less frequent, but more unusual types of tragedy. (7)

What is worse, without increased efforts and new initiatives, the total number of road traffic deaths and injuries worldwide is forecast to rise by some 65

percent between 2000 and 2020, and in low-income and middle-income countries deaths are expected to increase by as much as 80 percent. The majority of such deaths are currently among "vulnerable road users" – pedestrians, pedal cyclists and motorcyclists. In high-income countries, deaths of car occupants continue to be predominant, but the risks per capita that vulnerable road users face are higher. The first major report on RTI prevention was jointly issued by the World Health Organization (WHO) and the World Bank, and underscores the concern that the two bodies share about the detrimental impact of unsafe road transport systems on public health and global development. It is the contention of the report, first, that the level of road deaths and injuries is unacceptable, and second, that it is to a large extent avoidable. (4, 7)

The RTI is the third most important cause of overall mortality, and the main cause of death among 1-40 year olds. Worldwide, injuries incurred in road crashes contribute the largest single category. According to WHO data, deaths from RTIs account for about 25 percent of all deaths from injury (Figure 2.1). (6)

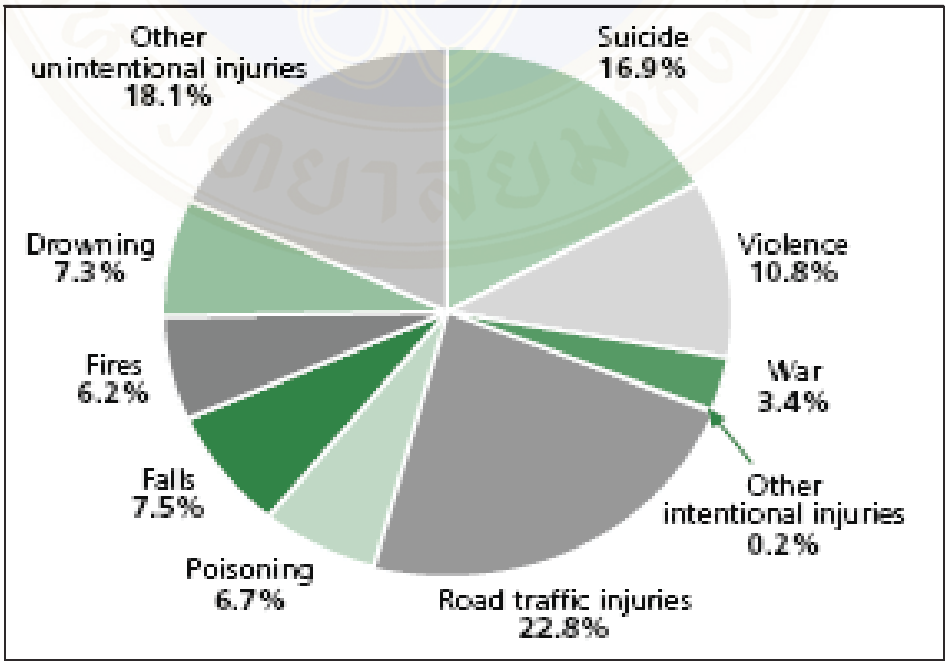


Figure 2.1 Distribution of global injury mortality by cause, 2002

Source: WHO Global Burden of Disease project, 2002

Approximately 85 percent of all global road deaths, 90 percent of the disability-adjusted life years lost due to crashes, and 96 percent of all children killed worldwide as a result of RTIs occur in low-income and middle-income countries. (13) Over 50 percent of deaths are among young adults in aged 15 to 44 years. For both children aged 5 to 14 years, and young people aged 15–29 years, RTIs are the second leading cause of death worldwide. (7)

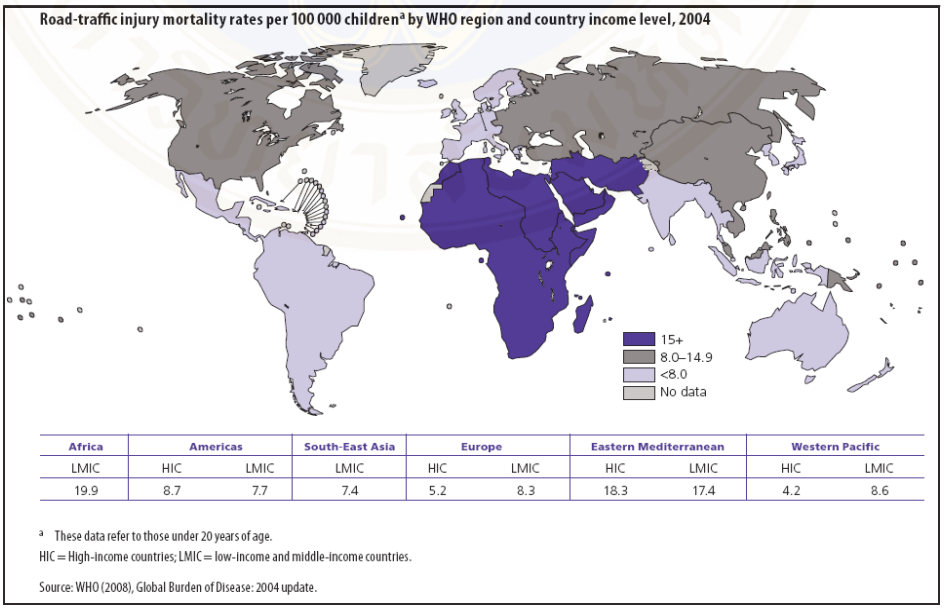
Table 2.1 Leading causes of deaths by age group, world 2002

Rank	< 1 year	1 to 4 years	5 to 9 years	10 to 14 years	15 to 19 years	20 to 24 years	All < 25 years
1	Perinatal conditions	Lower respiratory infections	Lower respiratory infections	Lower respiratory infections	Road traffic injuries	HIV/AIDS	Perinatal conditions
2	Diarrhoeal diseases	Childhood cluster diseases	HIV/AIDS	Road traffic injuries	Self-inflicted injuries	Road traffic injuries	Lower respiratory infections
3	Lower respiratory infections	Diarrhoeal diseases	Road traffic injuries	Drowning	Maternal conditions	Self-inflicted injuries	Diarrhoeal diseases
4	Malaria	Malaria	Childhood cluster diseases	HIV/AIDS	Lower respiratory infections	Maternal conditions	Childhood cluster diseases
5	Childhood cluster diseases	HIV/AIDS	Drowning	Tuberculosis	Interpersonal violence	Interpersonal violence	Malaria
6	Congenital anomalies	Perinatal conditions	Meningitis	Protein-energy malnutrition	Drowning	Tuberculosis	HIV/AIDS
7	HIV/AIDS	Protein-energy malnutrition	Fire burns	Fire burns	Tuberculosis	Lower respiratory infections	Congenital anomalies
8	Protein-energy malnutrition	Congenital anomalies	Tuberculosis	Self-inflicted injuries	Fire burns	Fire burns	Road traffic injuries
9	Syphilis	Drowning	Protein-energy malnutrition	Leukaemia	HIV/AIDS	War	Drowning
10	Meningitis	Road traffic injuries	Falls	Interpersonal violence	Leukaemia	Drowning	Tuberculosis

Source: WHO Global Burden of Disease project, 2002

Mortality

In 2004, RTIs accounted for approximately 262,000 child deaths among children and young people aged 0 to 19 years, almost 30 percent of all injury deaths of children. RTIs are the leading cause of death among young people aged 15 to 19 years. Globally, these deaths on the roads account for nearly 2 percent of all child deaths. There are significant geographic variations, however. In the South-East Asia Region, the proportion of childhood deaths due to RTIs is 1.3 percent, while in the Americas it is as high as 4.7 percent. Some 93 percent of child road deaths occur in low-income and middle-income countries. In 2004, the South-East Asia and African Regions and the low-income and middle-income countries of the Western Pacific Region accounted for two thirds of all road traffic deaths among children. Data shows that globally, the road traffic death rate for children is 10.7 per 100,000 population. In South-East Asia, however, the rate is 7.4 per 100,000 population, while in the African Region it is 19.9 per 100,000 population.(see figure 2.2) Although the mortality rate is not as high in Europe, RTIs still account for about a fifth of all childhood injury deaths in the European Union. (42)



Africa	Americas		South-East Asia	Europe		Eastern Mediterranean		Western Pacific	
LMIC	HIC	LMIC	LMIC	HIC	LMIC	HIC	LMIC	HIC	LMIC
19.9	8.7	7.7	7.4	5.2	8.3	18.3	17.4	4.2	8.6

[a] These data refer to those under 20 years of age.
HIC = High-income countries; LMIC = low-income and middle-income countries.
Source: WHO (2008), Global Burden of Disease: 2004 update.

Figure 2.2 Road traffic mortality rate per 100 000 children by WHO and country income level, 2004

Source: WHO (2008), Global Burden of Disease: 2004 update

Using epidemiological evidence from national studies, a conservative estimate can be obtained of the ratios between road deaths, injuries requiring hospital treatment, and minor injuries, as being 1:15:70 in most countries. In many low-income and middle-income countries, the burden of traffic-related injuries is such that they represent between 30 percent and 86 percent of all trauma admissions. (10)

While a decrease in deaths due to road traffic crashes of some 30 percent is forecast in high-income countries, current and projected trends in low-income and middle-income countries foreshadow a huge escalation in global road crash mortality between 2000 and 2020. Furthermore, on current trends, by 2020, road crash injury is likely to be the third leading cause of disability-adjusted life years lost. (10)

Table 2.2 Estimated global RTI – related deaths

	Number	**Rate per 100 000 population**	**Proportion Of total (percent)**
Low-income and middle-income countries	1 065 988	20.2	90
High-income countries	117 504	12.6	10
Total	1 183 492	19.0	100

Source: WHO Global Burden of Disease project, 2002

In high-income countries, most of those killed or injured in road traffic crashes are drivers and passengers of four-wheeled vehicles. In low-income and middle-income countries, however, “vulnerable road users” i.e. pedestrians, cyclists and motorcyclists, and users of public transport constitute a higher proportion of road

users, and consequently make up a larger proportion of those injured or killed on the roads.

The social and economic costs of RTIs

In economic terms, the cost of road crash injuries is estimated at roughly 1 percent of gross national product (GNP) in low-income countries, 1.5 percent in middle-income countries and 2 percent in high-income countries. Road crashes not only place a heavy burden on national and regional economies but also on households. In Kenya, for example, more than 75 percent of road traffic casualties are among economically productive young adults. (6)

At a national level, road traffic collisions place enormous costs on the economies affected. These costs include:

The direct impacts on health care services and the costs of providing rehabilitation; The indirect costs, such as the value of lost household services and lost earnings of victims and survivors, caregivers and families. The annual costs of road crashes in low-income and middle-income countries are estimated to be between US$ 65 billion and US$ 100 billion–more than the total annual amount received in development aid. Road traffic crashes and their consequences cost governments about 2 percent of their Gross National Product. In many low-income and middle-income countries, a large proportion of road traffic casualties are from the younger, wage-earning groups. (31)

In Africa, with 50 percent of the population below the age of 16 years, road crashes among economically active young people place an enormous economic burden on countries, while the costs of importing medicines and providing appropriate care for road traffic victims further strain resources. Even in high-income countries, road traffic crashes among young people impose a huge economic burden on societies. In the United States of America, crashes involving 15 to 20 year old drivers cost the country about US$41 billion in 2002. (3, 17)

In short, current road safety efforts fail to match the severity of the problem. Road travel brings society benefits, but the price society is paying for it is very high.

2.1.2 RTI situation in Vietnam

The prevalence of injury in Vietnam

Injuries and violence are a major and growing public health problem in Vietnam. In 2007, one in four deaths was attributed to injury - a dramatic increase from just 2 percent in 1976. The World Health Organization Global Burden of Disease Survey (GBD) estimates that 36 percent of all deaths aged 5-29 years were caused by violence and injuries (2004). (42) Associated with rapid economic growth, motorization in Vietnam increases by more than 15 percent annually. This high exposure, especially to vulnerable road users (motorcycle riders, passengers and pedestrians), as well as limited knowledge and enforcement of known risk factors has resulted in a rapid increase in the number of traffic injuries and deaths. RTIs were the leading cause of injury death with a mortality rate of 15 per 100,000 population (2007). (42) Associated with high exposure to unprotected water bodies and easy access to agricultural pesticides, drowning and suicide were the second and third leading causes of injury death in Vietnam respectively.

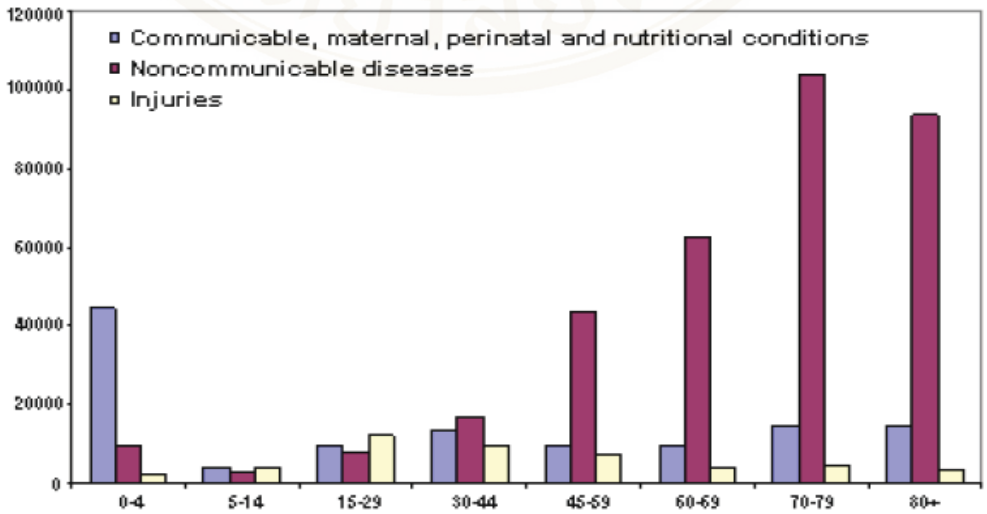


Figure 2.3 The causes of death by age group 2002

Source: WHO Global Burden of Disease, 2002

According to reports from the Ministry of Labor, Invalids and Social Affairs, occupational injuries are also increasing rapidly in Vietnam. In 2008, 6,047 people were injured, of which 573 people died during work related activities, an increase of 58 percent compared with the year 2000. This increase can be associated with the rapid industrialization process in Vietnam and while the limited application of safety measures by employers and employees. On the other hand, the state management of occupational safety and health has not met with the size of this problem. (42)

Injury mortality rates are highly variable throughout Vietnam. The highest (60.7%) are found in the low socioeconomic areas of the Northern provinces. Provinces surrounding the two largest cities of Hanoi and Ho Chi Minh City have the lowest injury mortality rates with 38.4 and 36.8 deaths per 100,000 population respectively. (42, 43)

The prevalence of RTI in Vietnam

The National Traffic Safety Committee (NTSC) reported more than 12,800 deaths and a further 10,546 injuries from road traffic crashes in 2007 this represents more than 35 deaths per day and a mortality rate of more than 15 per 100,000 population. Despite the magnitude of this burden, other national sources of data including health suggest that the incidence of road traffic mortality is actually much higher than represented by official figures. Official data is reported to underestimate the true burden by at least 30 percent. The majority of death and injuries on the roads are confined to the age group of 15 to 49 years – the group that makes up 56 percent of total population, and most economically active group. WHO estimates that RTIs are the leading cause of death for those aged 15-29 years in Vietnam. The Survey of Attitudes of Vietnamese Youth (SAVY) estimated that 42 percent of Vietnamese youth aged 22-25 had sustained at least one RTI. (42)

There are many contributors and causes of RTIs in Vietnam. There is a strong association with the explosive growth in motorization, with more than 26.8 million registered vehicles as of December 2008, 95 percent of these are motorized

two wheelers. New registrations in 2008 averaged at 482 new cars and 7680 new motorcycles each day. (44)

Despite the predominance of motorized two-wheelers, growth in four wheeled motor vehicles exceeds 15 percent per year associated with Vietnam's rapid economic development. (43) Other contributors include inappropriate road designs, low awareness, adherence and enforcement of proven risk factor reduction strategies such as wearing of helmets and seat-belts and prevention of speeding and drinking and driving.

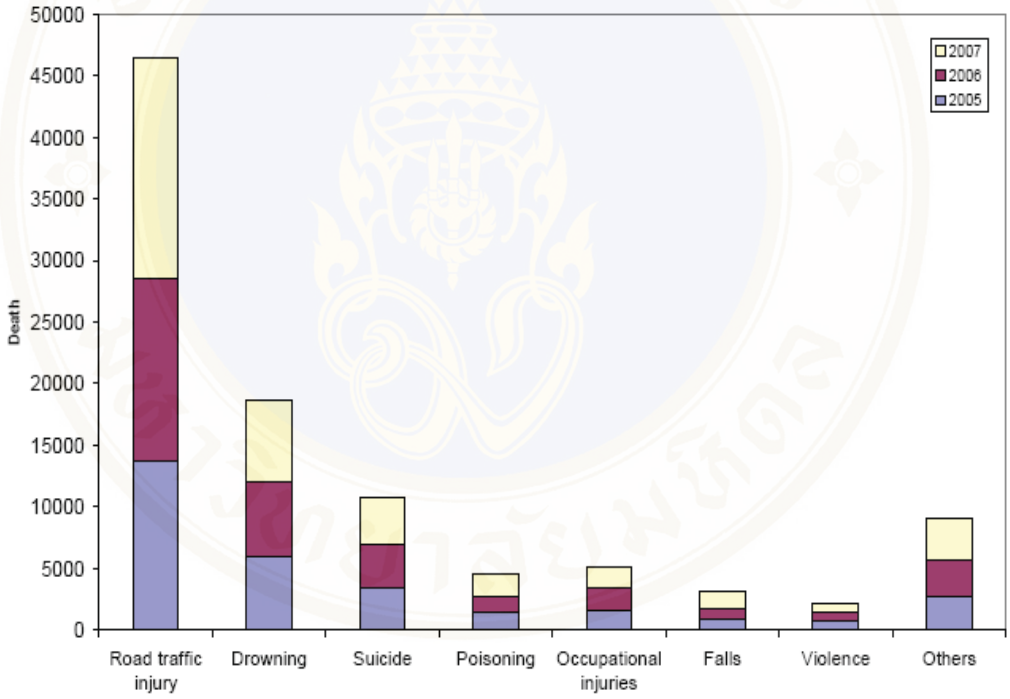


Figure 2.4 Injury mortality by leading causes, 2005-2007
Source: WHO Global Burden of Disease Study, 2007

Injury mortality trends by age groups and sex. Overall, injury mortality increased from infancy, reached a peak in the 20 to 29 year age group, and then diminished steadily until aged 60 to 69, only rising again among those aged 70 years and over. (Figure 2.6) However, among females, injury mortality increased from age 10 to 19 until age 30 to 39, then declined steadily until age 50 to 59 before rapidly increasing once again to reach a peak at age 70 and more. (27) Considering gender

distribution of accidents, 81 percent of road accidents were caused by males and 19 percent by female (Figure 2.5).

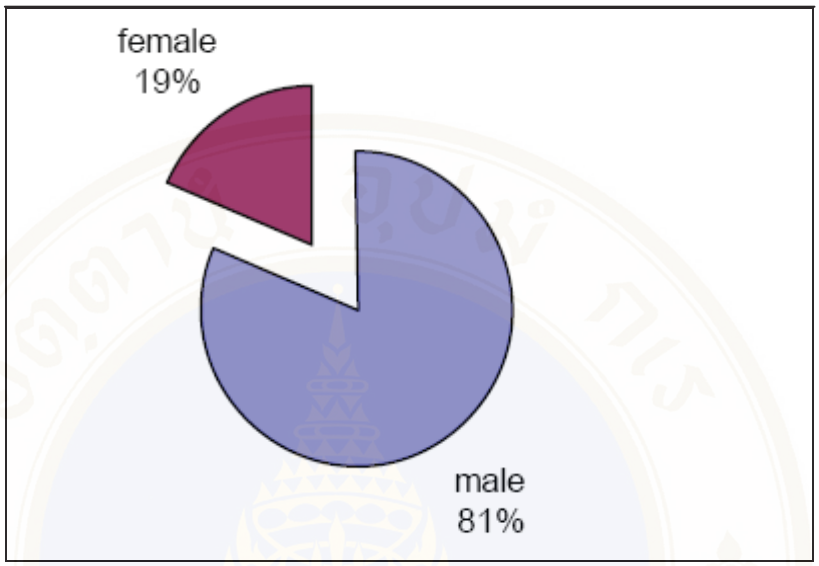


Figure 2.5 Gender distributions on traffic accident 2004

Source: Database from NTSC, 2004

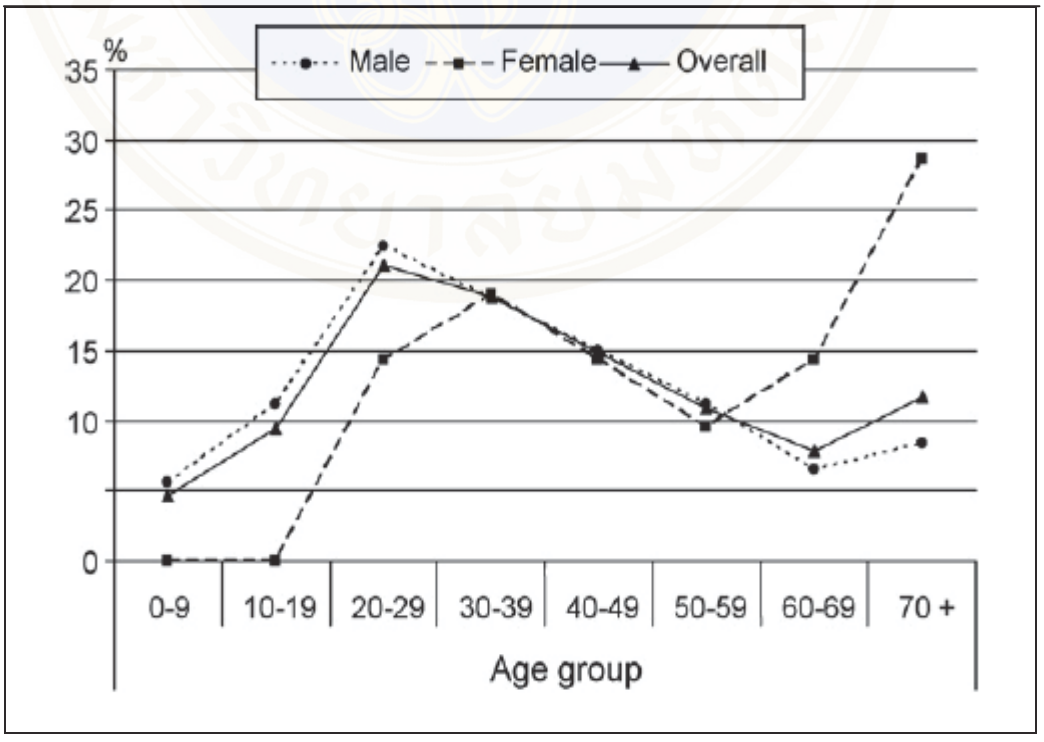


Figure 2.6 Injury mortality by age and sex groups

Source: Vietnam, Health Statistics Year Book 2005

Injury mortality among different age groups: Overall, RTIs resulted in the highest injury mortality proportion (52%), followed by drowning (14%), heroin overdose (13%) and falls (6%). However, drowning accounted for the highest injury mortality among those under 20. RTIs were the leading cause of death among those 20 aged and over. Heroin overdose was more common among the 20 to 49 age group. Falling accounted for the highest proportion of injury mortality in the over 70 age group. (Figure 2.7)

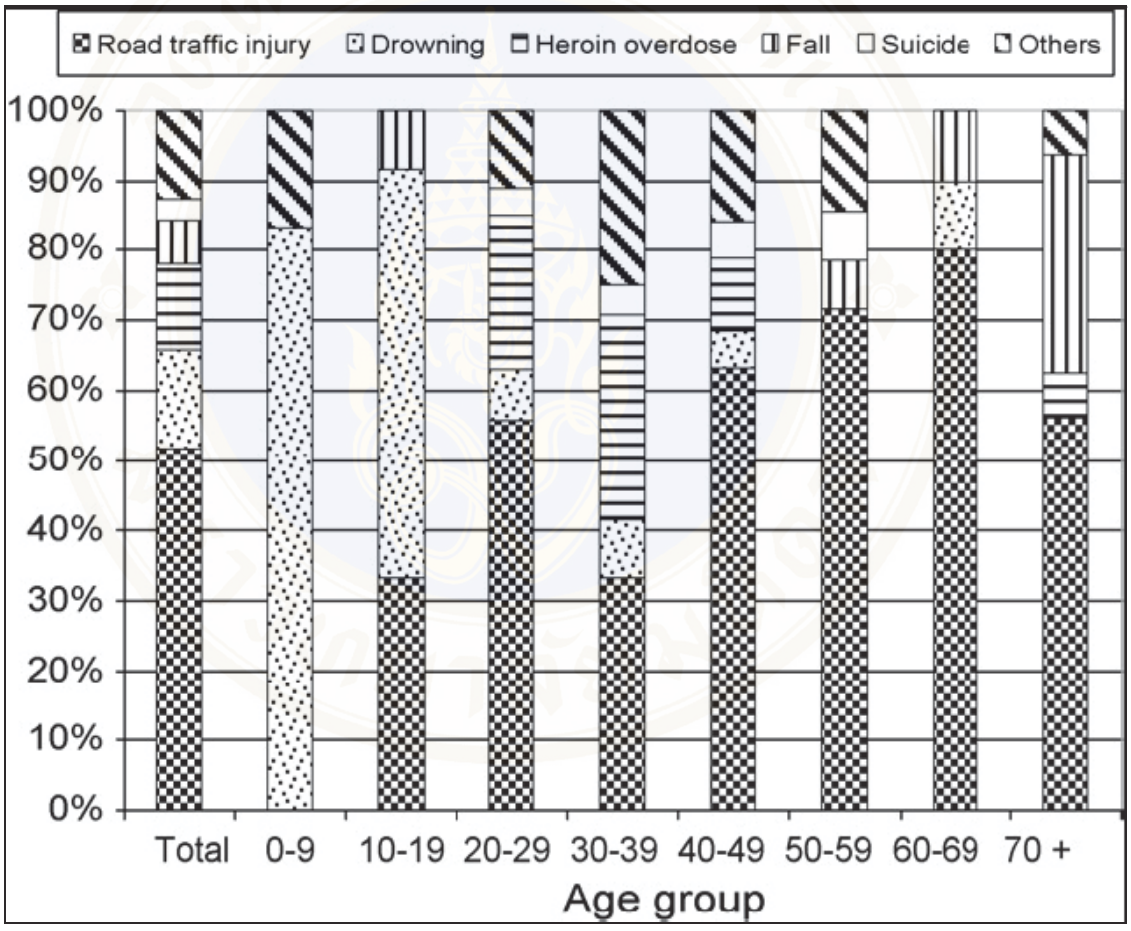


Figure 2.7 Injury mortality causes by age groups

Source: Vietnam, Health Statistics Year Book 2005

A study in seven districts in Hanoi in 2006 showed that the injury morbidity rate was 1,134/100,000 (male: 1212/100,000; female: 1068/100,000). Injury morbidity rates by age group, severity and cause are listed in table 2.3. (7)

Table 2.3 Injury morbidity rate by age group, severity and causes (Per 100.000)

	Male		Female		Total	
	No.	Rate	No.	Rate	No.	Rate
Age group						
0–9	4	930	5	1192	9	1057
10–19	8	1754	4	933	12	1350
20–29	9	1697	2	319	11	948
30–39	7	1317	2	367	9	835
40–49	3	621	6	1267	9	938
50–59	3	864	7	1799	10	1354
60–69	4	1714	6	2359	10	2038
Injury severity						
70 and above	1	630	4	1736	5	1144
Minor	25	777	27	801	52	787
Moderate	2	62	5	148	7	106
Major	5	155	3	89	8	121
Severe	7	218	1	30	8	121
Causes of injury						
Road traffic accident	20	622	14	416	34	514
Intentional injury	1	31	2	59	3	45
Fall on level surface	6	187	9	267	15	227
Fall from height	1	31	3	89	4	61
Falling objects	2	62	1	30	3	45
Sharp objects	3	93	0	0	3	45
Animal bites	2	62	0	0	2	30
Burns	3	93	4	119	7	106
Electrical shock	0	0	1	30	1	15
Other	1	31	2	59	3	45

Source: Hanoi Health Services, Annual Injury Prevention report, 2006

Trends in RTI in Vietnam

Like other developing countries in Asia and Africa, traffic accidents in Vietnam have been increasing at an alarming rate in recent years. Figure 10 shows that from 1990 to 2002, the number of traffic accidents, fatalities, and injuries continued to increase at 10 to 30 percent, 5 to 35 percent, and 5 to 45 percent per year, respectively (see figure 2.8). To face this problem, the government has focused on traffic enforcement. From the beginning of 2003, the Resolution 13/NQ-CP and other related documents were issued to control traffic accidents. Active participation of traffic police was considered as the most important in this field. The number of road accidents has been reduced slightly as a result of the strong efforts made by the government.

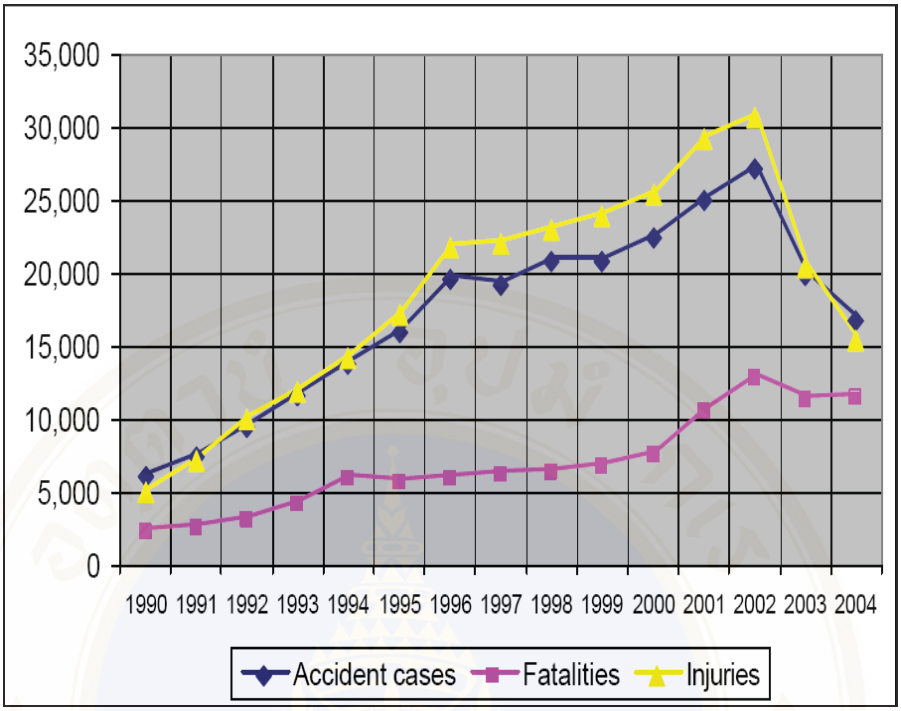


Figure 2.8 Trends in RTI

Source: Database from NTSC, 2004

Distribution of severity levels

The distribution of road traffic mortality rates by sex and age, globally, as well as for each WHO region, is shown in the Statistical Annex. Over 50 percent of the global mortality due to RTI occurs among young adults aged between 15 and 44 years, and the rates for this age group are higher in low-income and middle-income countries. In 2002, males accounted for 73 percent of all road traffic deaths, with an overall rate almost three times that for females: 27.6 per 100,000 population and 10.4 per 100,000 population, respectively.(13) Road traffic mortality rates are higher in men than in women in all regions regardless of income level, and also across all age groups. On average, males in low-income and middle-income countries of the WHO Africa Region and the WHO Eastern Mediterranean Region have the highest RTI mortality rates worldwide. The gender difference in mortality rates is probably related to both exposure and risk-taking behavior.

Burden of RTI

The road traffic death toll represents only the "tip of the iceberg" of the total waste of human and societal resources from road injuries. WHO estimates that, worldwide, between 20 million and 50 million people are injured or disabled each year in road traffic crashes (the reason for the wide range of this estimate being the considerable known underreporting of casualties).

Using epidemiological evidence from national studies, a conservative estimate can be obtained of the ratios between road deaths, injuries requiring hospital treatment, and minor injuries, as being 1:15:70 in most countries. In many low-income and middle-income countries, the burden of traffic-related injuries is such that they represent between 30 percent and 86 percent of all trauma admissions. (7, 13)

While a decrease of some 30 percent in deaths due to road traffic crashes is forecast in high-income countries, current and projected trends in low-income and middle-income countries foreshadow a huge escalation in global road crash mortality between 2000 and 2020. Furthermore, on current trends, by 2020, road crash injury is likely to be the third leading cause of disability-adjusted life year's loss. In economic terms, the cost of road crash injuries is estimated at roughly 1 percent of gross national product (GNP) in low-income countries, 1.5 percent in middle-income countries and 2 percent in high-income countries. (1, 13)

Vietnam has a high burden of RTIs. In 2007 there were 12,800 deaths, or 15 deaths per 100,000 population, according to official statistics. Other sources of data suggest that official figures may underestimate the actual number of deaths and injuries by more than 30 percent and 90 percent, respectively.

As of August 2008, there were more than 26 million registered vehicles in Vietnam, and 95 percent were motorized two-wheelers. There are almost 9000 new motorcycles on the road each day. An estimated 60 percent of all road traffic fatalities occur among motorcycle drivers and passengers. Overall costs estimating for the loss of a whole country will be 3,222,120 million VND. Based on a GDP value of year

2004 of 713,000 billion VND, the loss by accident would occupy 0.54percent. The national accident costs for 2003 and 2002 were higher (Table 2.4) it can be seen that in the year 2003, the number of road accidents and costs of road accidents reduced slightly. (3, 13)

Table 2.4 Calculating Annual Cost of Accident

	2002	2003	2004
Total cost of accident (mil.VND)	3.638.437	3.061.249	3.222.120
GDP (mil.VND)	536.000.000	575.000.000	713.000.000
Accident cost compare To GDP (percent)	0.66	0.54	0.45

Source: Hanoi Health Services, Annual Injury Prevention report, 2006

Policy towards RTI in Vietnam

To reduce deaths and injuries, protect property and contribute to sustainable development, the Government of Vietnam established the National Committee on Traffic Safety in 1995. In 2001, the Government promulgated the National Policy on Accidents and Injury Prevention with the target of reducing traffic deaths to 9 per 10,000 vehicles. Government initiatives to reduce traffic accidents include issuing new traffic regulations and strengthening traffic law enforcement. In 2003, the number of traffic accidents was reduced by 27.2 percent compared with the previous year, while the deaths and injury rates declined by 8.1 percent and 34.8 percent, respectively. (42, 43)

The Government of Vietnam will implement more stringent measures to reduce RTIs through health promotion campaigns, consolidation of the injury surveillance system, and mobilization of various sectors at all levels and the whole society. The introduction of mandatory motorcycle helmets is an important measure for many low and middle income countries, especially in South East Asia where motorized two-wheelers represents the predominant mode of personal transport. Vietnam has had various legislative requirements to wear helmets on certain roads since 2000. However this legislation has had limited enforcement and subsequently utilization was low. In June 2007, the Government promulgated new legislation making it mandatory for all persons on a motorbike to wear a helmet.

2.1.3 RTI prevention

2.1.3.1 Using models to analyze the epidemiology of injuries.

The four factors that are involved in injury, and the relationships between them, are illustrated in the diagram below (see figure 2.9). The example given is based on an incident in which a man is injured when his motorcycle slides and crashes on a slippery roadway.

The epidemiology of injury, as in the epidemiology of disease, requires

-The host (i.e. the person injured)

-The agent (i.e. the force or energy)

-The vector (i.e. the person or thing that applies the force, transfers the energy or prohibits its transfer)

-The environment (i.e. the situation or conditions under which the injury happens).

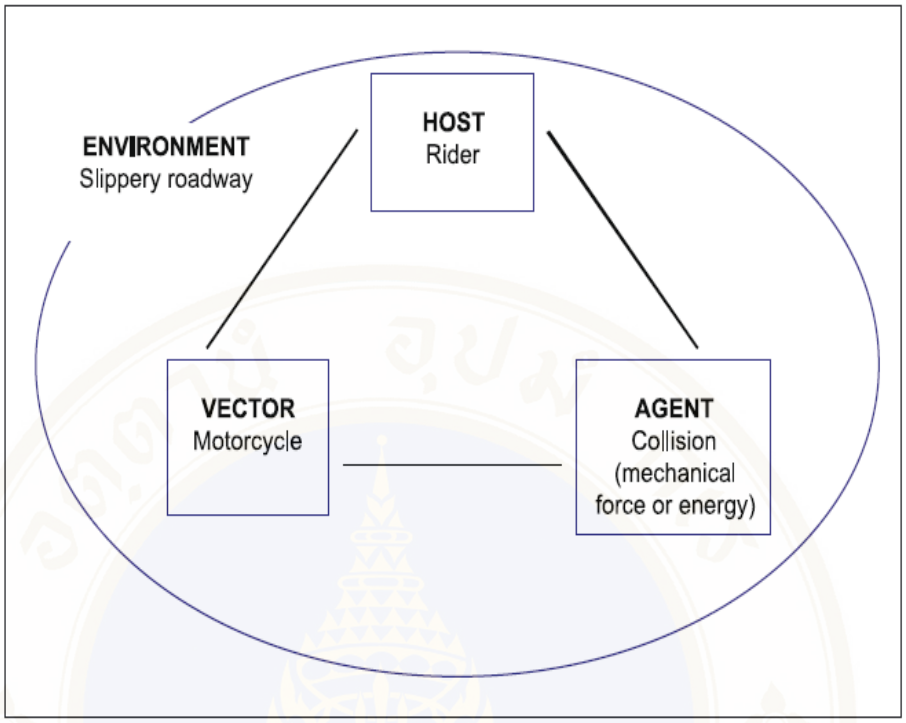


Figure 2.9 Epidemiological model of an injury caused by a motorcycle collision
Source: WHO (2004), Injury Surveillance Guidelines 2004

Using a model of this type can help to identify all the factors involved in an injury. It also helps people to think about where they might intervene to prevent such injuries from happening in the future or to reduce the harm done when they do happen. For instance, in the motorcycle collision model, there may be things about the rider, the motorcycle or the road that contributed to the crash. Perhaps there are things about motorcycle riders, motorcycles and/or road conditions that could be changed in order to prevent similar incidents in the future. Possible interventions that might occur to anyone thinking about the four elements of the motorcycle collision model are given in Table 2.5. (10)

Table 2.5: The Haddon Matrix as Applied to RTIs

Phase	Nature of intervention	Human	Vehicles and equipment	environment
Pre-crash	Crash prevention	Information Attitudes Impairment Police enforcement	Roadworthiness Lighting Braking Handing Speed management	Road design Road layout Speed limits Pedestrian facilities
Crash	Injury prevention during crash	Use of restraints impairment	Occupant restraints Other safety devices Crash-protective design	Forgiving roadside(for example, crash barriers)
Post-crash	Life sustaining	First-aid skill Access to medical personnel	Ease of access Fire risk	Rescue facilities congestion

Source: WHO (2004), Injury Surveillance Guidelines 2004

2.1.3.2 Using the injury spectrum

The so-called "injury spectrum" is another useful device for analyzing injuries. The injury spectrum, illustrated in Figure 10, maps an injury over time, starting with the host's exposure to a hazard, followed by the event, through to the occurrence of the injury and finally the possible resultant disability and/or death. Like the injury model described previously, the injury spectrum helps people to think about what happened in a particular case and how interventions might have prevented the injury from happening or reduced the damage done. Three levels of prevention are suggested by the injury spectrum:

- Primary prevention involves either preventing the event from occurring or preventing it from leading to injuries (primary prevention measures might include putting protective barriers around fires, discouraging people from smoking in bed, and wearing protective gear while working or participating in sports).

- Secondary intervention involves early diagnosis and appropriate management of an injury (e.g. applying basic first aid at the scene of an incident to stop an injury from having more serious consequences).

- Tertiary intervention, and improving the final outcome (e.g. rehabilitation), involves preventing further complications in the form of more severe injury, disability or death (e.g. giving an injured person crutches or a cane). (1, 10)

Figure 2.10 The injury spectrum

Source: WHO (2004), Injury Surveillance Guidelines 2004

2.1.3.3 Risk factors of RTI

A number of risk factors for RTIs had been indentified and discussed by WHO (1). These factors are summarized as:

- Factors influencing exposure to risk: example economic factors like economic development and social deprivation, demographic factors, miting high-speed vehicles with unprotected road-users, insufficient attention to traffic laws, and speed limits.

- Risk factors influencing crash involvement: inappropriate and excessive speed, presence of alcohol or recreational drugs, fatigue, being a young male road-user, a vulnerable road-user in an urban setting, travelling in darkness, unsafe vehicles, and road design.

- Risk factors influencing injury crash severity: inappropriate and excessive speed, inadequate use of seat-belts or child restraints, not wearing helmets by two-wheeled vehicle road-users, and insufficient vehicle crash protection.

- Risk factors influencing post-crash injury: delay in detecting crash and transporting victims to medical facilities, presence of fire due to a collision, presence of alcohol and other drugs, lack of appropriate pre-hospital services, lack of appropriate care in hospital emergency wards.

This study focuses on socio-economic factors: speeding, alcohol and drugs consumption, driver fatigue, distraction, road-related factors, vehicle-related factors, helmet wearing, and pre-hospital services.

Speed management:

Speed has been identified as a key risk factor in RTIs, influencing both the risk of road traffic crashes and the severity of the injuries that result from them. Higher speeds lead to a greater risk of a crash and a greater probability of serious injury if one occurs. This is because, as speed increases, so does the distance travelled during the driver's reaction time and the distance needed to stop. Also, at speed, the effects of drivers' errors are magnified. In a crash, the higher the speed the greater the amount of mechanical (kinetic) energy that must be absorbed by the impact. Thus, there is more likelihood of serious injury. (2)

Speed management aims to reduce the number of road traffic crashes and the serious injury and death that can result from them. Speed management needs to employ a range of measures that will include enforcement, engineering and education.

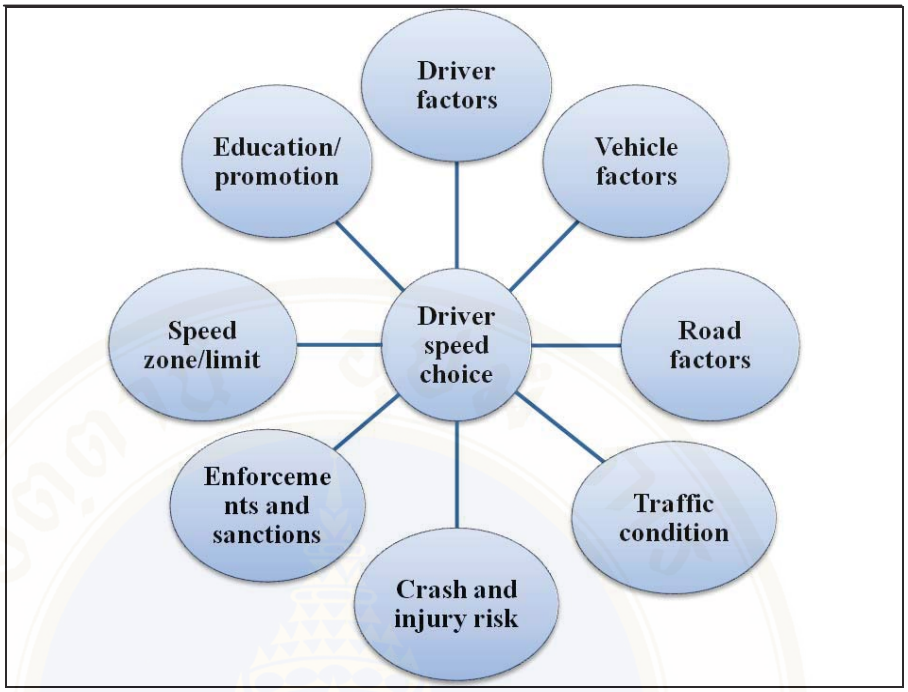


Figure 2.11 Factors effecting speed choice

Source: WHO 2004, Road Traffic Injury Prevention

Average speed limits in high-income countries

Urban roads	30–50 km/h
Main highways or rural roads	70–100 km/h
Motorways	90–130 km/h

Figure 2.12 Average speed limits in high-income countries

Source: WHO 2004, Road Traffic Injury Prevention

Drinking Alcohol:

Alcohol is a psychotropic substance that acts as a depressant on the central nervous system resulting in reduced perception and consciousness. It is this impairment of function that makes it a major risk factor for road traffic crashes.

Research indicates that a driver with a blood alcohol concentration (BAC) of 80mg/100ml blood is 2.7 times more likely to be involved in a crash compared to a

driver at zero BAC. Anecdotal evidence suggests motorcyclists may be at even greater crash risk than drivers at the same BAC.

Alcohol consumption in Vietnam is high, The Institute for Health Policy and Strategy year reported average consumption of 64g/day, substantially higher than the hazardous consumption threshold of 40g/day.

Official data suggests that 6 percent of all road traffic crashes are associated with alcohol; however this is likely a substantial under-estimation. The National Forensic Medicine Institute found in 2001, that in a sample of 500 fatal crashes, 34 percent were associated with a BAC in excess of national limits.

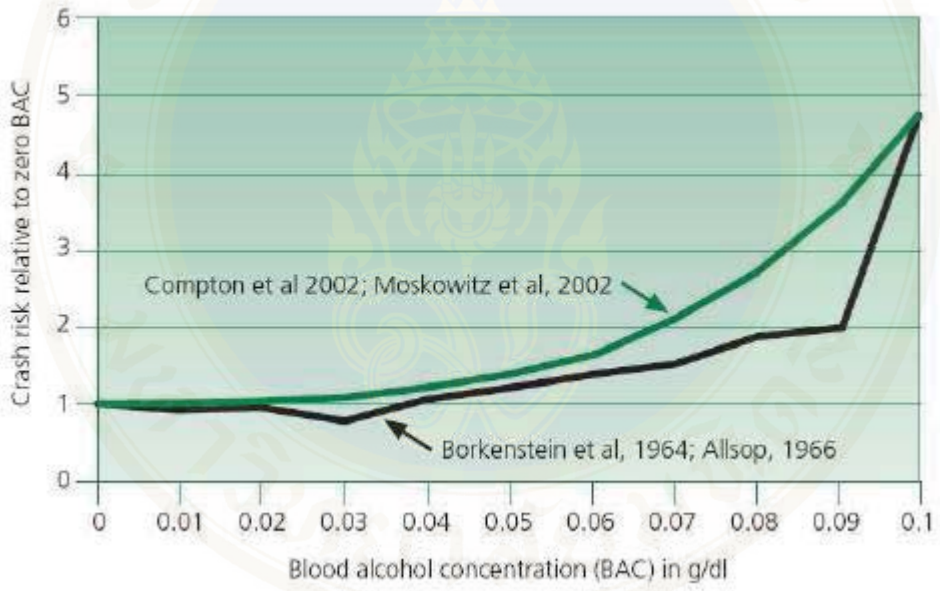


Figure 2.13 Crash risk increases exponentially as BAC increases

Source: WHO, Country office for Vietnam 2007

Drinking and driving increases the risk of a crash, and can result in death or serious injury. WHO recommends a blood alcohol concentration limit of 0.05 grams per deciliter (g/dl) for adult drivers. Less than half of the countries worldwide have drink–driving laws set at this limit. (1, 46)

Driver fatigue or sleepiness is associated with a range of factors including long-distance driving, sleep deprivation, and the disruption of circadian rhythms. Two high-risk groups have been identified :(1, 42)

Drivers driving while feeling sleepy

Drivers driving after less than five hours of sleep in the preceding 24 hours

Distraction:

Using a mobile phone, iPod or other electronic device, even if it is operated using hands free devices, leads to slower information processing and consequently an increased risk of a crash. The use of hand-held mobile telephones can adversely affect driver behavior – as regards physical as well as perceptual and decision-making tasks. The process of dialing influences a driver's ability to keep to the course on the road. Results of studies on distraction and mental load show that driver reaction times are increased by 0.5 to 1.5 seconds when talking into a mobile telephone. There is also some evidence that drivers who use mobile telephones while driving face a risk of a crash four times higher than those who do not. (1, 42)

Wearing helmets:

Helmets are a highly effective intervention for the prevention of head injuries and deaths associated with road traffic crashes. Evidence from Cochrane shows helmets can reduce the risk of death by 42 percent and serious injuries by 69 percent. Examples of successful introduction of mandatory helmet legislation include Taiwan China and Thailand which achieved a 33 percent and 41 percent reduction in head injuries respectively. Helmet legislation in Vietnam was first introduced in 2000, followed by a mandatory requirement for helmet wearing on specific roadways including national highways and assigned routes in 2001. Enforcement and therefore effectiveness of this legislation was limited.

In June 2007, the Government introduced new legislation that mandated all motorcycle riders and passengers to wear a helmet on all roads. The results from an analysis of hospital trauma in motorcyclists has shown a 16 percent reduction in the risk of road traffic head injuries in the first three months of the mandatory helmet law, compared to the three months prior to the law. Whilst not limited to just helmets, by November 2008, road traffic deaths have decreased by more than 1450 compared to the same time in 2007. (1, 14, 42, 47)

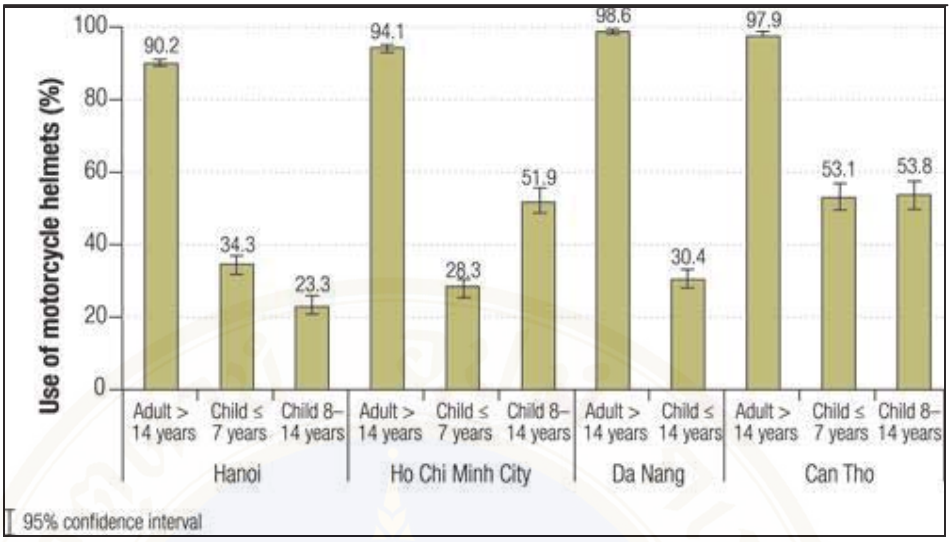


Figure 2.14 Observed proportion of adults and children wearing motorcycle helmets in four cities in Vietnam, 2008

Source: WHO, Country office for Vietnam 2007

Types of road user

Although all types of road user are at risk of being injured or killed in a road traffic crash, there are notable differences in fatality rates between different road user groups. In particular, "vulnerable" road users such as pedestrians and two-wheeler users are at greater risk than vehicle occupants and usually bear the greatest burden of injury. This is especially true in low-income and middle-income countries because of the greater variety and intensity of traffic mix and the lack of separation from other road users. Of particular concern is the mix between slow-moving and vulnerable non-motorized road users, including motorcycle riders, and fast-moving motorized vehicles.

According to statistics, 46 percent of total accidents happen on the national road network and 30 percent occurred on urban roads. 14 percent and 10 percent, respectively while a share of accidents which occurred on provincial roads and others road most accidents on national roads speeding and poor awareness of road users are the main reasons for accidents (see figure 2.15) (11, 13)

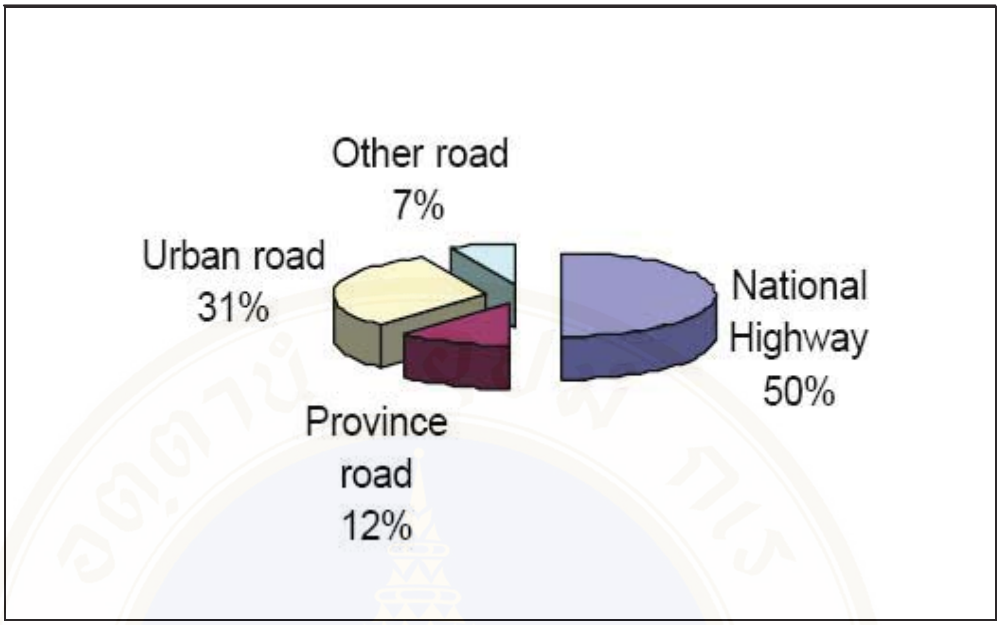


Figure 2.15 Place of traffic accident in 2004

Source: WHO, Country office for Vietnam 2007

2.2 Theoretical model

2.2.1 The Health Belief Model (HBM)

The Health Belief Model (HBM) was one of the first theories of health behavior, and remains one of the most widely recognized. It was developed in the 1950s by a group of U.S. Public Health Service social psychologists who wanted to explain why so few people were participating in programs to prevent and detect disease.

Components of the health belief model

Perceived Susceptibility:

Personal risk or susceptibility is one of the more powerful perceptions prompting people to adopt healthier behaviors. The greater the perceived risk, the greater the likelihood of engaging in behaviors to decrease the risk, It is only logical that when people believe that they are at risk of a disease, they will be more likely to

do something to prevent it from happening. Unfortunately, the opposite also occurs. When people believe they are not at risk or have a low risk of susceptibility, unhealthy behavior tends to result.

Perceived seriousness:

The construct of perceived seriousness speaks to an individual's belief about the seriousness of disease. While the perception of seriousness is often based on medical information or knowledge, it may also come from beliefs a person has about the difficulties a disease would create or the effects it would have on his or her life in general (McCormick- Brown, 1999). When the perception of susceptibility is combined with seriousness, it results in perceived threat (Stretcher & Rosenstock, 1997). If the perception of threat is to a serious disease for which there is a real adverse physical consequence, behavior often changes.

Perceived Benefits:

The construct of perceived benefits is a person's opinion of the value or usefulness of a new behavior in decreasing the risk of developing a disease. People tend to adopt healthier behaviors when they believe the new behavior will decrease their chances of developing a disease. Would people wear helmet when driving if they didn't believe it was preventing RTI?

Perceived benefits play an important role in the adoption of secondary prevention behavior, such as screenings.

Perceived barriers

This is an individual's own evaluation of the obstacles in the way of him or her adopting a new behavior. Of all the constructs, perceived barrier are the most significant in determining behavior changes (Janz & Becker, 1984). In order for a new behavior to be adopted, a person needs to believe the benefits of the new behavior outweigh the consequence of continuing the old behavior (center for disease control and prevention, 2004). This enables barriers to be overcome and the new behavior to be adopted.

Modifying Variables

The four major constructs of perception are modified by other variables, such as culture, education level, past experience, skill, and motivation, to name a few. These are individual characteristics that influence personal perceptions.

Cues to action

In addition to the four beliefs or perceptions and modifying variables, the HBM suggests that behavior is also influenced by cues to action. Cues to action are events, people, or things that move people to change their behavior. Examples include illness of a family member, media reports (Graham, 2002,), mass media campaign or health warning labels on a product. Displays on college campuses of motorcycles involved in fatal crashes from drunk driving is an example of cues to action supporting don't drink and drive campaign.

Self- efficacy

People generally do not try to do something new unless they think they can do it. If someone believes a new behavior is useful (perception benefit), but does not think he or she capable of doing it (perception barrier), It is unlikely to tried.

In summary, according to the Health Belief Model, modifying variables, cues to action, and self-efficacy affect person's perceptions of susceptibility, seriousness, benefit, and barriers, and therefore, person's behavior. (39)

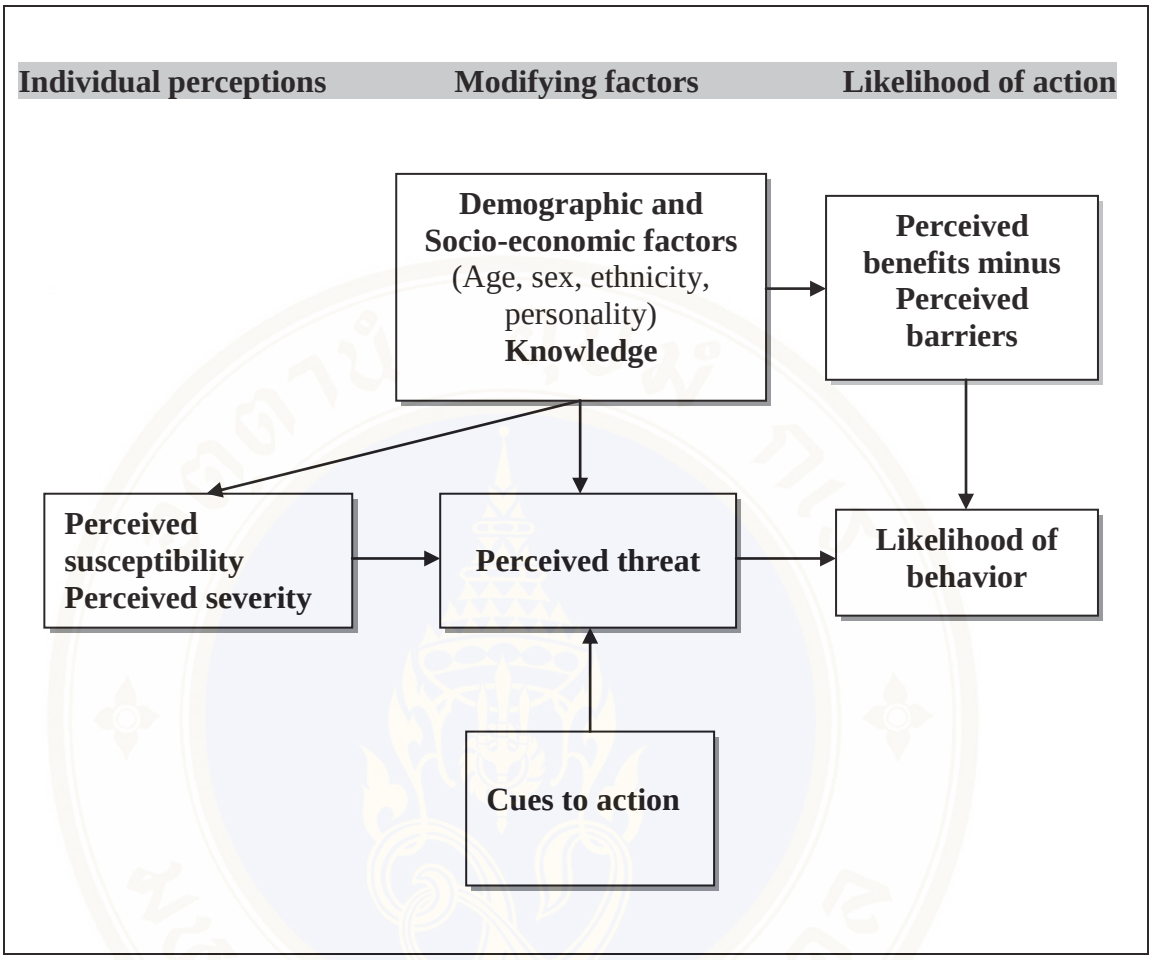


Figure 2.16 the Health Belief Model

2.2.2 The health belief Model and RTI behavior change

Health behavior models including perceived vulnerability do not explain about how risk perceptions accrue. Studies suggest, however, that people take account of objective medical risk factors when assessing perceived susceptibility to health hazards. A recent study of women's perceived risk to various chronic diseases revealed that psychological factors such as perceived similarity to women who contract disease predicted women's perceived susceptibility above and beyond several other medical risk factors. It has been argued that people seem to be able to incorporate knowledge about their family health history, personality and physical and

psychological conditions into their risk perceptions but do not easily recognize the relationship between their own actions and the risks they run. It is evident, however, from a number of studies that those who confirm engagement in risk taking behaviors, such as dangerous driving and excessive alcohol consumption, rate themselves as more vulnerable to health hazards than their peers. Whilst the role of attitudes and beliefs has long been considered crucial in the prevention and control of infectious and non-communicable diseases, to date there have been few qualitative investigations of injuries. Population-based studies focusing on perceived risk of RTIs have yet to be conducted in sub-Saharan Africa. (23, 39)

The application of the HBM to this study

There were applied the model based on design of factors and the dependent variable according to the components of the HBM with conversing to the modified (applied) model (figure). The HBM was the model could be explaining the process or relationship between the independent factors and the dependent factor in this study.

Age, gender, allowance, kind of residence, having a driving license, driving experience was selected as the key socio-demographic factor, affecting the preventive behavior of student motorcycle riders. Regarding knowledge of the students, were mentioned on the risk factors of RTI.

The perception of university students was mentioned in respect of hazards of RTI, benefits and barriers on implementations of RTI prevention.

Cue to action were the information sources which provide correct information to university students.

Perceptions of personal control have a big influence on behavior: people do not act on attitudes if they believe they cannot perform the required behavior. When people think they can control their behavior, perceptions are effective in guiding action. This is because perceptions of control produce intentions that then guide attitude-consistent behavior. Perceptions can influence behaviors in two different ways: 1.they can directly trigger consistent behaviors with little intervening thought; and 2.they can influence behaviors after extensive and deliberate consideration or processing; thought causes the formulation of intention.

2.3 Related study

A study by Luong Xuan Hien (50) involved 1000 students from Technical and Teachers College of Thai Binh city in Vietnam with a mean age of 22.1±3.3 years , 12.3 percent of the participants answered that they regularly drove despite alcohol or drug impairment, and 17.2 percent used a mobile phone “always” or “sometimes” while driving a two-wheel vehicle. Of the motorcyclists, 48.7 percent "always", and 47.7 percent "sometimes", wore a helmet. The main source of information about road safety were television (73.3%) and school (46.9%) followed by friends (26.7%), newspapers (26.6%), radio (26.3%) and family (24.7 %). (16)

A study by Nguyen Thi Lien Huong and Nguyen Thi Hong Tu (51) of 2800 households in seven districts in Hanoi showed that the injury morbidity rate was 1134/100,000, and the injury mortality rate was 23.7/100,000. There was no significant difference in age or sex between injury severity levels. RTIs were the leading cause of injury. Causes of injury mortality differed among different age groups. Only 4 percent of injured cases were transported to hospital by ambulance. RTIs were found to be the leading cause of both injury morbidity and mortality in study of them. That may well be due to the increasing motorization of travel in Vietnam, especially in the major cities. This finding corresponds with those of many other studies in Vietnam. Some studies show that RTIs result in approximately 72 percent of traumatic brain injuries, which resulted in a high proportion of mortality and permanent disabilities if early treatment or surgery were not provided. (14)

According to the WHO country office for Vietnam, observations of helmet wearing in a sample of provinces shortly after the law indicated (In June-2007) average wearing in adults of 96 percent, but only 39 percent of children, and it was also found that up to 80 percent of helmets sold did not meet the national standard. Official data suggests that 6 percent of all road crashes are associated with alcohol; however this is probably a substantial under-estimation.

A study by Nguyen Thi Lien Huong (15) of injury and pre-hospital trauma care in Hanoi, Vietnam showed that the total number of deaths due to injuries was 128, yielding an injury mortality rate of 23.7 per 100,000, and the rates of major and severe injury morbidity rates for males was three times as high as for females.

A study by Hok Sirany (37) of the factors related to motorcycle accidents among motorcycle rider in Saliya, Phutthamonthon district, Nakhon Phathom provice, Thailand found that males had accidents much more than females. This study also found that drivers who had had 5 years or less driving experience had the same accident rates as those who had had 6-10 years driving experience or more than 10 years. With regard the risk behavior factors, 59.0 percent of the motorcycle riders said they never used alcohol before driving, 31.5 percent said they drank sometimes, and only 9.5 percent said they drank often when they drove a motorcycle. Regarding the use of some kind of medicine or drug abuse while riding a motorcycle, 84.3 percent of the respondents said that never used any kind of medicine, 97.1 percent never abused drugs, and 14.7 percent used medicine or drugs sometimes. Regarding helmet use by of riders, more than half of the respondents said that they always used a helmet while riding a motorcycle and the rest used a helmet only sometimes or never. High risk occurred among those driving at 51-80 km/hour. The majority stated that they broke traffic rules often.

A study by Dr Yahia (52) of the attitudes and practice of 200 students of health sciences college in Saudi Arabia regarding road traffic regulations showed that more than half of the students had been involved in road traffic accidents, 22 percent of these had been injured, and 13 percent admitted to hospital for an average of nine days. High speed was the main cause of the accidents. The degree of knowledge about road traffic regulation was moderate to high in more than 75 percent of the students, while more than 90 percent of them believed in the importance of the use of seat belts. (49)

A review of risk factors and patterns of motorcycle injuries by Mau-Roung Lin (19) showed that drinking motorcycle riders were more likely to be involved in a

crash than nondrinking riders through lost control of their vehicles, . They were also more likely to have lower rates of helmet use, more-severe head injuries, and higher ISS levels. Less driving experience is associated with a higher risk of motorcycle crashes and injuries. Formal driver training was expected to increase riding skills and reduce the risk of motorcycle crashes and injuries. However, riders who received training had no significant reduction in the risk of motorcycle crashes compared with those who had not. There was evidence that the risk-taking characteristics of young riders contributed to the high risk of the motorcycle injuries, and risk-taking behaviors among motorcycle drivers may include speeding, drinking while driving, not using a helmet while driving and these behaviors are correlated with each other.

A study by Pilar Ramos (24) of young people's perception of traffic injury risks, perception and enforcement measures showed that young people in Spain are aware that road traffic crashes are an important problem and leading cause of morality among them, and that participants point out the lack of effectiveness of school driver education, but they do not recognize the contribution to reduction of traffic injuries through well executed mass media campaigns.

A study by Li-Ping Li (17) of improper motorcycle helmet use in provincial areas of a developing country showed that: A large proportion of both drivers and passengers (34% and 71% respectively) did not wear a helmet, or did not have their helmet fastened (34% and 14%). Proper helmet usage rates were lower among male drivers, younger people, on secondary streets, and during the evenings and weekends. The majority of the 2325 drivers interviewed (90%) acknowledged the benefits of helmet wearing, but 72 percent reported that helmet are not always comfortable, and only 20 percent said they would wear a helmet for preventive purposes.

A study by Anne Nordrehanug (23) of perceived susceptibility and causes of RTIs in an urban and rural area of Tanzania showed that: in Dar es Salaam 75 percent and 82 percent of males and females, respectively, perceived it as likely that thet would experience a RTI in general. Factors associated with high perceived

vulnerability as a pedestrian or being injured by a bicycle were amount of road safety information received from health workers and friends, having caused a car to swerve and having crossed a road while talking. Respondents perceived driver reckless and driver drunkenness as the leading causes of RTIs in both areas.

A study by Craig D. Newgard (26) of the relationship between age and serious injury in motor vehicle crashes in United States showed that: one hundred thousand one hundred and fifty-six adult front-seat occupants were included in analysis, of which 14,128 (2%) were seriously injured. The association between age and serious injury was modified by both gender and seat position. When the probability of injury by age was plotted separately for both women and men, the relationship with injury appeared quite different. Among women, the risk factors of injury remained relatively flat until about 40 years. For men, the probability of injury increased abruptly from 15 to 25 years, and then plateaued after approximately 30 years.

A study by Khalid A.J (55) of factors related to motorcycle accidents in Bangkok, Thailand 2002 showed that young people aged from 21 to 30 years with low education background were more prone to motorcycle accidents. Regarding personal risk factors, this study showed that regular helmet user, fast young age riders with less driving experience were directly related to the occurrence of motorcycle accidents.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Study design

This cross-sectional study describes the factors related to preventive behavior on RTIs of student motorcycle riders at Hanoi Medical University in Vietnam. The independent variables include: socio-demographic factors, knowledge about RTIs, perception towards RTIs and cues to action. In this research the relationship between the independent variables and preventive behavior on RTI was investigated.

3.2 Study area

Hanoi Medical University was selected for study area. Its location is in the centre of Hanoi, the capital of Vietnam. There were more than 2,000 students in 2009 divided into 6 years of study from the first year to the sixth year.

3.3 Study population

The target population was student motorcycle riders at Hanoi Medical University in Vietnam. The total of student motorcycle riders were 1,268 students including:

- 305 first year students
- 332 second year students
- 166 third year students
- 194 fourth year students
- 145 fifth year students
- 126 sixth year students

3.4 Sample size and sampling technique

3.4.1 Sample size estimation

Sample size was estimated for proportion without replacement according to the following formula: (Cochran 1963)

$$n = \frac{Z^2 \times N \times P \times (1-P)}{Z^2 \times P \times (1-P) + (N-1) \times E^2}$$
$$= \frac{1.96^2 \times (1268) \times (0.42) \times (0.58)}{1.96^2 \times (0.42) \times (0.58) + (1268-1) \times (0.06)^2}$$
$$= 216$$

Where: at

n = the desirable calculated sample size

Z = Standard normal score set at 1.96, corresponding 95% confident interval ($\alpha = 0.05$)

P = 0.42 (The Survey of Attitudes of Vietnamese Youth (SAVY) estimated that 42 percent of Vietnamese youth aged 22-25 had sustained at least one RTI in 2007) (44).

q= 1- p

N = Total number of sample population; 1,268

E = degree of accuracy desired, setting at 0.06 (6%).

To prevent information loss from incomplete data or withdrawal of participants from this study, the sample size was increased by 10 percent. Therefore, the sample was 240.

3.4.2 Sampling technique

The estimated sample size of 240 university student motorcycle riders was divided into six groups by proportional to size method. Therefore, the number of university students in each grade was:

Number of the first year $\frac{305 \times 240}{1268} = 58$ students

Number of the second year $\frac{332 \times 240}{1268} = 63$ students

Number of the third year $\frac{166 \times 240}{1268} = 31$ students

Number of the fourth year $\frac{194 \times 240}{1268} = 37$ students

Number of the fifth year $\frac{145 \times 240}{1268} = 27$ students

Number of the sixth year $\frac{126 \times 240}{1268} = 24$ students

Finally the number of respondents in each grade was selected by simple random sampling without replacement.

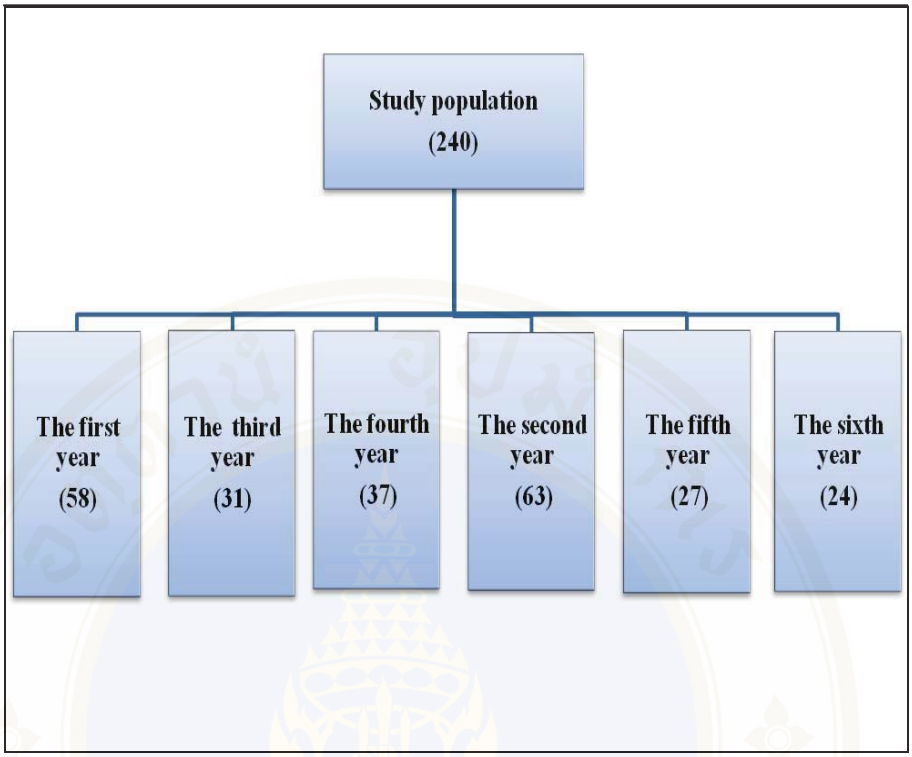


Figure 3.1 Sampling technique

3.5 Research instrument for data collection

The instrument in this study for collection of data was a self-administered questionnaire. The questionnaire included the following parts:

Part 1: Socio-demographic characteristics

Age: in this study, age was from 18-25 years old.

Gender: in this study, gender was categorized into two groups Male or Female.

Residence: in this study, residence was categorized into two groups: the students lived in a dormitory at university or lived outside.

Allowance: was divided into three categorizes: group 1: Less than 1,500,000 VND per month; group 2: 1,500,001 - 2,500,000 VND per month and group 3: More than 2,500,000 VND per month.

Driving license: in this study, driving license was categorized into two groups: having or not having a driving license.

Driving experience: it was categorized by years.

Part 2: Knowledge about RTI prevention.

This part was concerned with psychosocial factors about the knowledge of university student motorcycle riders towards road injury prevention.

Knowledge: Multiple choice questions were used for knowledge about RTI prevention. A correct answer was given "1" point and an incorrect answer was given zero "0". Knowledge was divided into three groups. According to Benjamin S Bloom criteria (40, 41):

Group1: Poor if score less than 60% total of score
Group 2: Moderate if score from 60-80% total of score
Group 3: Good if score more than 80% total of score.

In this part, there were 15 questions with a possible maximum score of 15. Thus, the classification of score level was categorized into 3 level of knowledge as:

-Low: if score less than or equal 8
-Moderate: if score from 9 -12
-High: if score equal or more than 13

Part 3: Perception

Perception in this study was divided into perceptions toward hazard of RTI, perceptions towards benefits and barriers of implementing prevention practices. There were 27 statements, and in each part had 9 statements. The score was given follows:

-For positive question:

+Strongly agree = 5

+Agree = 4

+Uncertain = 3

+Disagree =2

+ Strongly disagree =1

-For negative question:

+Strongly agree = 1

+Agree = 2

+Uncertain = 3

+Disagree =4

+ Strongly disagree =5

Then perception was categorized into three levels according to Best Rating Criteria (40, 41) as follow:

Class interval (CI) = (Maximum score – Minimum score) / No of categorized level

Therefore CI of Perception towards RTI prevention was 36 (Maximum score 135 minus minimum score 27 and divided by 3) and CI for each part was 12.

The level of perception towards RTI prevention was categorized as:

-Low: if score from 27 to [27 + 36] = 63

-Moderate: if score from 64 to [27 + (2 x 36)] = 99

-High: if score from 100 to [27 + (3 x 36)] = 135

And the level of each part (perception toward hazards of RTI, perception towards benefits, and barrier on implementations of RTI prevention) was categorized as:

-Low: if score from 9 to [9 + 12] = 21

-Moderate: if score from 22 to [9 + (2 x 12)] = 33

-High: if score from 34 to [9 + (3 x 12)] = 45

Part 4: Cues to action

This part included the influence of media and influence of person on the preventive behavior on RTI of the respondents. It includes 1 question with 9 answer options; the respondents could choose more than one option.

Part 5: Preventive behavior on RTI

This part included 11 questions with a possible total score of 44 points relating to student motorcycle riders' behavior on RTIs. Question topics included: wearing a good-quality helmet, controlling speed, drinking and driving, drug use, using mobile phones and iPod while driving, fatigue, using safe motorcycles.

The point was given:

-Always =4

-Sometimes = 3

- Rarely =2

- Never =1

Total scores were categorized into 2 levels as good and poor behavior. (40, 41)

Good: If score > Median

Poor: If score ≤ Median

3.6 Pre-Testing of the Questionnaire

A questionnaire was developed according to the study objectives, and conceptual framework. The thesis advisors, experts, colleagues and the thesis committee were consulted. The final questionnaire was finalized.

The questionnaire was tested on 30 respondents with similar characteristics to the study group at Hanoi University of Odonto-stomatology in Vietnam.

Thereafter, the reliability and validity of questionnaire concerning knowledge, perception, and preventive behavior on RTIs were done assessed. The Cronbach's alpha method for perception part and preventive behavior part, and Kuder Richardson (KR20) for Knowledge part as follows:

Knowledge:	Reliability of KR20 coefficient	= 0.718
Perception:	Reliability of Cronbach's alpha	= 0.748
Preventive behavior:	Reliability of Cronbach's alpha	= 0.718

After pre-testing and testing for reliability and validity then questionnaire was modified before using for data collection in this study.

3.8 Data collection

After obtaining the permission from the Mahidol University Ethics Committee, data collection was completed as follows:

1) A formal letter from the AIHD was sent to the directors of the university asking permission to collect data in the university.
2) After getting permission from the university directors, the researcher contacted university students, and explained the purposes and process of this study, confirmed protection of their legal and ethical rights.
3) The self-administered questionnaire used to collect data in this study was translated into Vietnamese.
4) The questionnaire was distributed to the respondents who were willing to participate in this research and needed about 15 to 20 minutes to answer it.
5) After students finished the questionnaires, they put them into boxes provided by the researcher in the front of the class room.

3.9 Data analysis

After examination and correction of each returned questionnaire, the data was processed by statistical program. Descriptive statistics was used to analyze socio-demographics, knowledge, perception, cues to action and preventive behavior using frequency, percentage, mean, standard deviation, and median, maximum, minimum. The relationships between the socio-demographics, knowledge, perception, cues to action factors respectively with preventive behavior were analyzed using Chi-square and fisher's exact test. The confidence level for this study was set at 95 percent.

CHAPTER IV
RESEARCH RESULTS

This study was conducted to describe the preventive behavior on RTIs of student motorcycle riders at Hanoi Medical University in Vietnam, and to identify the relationship between the preventive behavior regarding RTI and the socio-demographic factors, the psychosocial factors, the cues to action of those students respectively. The data was collected from 240 students by a self-administered questionnaire in January 2010. All 240 participants were given the questionnaire, and 238 questionnaires were fully completed by the respondents; 2 questionnaires were not completed.

The results of this cross-sectional study are presented in tables using frequency and percentage distribution to describe respondents' characteristics, their cues to action, knowledge, perceptions and preventive behavior. The association between the dependent variable and independent variables was statistically analyzed by Chi-Square test, and Fisher Exact test with the level of significance set at $\alpha = 0.05$.

The study result is presented in 5 parts according to the conceptual framework:

Part 1: Socio-demographic factors

Part 2: Knowledge of respondents regarding RTIs

Part 3: Perception of respondents towards RTI prevention

Part 4: Cues to action

Part 5: Preventive behavior regarding RTIs

Part 6: The association between the independent variables and preventive behavior

4.1 Socio-demographic factors

Table 4.1 shows that the majority of respondents (66.0%) were aged between 18 and 21 years; the remaining 34.0 percent were aged between 22 and 25 years. The minimum and maximum ages were 18 and 25, respectively; the mean was 20.89 and standard deviation was 2.04.

According to gender, more than half of respondents (51.28%) were female, while the remaining 48.72 percent were male.

76.91 percent of the respondents received a monthly student allowance of 1,500,000 VND; 20.24 percent received 1,500,001 to 2,500,000 VND; and 2.85 percent received more than 2,500,000 VND. The mean allowance was 1,390,000 VND with standard deviation of 499,600 VND, a minimum of 500,000 and a maximum of 3,000,000 VND.

Regarding kind of residence, more than half of respondents (53.83%) stayed at the university dormitory, while 29.05 percent stayed outside the university, and only 17.12 percent of respondents stayed with their families.

Regarding the driving license, a large majority (85.30%) of the respondents had a driving license, while only 14.70 percent respondents did not.

Regarding the riding experience of respondents, the majority (81.92%) of the respondents had ridden less than 5 years, while only 18.08 percent had ridden at least 5 years.

With regard to RTIs, more than one-third (39.54%) of the respondents had had at least one RTI in the previous two years, while the remaining 60.46 percent had not. Of the respondents who had had a RTI, 57.35 percent had had only one, 29.81 had had two, 6.42 had had three, 4.22 percent had had four and 2.2 had had more than four RTIs.

Table 4.1 Number and Percentage of Respondents by Socio-Demographic Characteristics

Socio-Demographic characteristic N = 238	Number (n)	Percent (%)
Age group (year)		
18-21	157	66.00
22-25	81	34.00
Mean = 20.89 SD = 2.00 Min = 18 Max = 25		
Gender		
Male	116	48.72
Female	122	51.28
Allowance (VND/month)		
≤ 1,500,000	183	76.91
1,500,001 – 2,500,000	48	20.24
>2,500,000	7	2.85
Mean = 1,390,000 SD = 499,600 Min = 500,000 Max = 3,000,000		
Kind of residence		
Dormitory of University	128	53.83
Outside University	69	29.05
With family	41	17.12

Table 4.1 Number and Percentage of Respondents by Socio-Demographic Characteristic (cont.)

Socio-Demographic characteristic N = 200	Number (n)	Percent (%)
Driving license		
Yes	203	85.30
No	35	14.70
Riding experience (years)		
< 5 years	195	81.92
≥ 5years	43	18.08
RTIs		
Yes	94	39.54
No	144	60.46
Number of injury in the past 2 years (times)		
1	54	57.35
2	28	29.81
3	6	6.42
4	4	4.22
≥5	2	2.20

4.2 Knowledge of respondents about RTI prevention

Table 4.2 shows that nearly two-third of the respondents (64.33%) had a moderate knowledge level, while 24.41 percent and 11.26 percent of the respondents had good and poor levels, respectively.

Table 4.2 Number and Percentage of Respondents by Level of Knowledge about RTI

Level of Knowledge N=238	Number (n)	Percent (%)
Good	58	24.41
Moderate	153	64.33
Poor	27	11.26

Score: Poor 3 – 8, Moderate 9 – 12, Good 13 – 15

Table 4.3 provides information about the respondent's knowledge of RTIs. Most of the respondents (more than 90%) answered correctly about RTI risk factors, eye protection, and how to drive at night safely, 60 to 80 percent of respondents answered correctly about the legislation defines in Vietnam, how to prevent RTIs, the major factors in accidents caused by motorcycle, while only about 50 percent of respondents answered correctly about requirements for wearing a helmet, legislation sets the maximum legal motorcycle speed limited, reflective helmet and clothing.

Table 4.3 Number and Percentage of Correct Answer of Knowledge about RTI

Questions/ Items	Correct Answer (n)	Correct Answer (%)	Comment
1. In Vietnam, legislation defines a prohibited blood alcohol concentration (BAC)?	192	80.72	Good
2. In Vietnam, legislation defines prohibited breath alcohol content (BrAC) as?	157	73.51	Moderate
3. In Vietnam legislation sets the maximum legal motorcycle speed limited as?	142	59.74	Poor
4. Which of the following is not a risk factor influencing crash involvement?	219	92.05	Good
5. Which of the following may prevent a road traffic accident?	187	78.62	Moderate
6. What are the requirements for wearing a helmet?	119	50.04	Poor
7. Which of the following statements about eye protection is true?	217	91.22	Good
8. Which of following statements is true? When riding at night the rider should:	212	89.13	Good
9. How can you avoid confusing other drivers?	193	83.13	Good
10. What is the major factor in accidents caused by motorcycles?	198	83.21	Good

Table 4.3 Number and Percentage of Correct Answer of Knowledge about RTI (cont.)

Questions/ Items	Correct Answer (n)	Correct Answer (%)	Comment
11. What is the best way to stay out of trouble while riding a motorcycle?	89	37.46	Poor
12. A motorcycle rider has an advantage over a car when passing parked vehicles because?	154	64.70	Moderate
13. Which of the following statements is true about brightly colored, reflective helmets and clothing?	119	50.00	Poor
14. Which of the following statements is true for riders when they are ridding at night?	188	79.00	Moderate
15. When a heavy fog occurs what should motorcycle riders do?	212	89.12	Good

Score: Poor =0-142, Moderate =143-190, Good =191-238

4.3 Perception of respondents towards RTI prevention

Table 4.4 shows that the majority of respondents (89.5%) had high levels perception towards hazard of RTIs, while the remaining 10.5 percent had moderate levels and no respondent had a low level of perception.

Table 4.4 Number and Percentage of Respondents by Level of Perception towards Hazard of RTIs

Level of Perception towards Hazard of RTIs N=238	Number (n)	Percent (%)
High	213	89.50
Moderate	25	10.50
Low	0	0

Score: Low = 9-21, Moderate= 22-33, High= 34-45

Regarding perception towards the benefits of implementing preventive behavior, Table 4.5 shows that, a vast majority (87.71%) of the respondents had a high perception level, while remaining only 12.29 percent had moderate levels and no respondent had a low level.

Table 4.5 Number and Percentage of Respondents by Level of Perception towards Benefit on Implementation of Preventive Behavior

Level of Perception towards Benefit N=238	Number (n)	Percent (%)
High	209	87.71
Moderate	29	12.29
Low	0	0

Score: Low = 9-21, Moderate= 22-33, High= 34-45

Regarding perception towards barriers, most respondents (89.47%) had moderate level, 5.51 percent had high level, and only 5.02 percent had low level of perception. (Table 4.6)

Table 4.6 Number and Percentage of Respondents by Level of Perception towards Barrier on Implementation of Preventive Behavior

Level of Perception towards Barrier N=238	**Number** (n)	**Percent** (%)
High	13	5.51
Moderate	213	89.47
Low	12	5.02

Score: Low = 9-21, Moderate= 22-33, High= 34-45

Table 4.7 shows the level of perception towards RTI prevention of respondents. All respondents had high or moderate perception levels, a majority (78.24%) had high levels, while the remaining 21.76 percent had moderate levels, and none of them had a low level.

Table 4.7 Number and Percentage of Respondents by Level of Perception towards RTI Prevention

Level of Perception towards RTI Prevention N=238	**Number** (n)	**Percent** (%)
High	186	78.24
Moderate	52	21.76
Low	0	0

Score: Low = 27-63, Moderate= 64-99, High= 100-135

Table 4.8 shows the frequency and percentage distribution of the respondents' perceptions towards the preventive behavior regarding RTIs. Most of the respondents strongly agreed with hazard of RTI. More than 80 percent of the respondents strongly agreed or agreed that wearing a motorcycle helmet correctly could reduce RTIs, that using a mobile phone when driving is a RTI risk factor, that using a motorcycle good condition causes fewer RTIs consequences; that traffic laws are necessary for all drivers; and that motorcycles should have a regular check-up. About 40 percent of the respondents strongly agreed or agreed that wearing a helmet is uncomfortable; and that it is difficult to follow the traffic laws. Only a few (less than 30 percent) agreed that listening to music when driving is the young style, and that a regular motorcycle check-up are not possible.

Table 4.8 Number and Percentage of Respondents according to different Items of Perception towards RTIs Prevention

Statements/Items N=238	* SA	A	U	D	SD	Comment
	n (%)	n (%)	n (%)	n (%)	n (%)	
Perception towards hazard of RTIs						
1. RTI is a public health problem and a leading a cause of death in the world	123 51.70	87 36.60	14 5.90	13 5.50	1 0.40	High
2. Motorcycle accidents cause severe injuries or permanent disability	178 74.82	59 24.83	1 0.45			High
3. Children may suffer permanent disability a road traffic accident.	139 58.40	75 31.50	16 6.70	4 1.70	4 1.70	High
4. Brain injuries are a common Cause of death in road crashes an involving motorcycles	99 41.61	106 44.50	16 6.73	12 5.02	5 2.04	High
5. I usually risk RTI	82 34.55	103 43.32	30 12.61	11 4.51	12 5.01	High
6. RTI can lead to long-term absence from work.	95 39.90	111 46.61	16 6.65	9 3.82	7 7.02	High

Table 4.8 Number and Percentage of Respondents according to different Items of Perception towards RTI Prevention (cont.)

Statements/Items N=238	* SA	A	U	D	SD	Comment
	n (%)	n (%)	n (%)	n (%)	n (%)	
7. Road traffic accidents have indirect costs, such as the value of lost household services and lost earnings of victims and survivors, caregivers and families.	76 31.90	136 57.08	21 8.80	4 1.72	1 0.40	High
8. Road crashes not only place a heavy burden on national and regional economies but also on households	98 41.28	128 53.81	5 2.04	5 2.04	2 0.83	High
9. RTIs directly impact on health care services and costs of providing rehabilitation.	95 39.96	117 49.21	12 5.00	12 5.00	2 0.83	High
Perception towards benefit of implementation of preventive behavior of motorcycle rider.						
10. RTIs can be prevent	100 42.07	121 50.81	11 4.57	4 1.72	2 0.83	High

Table 4.8 Number and Percentage of Respondents according to different Items of Perception towards RTI Prevention (cont.).

Statements/Items N=238	*SA	A	U	D	SD	Comment
	n (%)	n (%)	n (%)	n (%)	n (%)	
11. Wearing a motorcycle helmet correctly can reduce the risk of death or severe injury.	104 43.52	109 45.82	18 7.61	4 1.72	3 1.33	High
12.Alcohol significantly impairs driving ability of adolescents-typically at lower blood concentration levels than is the case for adults	43 18.07	87 36.62	79 33.05	20 8.43	9 3.83	Moderate
13. Using mobile phones when driving is a risk factor of road traffic accidents	71 29.80	122 51.26	37 15.50	4 1.72	4 1.72	High
14. On a motorcycle riders and passengers should use a helmet	125 52.60	96 40.28	11 4.57	4 1.72	2 0.83	High
15.A good condition motorcycle causes fewer traffic accidents consequences	83 34.91	129 54.22	16 6.65	4 1.72	6 2.50	High

Table 4.8 Number and Percentage of Respondents according to different Items of Perception towards RTI Prevention.(cont.)

Statements/Items N=238	*SA	A	U	D	SD	Comment
	n (%)	n (%)	n (%)	n (%)	n (%)	
Perception towards the barrier on implementation of preventive behavior against RTIs						
16.Traffic laws are necessary for all drivers	124 52.16	106 44.50	3 1.32	4 1.72	1 0.40	High
17.A motorcycle must have a regular check-up	111 46.64	112 47.10	9 3.72	3 1.32	3 1.32	High
18.An increase in average speed is directly related both to the likelihood of a crash occurring and to the severity of the crash	78 32.82	129 54.24	21 8.81	7 2.81	3 1.32	High
19.Wearing a helmet is uncomfortable	35 14.72	74 31.14	46 19.23	68 28.60	15 6.31	Moderate
20.It is difficult to follow the traffic laws and regulations	26 10.92	95 39.90	60 25.15	43 18.11	14 5.92	Moderate
21.It is not possible for you to have your vehicle check-up regularly	14 5.92	23 9.71	48 20.14	95 39.91	58 24.43	Moderate

Table 4.8 Number and Percentage of Respondents according to different Items of Perception towards RTI Prevention (cont.)

Statements/Items N=238	*SA	A	U	D	SD	Comment
	n (%)	n (%)	n (%)	n (%)	n (%)	
22.Listening to music when driving is the young driver's style	36 15.13	43 18.07	43 18.07	83 34.92	33 13.91	Moderate
23.Wearing a helmet may harm child health	14 5.90	17 7.14	63 26.43	105 44.12	39 16.43	Moderate
24.Alcohol consumption by drivers put pedestrians and riders of motorized two-wheelers at risk	78 32.80	133 55.88	13 5.50	10 4.20	4 1.72	High
25. Preventive behavior may require my money and time.	20 8.42	55 23.13	135 56.71	16 6.64	12 5.00	Moderate
26.No accident occurs if there is clear visibility	11 4.62	38 16.01	75 31.44	93 39.53	21 8.80	Moderate
27.Only 40 % of countries have a comprehensive helmet law and require helmet to meet a specific standard	19 8.02	60 25.21	41 17.12	94 39.55	24 10.10	Moderate

*SA= Strongly Agree; A= Agree; U= Uncertain; D= Disagree; SD= Strongly Disagree
Score: Low= 1-2.33, Moderate= 2.34-3.67, High= 3.68-5

4.4 Cues to Action

Regarding cues to action influence of media, Table 4.9 shows that most of the respondents (92.91%) received information from the television; more than half received information from the internet and newspapers; 36.53 percent from attending driving safety training courses; and only one-third (31.15%) from the radio.

Table 4.9 Number and Percentage of Respondents by Influence of Media

Influence of Media **N=238**	**Number** (n)	**Percent** (%)
1. Internet	135	56.73
2. TV	221	92.91
3. Newspaper	133	55.92
4. Radio	74	31.15
5. Attended driving safety training causes	87	36.53

Regarding cues to action influence of person, Table 4.10 shows that nearly a half of the respondents received information from family members (42.12%) and friends (42.41%); 15.15 percent from health personnel; and only 12.24 percent of respondents from teachers.

Table 4.10 Number and Percentage of Respondents by Influence of Person

Influence of Person N=238	Number (n)	Percent (%)
1. Health personnel	36	15.15
2. Friends	101	42.41
3. Family members	103	42.12
4. Teachers	29	12.24

4.5 Preventive behavior regarding RTI

The preventive behavior of respondents was divided into good preventive behavior and poor preventive behavior. The majority of respondents (87.8%) belonged to the good preventive behavior group, and 12.2 percent to the poor group, as shown in Table 4.11.

Table 4.11 Number and Percentage of Respondents by Level of Preventive Behavior regarding RTI Prevention

Level of Preventive Behavior N=238	Number (n)	Percent (%)
Good	209	87.80
Poor	29	12.20
Median= 36 SD= 5.32 Min= 21 Max= 44		

Score: Poor ≤ Median, Good > Median

Regarding the details of the respondents' preventive behaviour, Table 4.12 shows that most of the respondents (89.9%) always wore a crash helmet while riding a motorcycle, and the remaining 10.1 percent sometimes wore a helmet when driving.

Regarding motorcycle speed, nearly two-thirds (73.1%) of the respondents answered that they always or sometimes rode a motorcycle faster than 40 km/h; 16.4 percent rarely did so and only 10.5 percent answered that they never did.

Regarding drinking alcohol and driving, more than half (51.7%) of respondents had never drunk alcohol before driving, 22.7 percent rarely, 21.0 percent sometimes, and the remaining 4.6 percent answered that they always drank when driving. However most (87.8%) of the respondents answered that they never or rarely rode a motorcycle when drunk.

Regarding a using mobile or iPod while riding a motorcycle, more than half (54.6%) of the respondents answered that they had never or rarely used mobiles, but 41.6 percent sometimes did, and 3.8 percent always did. For using iPod while ridding a motorcycle, nearly a half (48.2%) of the respondents answered that they had never used one, one-third (33.6%) rarely used an iPod, and the remaining 12.2 percent sometimes did. Only 5.0 percent always used one while ridding.

Regarding fatigue factors, more than two-thirds of the respondents answered that they never or rarely felt sleepy while riding, 26.5 percent sometimes did, and a few (3.4%) always did. Most of the respondents never or rarely rode a motorcycle after one night without sleep, whereas only 11.3 percent and 0.8 percent of them sometimes or always did it. A majority (88.2%) of the respondents answered that they never or rarely rode a motorcycle between 2:00 am and 5: 00 am, the remaining 10.5 percent sometimes did and only 1.3 percent always did. Concerning the traffic law, nearly two-thirds (66.8%) of the respondents answered that they never or rarely broke the traffic law, 32.4 percent sometimes did, and 8.0 percent always did.

Table 4.12 Number and Percentage of Respondents according to different Items of Preventive Behavior regarding RTIs Prevention

Statements/Items N=238	*A n (%)	S n (%)	R n (%)	N n (%)	Comment
1. How often do you use a helmet while riding a motorcycle?	214 89.89	21 10.11			Good
2. Have you ever ridden a motorcycle faster than 40 km/h?	34 14.33	140 58.75	39 16.42	25 10.50	Good
3. Have you ever ridden a motorcycle after drinking alcohol?	11 4.55	50 21.00	54 22.73	123 51.72	Poor
4. Have you ever ridden a motorcycle when drunk?	4 1.72	25 10.50	37 15.51	172 72.27	
5. Have you ever ridden a motorcycle after you took some medicine?	5 2.15	30 12.62	58 24.35	145 60.93	Poor
6. Have you ever used a mobile phone while you were riding a motorcycle?	9 3.82	99 41.63	66 27.72	64 26.87	Poor
7. Have you ever used an iPod while you were riding a motorcycle?	12 5.02	29 12.21	80 33.65	117 49.12	Poor
8. Have you ever ridden a motorcycle while you felling sleepy?	8 3.43	63 26.54	93 39.12	74 31.01	Poor
9. Have you ever ridden a motorcycle after you working over night?	2 0.82	27 11.33	89 37.42	120 50.37	Poor
10. Have you ever ridden a motorcycle between 02:00am and 05:00 am?	3 1.32	25 10.50	64 26.87	146 61.31	Poor
11. How often you break the traffic law?	2 0.84	77 32.35	121 50.84	38 15.97	Poor

* A= Always, S = sometimes, R = Rarely, N = Never
Score: Poor =1 - 2.5, Good = 2.6 – 4

4.6 Association between the Independent Variables and Preventive Behavior

4.6.1 Association between Preventive Behavior and Socio-Demographic Characteristics

Table 18 shows the results of the analysis between socio-demographic characteristics and preventive behavior. The results showed that there was a statistically significant association between gender and preventive behavior regarding RTI (P-value = 0.02). Of the female respondents, most (94.34%) had good levels of preventive behavior, while the remaining 5.66 percent had poor levels. On other hand, of the male group, 81.0 percent had good levels of preventive behavior, and 19 percent had poor levels.

Regarding the age groups, of group the 18 to 21 group, the majority (87.3%) had good level of preventive behavior, and only 12.7 percent of them had poor level, this result is nearly the same with result of group 22-25 years old with 88.91 percent had good level and 11.09 percent had poor level of preventive behavior. The analysis data also showed that there was no statistically significant association between the age of the respondent and their preventive behavior level. (P-value = 0.716)

Regarding the type residence, there was no statistically significant association between the kind of residence and the preventive behavior of the respondents (P-value= 0.532). Of the respondents, who stayed at a dormitory of university, the majority (87.5%) had good preventive behavior level, and only 12.5 percent had poor levels. Most of the respondents (92.72%), who stayed with their families, had good levels of preventive behavior, while the remaining 7.28 percent had poor levels. For the respondents who stayed at a residence outside the university the situation was similar.

The analyzed data also showed that statically there was no significant association between students' allowance and their preventive behavior. (P-value =

0.549). Of the respondents who received a monthly allowance less than 1,500,000 VND, most (89.08%) had good preventive behavior, and only 10.92 percent of them had poor levels. Of the respondents who received a monthly allowance of between 1,500,001 and 2,500,000 VND, the majority (83.32%) had good preventive behavior, and 16.68 percent had poor levels. The majority of respondents (85.70%) who received a monthly allowance of more than 2,500,000 VND had good preventive behavior.

Regarding RTIs and the number of the respondents' injuries, most (92.44%) of those who had had RTIs in the previous 2 years had good preventive behavior, while the remaining 7.56 percent had poor levels. However, of the respondents who had had at least once RTI, 80.92 percent had good preventive behavior, and 19.08 percent had poor levels. The results show that there was a statically significant association between RTIs and preventive behavior (P-value = 0.008), but no significant association between the number of RTIs in the previous 2 years and preventive behavior (P-value= 0.083).

The result showed that, of the respondents who had driving licenses, the majority (88.2%) had good preventive behavior, while the remaining 11.8 percent had poor levels. However 85.72 percent of the respondents who did not have a driving license, had good levels and 14.28 percent had poor levels. The Chi-Square test result showed that there was no statistically significant association between driving license and preventive behavior level.

Regarding driving experience, of the respondents who had ridden a motorcycle more than 5 years, the majority (86.0%) had good preventive behavior levels; the remaining 14 percent had poor levels. However, of the respondents whose driving experience was less than 5 years also was similar as mentioned above. The Chi-Square test result showed that there was no statistically significant association between driving experience and preventive behavior level.

Table 4.13 The Association between Preventive Behavior and Socio-Demographic Characteristics

Socio-Demographic Characteristic	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
Age group						
18-21	137	87.30	20	12.70	0.132	0.716
22-25	72	88.91	9	11.09	(1)	
Sex						
Male	94	81.00	22	19.00	9.721	**0.020***
Female	115	94.34	7	5.66	(1)	
Kind of residence						
Dormitory	112	87.50	16	12.50	1.263	0.532
Outside	59	85.45	10	14.55	(2)	
With family	38	92.72	3	7.28		
Allowance (VND/month)						
≤ 1,500,000	163	89.08	20	10.92	1.203	0.549
> 1,500,001 - 2,500,000	40	83.32	8	16.68	(2)	
> 2,500,000	6	85.70	1	14.30		
Driving license						
Yes	179	88.20	24	11.80	0.169	0.681
No	30	85.72	5	14.28	(1)	
Driving experience (years)						
≤ 5 years	172	88.24	23	11.76	0.153	0.695
> 5 years	37	86.00	6	14.00	(1)	

Table 4.13 Association between Preventive Behavior and Socio-Demographic Characteristics (cont.)

Socio-Demographic Characteristic	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
RTIs						
Yes	76	80.92	18	19.08	7.042	**0.008****
No	133	92.44	11	7.56	(1)	
Number of injury in the past 2 years (times)						
1	11	20.40	43	79.60		0.083[F]
2	1	3.66	27	96.54		
3	1	16.72	5	83.28		
4	1	25.00	3	75.00		
≥5	0	0	2	100		

*P-value < 0.05; **P-value < 0.01; F = Fisher Exact test

4.6.2 The Association between Knowledge and Preventive Behavior regarding RTIs

Table 4.14 shows the association between knowledge and the preventive behavior regarding RTIs. The Fisher Exact test found that there was a statistically significant association between the level of respondents' knowledge and their preventive behavior (P-value=0.028). Of the group with good knowledge, most (96.6%) had good preventive behavior and only 3.4 percent had poor preventive behavior. Of the moderate knowledge group, 83.71 percent had good preventive behavior, and 16.29 percent had poor levels. However, of the respondents whose

knowledge was poor, 92.62 percent had good preventive behavior, and the remaining 7.38 percent had poor preventive behavior.

Table 4.14 The Association between Knowledge and Preventive Behavior regarding RTIs

Knowledge	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
Good	56	96.60	2	3.40	7.182 (2)	**0.028***
Moderate	128	83.71	25	16.29		
Poor	25	92.62	2	7.38		

*P-value < 0.05

4.6.3 The Association between Perception towards Hazards and Preventive Behavior regarding RTIs

Table 4.15 shows that, of the respondents with a high perception towards RTI hazards, the majority (89.7%) had good preventive behaviour, while the remaining 10.3 percent had low level of preventive behaviour. Of the respondents whose perceptions towards RTI hazards were good, 72.0 percent had good preventive behaviour, that is lower than those in high knowledge group, and the remaining one-third had poor preventive behaviour. The Chi-Square test result showed that there was a statistically significant association between perception towards hazards and preventive behavior regarding RTI. (P-value = 0.011).

Table 4.15 The Association between Perception towards Hazards and Preventive Behavior regarding RTIs

Perception towards Hazards	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
High	191	89.70	22	10.30	6.530 (1)	**0.011***
Moderate	18	72.00	7	28.00		

*P-value < 0.05

4.6.4 The Association between Perception towards Benefit and Preventive Behavior regarding RTI

Table 4.16 shows that of the respondents with a high perception towards the benefit of implementation, the majority (88.0%) had good preventive behaviour; only 12 percent had poor levels. On other hand, of those respondents with a moderate perception, the majority (86.24%) had good preventive behaviour, and 13.76 percent had poor levels. The Fisher Exact test result showed that there was no statistically significant association between perception towards benefit and preventive behavior regarding RTIs. (P-value = 0.484).

Table 4.16 The Association between Perception towards Benefit and Preventive Behavior regarding RTIs

Perception towards Benefit	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
High	184	88.00	25	12.00		0.484[F]
Moderate	25	86.24	4	13.76		

F= Fisher Exact test

4.6.5 Association between Perception towards Barrier and Preventive Behavior regarding RTI

Table 4.17 shows that, of the respondents who had high levels of perception towards barriers, the majority (84.62%) had good preventive behavior, and the remaining 15.38 percent had poor levels. Of those with moderate perception towards barriers, 89.2 percent had good preventive behaviour levels, and only 10.8 percent had poor levels. On the other hand, of the respondents who had low perception towards barriers, the percentage of respondents (66.74%) who had good preventive behaviour was lower than those who had high or moderate perception levels, and 33.26 percent had poor preventive behaviour. The Chi-Square test result showed that, there was no statistically significant association between perception towards barriers and preventive behavior regarding RTI. (P-value = 0.063).

Table 4.17 The Association between Perception towards Barrier and Preventive Behavior regarding RTI

Perception towards Barrier	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
High	11	84.62	2	15.38	5.523 (2)	0.063
Moderate	190	89.20	23	10.80		
Low	8	66.74	4	33.26		

4.6.6 the Association between Perception towards RTI Prevention and Preventive Behavior regarding RTIs

Table 4.18 shows that there was no statistically significant association between perceptions towards RTI prevention and the preventive behavior regarding RTI of respondents (P-value = 0.425). Of the respondents who had high levels of perception towards RTI prevention, most (88.73%) had good preventive behaviour, and 11.27 percent had poor. However, of the respondents who had moderate perception towards RTI prevention, the most (84.6) had good preventive behaviour, and only 15.40 percent had poor.

Table 4.18 The Association between Perception towards RTI Prevention and Preventive Behavior

Perception Towards RTI Prevention	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
High	165	88.73	21	11.27	0.637 (1)	0.425
Moderate	44	84.60	8	15.40		

4.6.7 The Association between Cues to Action influence of Media and Preventive Behavior regarding RTI

Table 4.19 shows the results of the analysis of the relationship between media cues to action and preventive behavior regarding RTI. The analyzed data found that there was no statistically significant association between students who got information about RTI prevention from the internet and students who did not with respect to their preventive behavior regarding RTIs (P-value = 0.385).

Concerning the association between television and preventive behavior, of the respondents who received information from the television, the majority (86.72%) had good preventive behavior, and the remaining 13.28 percent had poor. Of the respondents who did not receive information from the television, 89.30 percent of them had good preventive behavior, and 10.70 percent had poor levels. However, the Fisher Exact test result showed that there was no statistically significant association between media information from television and the preventive behavior (p-value = 0.641).

The analyzed data found that there was no statistically significant association between students who got their information about RTI prevention from

newspapers and students who did not with respect to their preventive behavior regarding RTI. (P-value = 0.751). Preventive behavior was slightly lower among those respondents who received information from newspapers (87.21%) compared to those who did not (88.60%).

The Chi-Square test result also showed that there was no statistically significant association between student who got information about RTI prevention from the radio and students who did not get such information from internet with respect to the preventive behavior regarding RTIs.(P-value = 0.674).

Table 4.19 The Association between Cues to Action influence of Media and Preventive Behavior regarding RTI

Influence of Media	**Preventive Behavior**				**χ^2 (df)**	**P-value**
	Good		**Poor**			
	(n)	(%)	(n)	(%)		
Internet	117	86.72	18	13.28	0.385	0.535
Without Internet	92	89.30	11	10.70	(1)	
TV	194	87.80	27	12.20		0.641[F]
Without TV	15	88.22	2	11.78		
Newspaper	116	87.21	17	12.79	1	0.751
Without Newspaper	93	88.60	12	11.40	(1)	
Radio	64	86.50	10	13.50	0.177	0.674
Without Radio	145	88.44	19	11.56	(1)	

F= Fisher Exact test

4.6.8 The Association between Cues to Action Influence of Person and Preventive Behavior regarding RTIs

The observed distribution of preventive behavior of respondents according to personal influence, illustrated that students who were influenced by their family members had a good level of the preventive behavior (93.20%) higher than those who were not influenced by their family members (83.73%). The Chi- square test showed that there was a statistical association between the influence of family members and preventive behavior regarding RTIs. (P-value = 0.026). (Table 4.20)

The analyzed data showed that students who obtained information from health personnel and those who did not receive any RTI prevention information from them were the same (88.13% and 86.12%) in relation to their respective preventive behavior regarding RTI. The Chi-square test result showed there was no statistically significant association between those who received or did not receive information from health workers. (P-value = 0.734)

Regarding the influence of driving safety training courses, the result showed that students who were influenced by attended driving safety training causes had a good level of preventive behavior (81.81%) lower than those who were not influenced from attended driving safety training causes (90.74%). The Chi- square test result showed that there was no statistical association between the influence of attended driving safety training causes and the preventive behavior regarding RTI. (P-value = 0.07)

However, the analyzed data, did not find any statistically significant associations between the influence exerted by teachers and the preventive behavior of students. (P-value = 0.374). The Chi- square test result also showed that there was no statistically significant association between the influence of friends and preventive behavior regarding RTIs. (P-value = 0.497)

Table 4.20 The Association between Cues to Action Influence of person and Preventive Behavior regarding RTI

Influence of Person	Preventive Behavior				χ^2 (df)	P-value
	Good		Poor			
	(n)	(%)	(n)	(%)		
Health workers	31	86.12	5	13.88	0.115	0.734
Without health workers	178	88.13	24	11.87	(1)	
Friends	87	86.14	14	13.86	0.461	0.497
Without friends	122	89.15	29	10.85	(1)	
Family member	96	93.20	9	6.80	4.928	**0.026***
Without family members	113	83.73	20	16.27	(1)	
Teachers	24	82.50	5	17.50	0.789	0.374
Without teachers	185	88.50	24	11.50	(1)	
Attended driving safety	72	82.81	15	17.19	3.227	0.072
training courses.	137	90.74	14	9.26	(1)	
Without training						

*P-value < 0.05

CHAPTER V
DISCUSSION

This study was conducted at the Hanoi Medical University in Vietnam. 240 students who were motorcycle riders were selected to be respondents. This study describes the preventive behavior of the respondents regarding RTIs, and their socio-demographic factors, knowledge, perceptions towards RTI prevention, and cues to action. This study also identifies the relationships between the socio-demographic factors, knowledge, perceptions towards RTI prevention, and cues to action respectively with the respondents' preventive behavior regarding RTIs.

5.1 The respondents' preventive behavior regarding RTI

In this study, most of the respondents had good levels of preventive behavior. Regarding to more detail, 11 questions were asked about wearing a helmet, speed, drinking and driving, risk-talking behavior, driver fatigue, and breaking the traffic law.

The majority (89.9%) of the respondents always wore a helmet when riding a motorcycle, while 10.1 percent only sometimes wore a helmet. In study of Luong Xuan Hien in 2008, 48.7 percent "always" and 47.7 percent "sometimes" wore a helmet. Vietnam has had various legislative requirements to wear helmets on certain roads since 2000. However this legislation has had limited enforcement and consequently utilization has been low. In June 2007, the Government promulgated new legislation making it mandatory for all persons on a motorbike to wear a helmet. A study of helmet wearing in three provinces, reported that helmet use was highest in Yen Bai (73 percent of drivers), and lowest in Da Nang (27 percent of drivers).

Further roadside observations were undertaken in June and December 2008 and May 2009 to monitor helmet wearing rates. Between November 2007 and June 2008, significant increases in helmet wearing were observed. In Yen Bai rose from 73 percent to 94 percent, in Da Nang from 28 percent to 100 percent, and in Binh Duong from 48 percent to 95 percent. Based on the most recent observations in May 2009, high wearing rates have been maintained for at least 18 months of the helmet legislation. (43)

Regarding speed, more than two-thirds (70%) of the respondents "always" or "sometimes" rode a motorcycle faster than 40 km/h on city road. (The city speed limit was 40 km/h). Some other studies in Vietnam have also found that most young drivers always or sometimes ride faster than the speed limit.

Concerning drinking and driving, more than 30 percent of the respondents "always" or "sometimes" drank before driving and 10 percent sometimes drove when drunk. According to WHO data for Vietnam, alcohol consumption in Vietnam is high. The Institute for Heath Policy and Strategy reported an average consumption of 64 g/day, substantially higher than the hazardous consumption threshold of 40g/day. Official data suggests that 6 percent of all road traffic crashes are associated with alcohol, however this likely a substantial under-estimation. The National Forensic Medicine Institute found in 2001, in a sample of 500 fatal crashes, 34 percent were associated with a BAC in excess of national limits. (46)

Regarding risk-taking behavior, this study showed that more than a half of the respondents "always" or "sometimes" used mobile phones and about 20 percent used an iPod while driving. The Luong Xuan Hien' study found that 17.2 percent of 1000 young drivers in Thai Binh, Vietnam, used a mobile phone "always" or "sometimes " while driving a two-wheel vehicle. (16)

Regarding driver fatigue, and breaking the traffic law, the results showed that, more than 30 percent of the respondents "always" or "sometimes" rode a

motorcycle while felling sleepy; about 10 percent sometimes rode after working over night; and 40 percent “always” or “sometimes” broke the traffic law.

5.2 Socio-demographic factors

In this study, more than 50 percent of the respondents were under 22 years old. Regarding the allowances of the respondents, the majority received 1,500,000 VND per month, or less. Regarding the RTIs of the respondents, 39.54 percent had had at least one RTI. This result was consistent with the survey of attitudes of Vietnamese youth which found that 42 percent of Vietnamese youth aged 22 to 25 had sustained at least one RTI. Motorcycle riders have especially high rates of injury in Vietnam. However several special motorcycle-related features are evident in Vietnam. First, motorcycle use has been growing dramatically, and motorcycles are one of the most important means of transportation because of the country’s rapid economic development, convenience in congested traffic, and ease of parking on narrow streets. Motorcycles comprised 95 percent of registered motor vehicles in 2006. Second, there are some unique road environments, such as more congested traffic, store advertising sigs, and a traffic mixture of vehicles and bicycles. (44)

Most respondents had had driving experience of less than 5 years, and the majority had driving licenses. More than half (53.83%) of the respondents stayed at a university dormitory, 29.05 percent lived outside the university, and only 17.12 percent lived with their families.

5.3 Knowledge of respondents about RTIs

According to the number and percentage distribution by level of knowledge, the majority of respondents had moderate or good levels, while the remaining 11.26 percent had poor levels. Most of the respondents answered correctly questions about the risk factors influencing traffic accidents, the major factor of motorcycle accidents, and eye protection. However, only a half of them answered

correctly about brightly colored clothing, the maximum legal motorcycle speed limit, and the requirements for wearing a helmet.

The Yahia's study of 297 students at the Heath Science College in Saudi Arabia found that the degree of knowledge of road traffic regulation was moderate or high in more than 75 percent of those students. (49)

5.4 Perception toward RTI prevention

This study found that most of the respondents had high levels of perception towards RTI prevention (78.2%), only about 20 percent had moderate levels, and no students had a low level.

Focusing in more detail on level of perception towards hazard of RTIs, all of the respondents got high or moderate level, and the percentage of moderate level perception were only about 10 percent. More than 90 percent of the respondents "strongly agreed" or "agreed" that motorcycle accidents cause severe injuries or permanent disability; that children may suffer permanent disability from road traffic accidents; that road traffic accidents have indirect costs such as the value of lost household services and lost earnings of victims and survivors, caregivers and families; and that road crashes not only place a heavy burden on national and regional economies but also on households.

This study also showed that most of the respondents had high or moderate levels of perception about the benefits and barriers of implementing RTI prevention; only 5 percent had a low level of perception. However, about 40 percent "Strongly Agreed" or "Agreed" that wearing a helmet is uncomfortable, and that it is difficult to follow the traffic laws and regulations. 30 percent "Strongly Agreed" or "Agreed" that listening to music when driving is a young driver's style, and 20 percent of respondents "Strongly Agreed" or "Agreed" that, it is not possible to have regular vehicle check-ups.

A study by Li-Ping Li (17) in china interviewed 2325 riders. Although 88.9 percent of the motorcyclists believed that helmets had a protective effect, only 20.4 percent reported that the main reason for wearing a helmet was to prevent or decrease the severity of head injury. When asked why people might not use a helmet, almost all interviewees reported that the common perception was that helmets were only needed when riding on highways (95.9%). Many interviewees also felt that helmets were not always comfortable (71.3%).

5.5 Cues to Action

Regarding Media cues to action, 92.91 percent of the respondents got information from the television and 56.73 percent from internet. Regarding to the cues to action from individual, 42.12 percent and 42.41 percent of respondents received information from their family and their friends respectively. However, only 12.24 percent received information from their teachers.

5.6 Association between socio-demographic characteristics and preventive behavior regarding RTIs

The results showed that there was no statistical association between preventive behavior and age groups (18-21 or 22-25 age group), and that there was no statistical association between kind of residence of the respondents, their allowance, or driving experience (group less than 5 years and more than or equal 5 years) and preventive behavior regarding RTI.

The NTSC reported that the majority of deaths and injuries on roads are confined to the 15 to 49 years age group, the group that makes up 56 percent of the total population, and the most economically active group. WHO estimates that RTIs are the leading cause of death for the 15 to 29 years age group in Vietnam. (44) A study by Mau-Roung Lin and Jess in Taiwan showed that less driving experience is associated with a higher risk of motorcycle crashes and injuries; formal driver training

is expected to increase riding skills and reduce the risk of motorcycle crashes and injuries. (19) However for riders who received training there was no significant reduction in the risk of motorcycle crashes compared with those who did not receive such training.

This research showed that gender of respondents was associated with preventive behavior. More female respondents had good preventive behavior than males, and of those respondents whose preventive behavior was poor, most were male. The research also found that there was evidence of a strong relationship between preventive behavior and RTI of respondents. The respondents who had good preventive behavior were injured less than those with poor preventive behavior. On other hand, more than 60 percent of the respondents who had poor preventive behavior received RTIs.

A study by Luong Xuan Hien (16) of 1000 students of the Technical and Teachers College of Thai Binh, Vietnam, found that young males were at highest risk of road traffic accidents. The report of RTI based on hospital data of Vietnam, 2007, showed that the hospitalized males were twice as numerous as females (26.575 males compared to 11.626 females).

According to the WHO report, RTI mortality rates are also substantially higher for males than females. El Salvador's road traffic fatality rate for males, for instance, was 58.1 per 100 000, compared with 13.6 per 100,000 for females. In Latvia, there is a similar gender difference, with a rate of 42.7 per 100,000 for men and 11.4 per 100,000 for females. Certain factors in some countries give rise to an even greater gap between the genders; females may be excluded as drivers or passengers. In general they may face also less exposure to road traffic crash risk for cultural or economic reasons. (1)

A comprehensive review of 46 studies in low-income and middle-income countries found that, in terms of involvement in road traffic crashes, there was a consistent predominance of males over females; males were involved in a mean of 80

percent of crashes, and 87 percent of drivers were male. Recent studies from China, Colombia, Ghana, Kenya, Mexico, Mozambique, the Republic of Korea, Thailand, Trinidad and Tobago, Vietnam and Zambia all indicate greater rates of male, as opposed to female involvement in road traffic collisions. (11)

5.7 Association between knowledge and preventive behavior

This study showed that the majority of the respondents had good or moderate knowledge levels (more than 80 percent), while only about 20 percent of the respondents had poor knowledge levels. The result showed that there was a statistically association between level of knowledge and the preventive behavior regarding RTIs of the respondents. More than half of the respondents answered correctly the question about cause of RTI and risk factors of RTI. And also most of students answered correctly the question about how to driving safety.

Awareness rising in Vietnam involves a variety of activities primarily designed to raise awareness of road safety issues and to create supportive environments for implementation of road safety programs. Other informative and educational programs are being implemented in the project province to increase knowledge and awareness of known risk factors in key target groups.

5.8 Association between perception and preventive behavior

The data analysis showed that there was a statistically significant association between perception towards RTIs hazard and preventive behavior. The percentage of students who had good preventive behavior and high perception towards hazards was higher than those who had poor preventive behavior and high perception. (89.7 percent compared to 10.3 percent).

Although more respondents had good preventive behaviour (84.6%) and high level of perception towards RTI prevention than had good preventive behaviour

and moderate perception level, there was no association between perception towards RTI prevention and the preventive behaviour.

A study of Anna Noderhaug in Tanzania showed that with few exceptions, exposure to safety information and involvement in risk related behaviour were associated with higher odds for vulnerability perceptions. (23)

In health belief model, perceived susceptibility is recognized as an important early link in a causal chain of factors leading to the adoption of health promoting behaviours. Considerable evidence has confirmed the relationship between risk perceptions and preventive behaviour. People seem to be more likely to underestimate their vulnerability if the injury is something they perceive to have control over or are not yet familiar with. The respondents in this study were medical students, most of them had high perception towards RTI prevention, and then also most of them had good preventive behaviour.

5.9 Association between cues to action and preventive behavior

Although the television is the most influential medium providing information to the respondents regarding RTI prevention, this research showed that there was no association between television and the preventive behavior of respondents.

The results also showed that there was no association between the internet, newspapers or radio and the preventive behavior regarding RTI of students.

With regard to cues to action from individual, family members and friends were very important for students' preventive behavior. There was an association between family members influence and the RTI preventive behavior of respondents.

The study of Luong Xuan Hien (16) showed that, television (73.3%) and school (46.9%) were significantly more important than friends (26.7%), newspapers (26.6%), radio (26.3%), or families (24.7%).

The focus on media effectiveness in Vietnam, in traffic injury prevention mass media campaigns has been evaluated for theory-based approaches to speeding reduction, tested for drinking and driving message recognition in target audiences and systematically reviewed for their effectiveness in reducing alcohol-related crashes. However, the mass media in Vietnam does not provide a basis from which contribution can be objectively evaluated. For example there has been no media publicity on programs to guild people in how to implement to the mandatory helmet legislation in practice. (14)

CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This cross-sectional descriptive study aimed to identify the factors associated with preventive behavior on road traffic injuries of student motorcycle riders at Hanoi Medical University in Vietnam. The association between the socio-demographic factors such as age, gender, allowance, kind of residence, driving experience, and driving license to the preventive behavior of students who were drivers; then knowledge about RTIs, their perception towards hazard of RTI, perception towards benefit and barrier of RTI prevention, cues to action and preventive behavior regarding RTI of respondents was identified respectively. The sample size was 240 students who were motorcycle drivers. Data was collected using a self-administered questionnaire in January, 2010. Data was analyzed using descriptive statistics with percentage, mean, standard deviation, and Chi-Square test was used to find the association between the independent variables and dependent variable. The conclusion is as follows.

1. The age of study population was between 18 to 25 years old, and majority of them had a monthly allowance of less than 1.500.000. More than half of the respondents lived in a dormitory of the university; most of the students had driving licenses, and a majority had less than 5 years driving experience. More than one-third of the respondents had had at least one RTI in the previous two years.

2. Gender and RTI in the previous 2 years had a statistically significant association with preventive behavior regarding RTI with P-value < 0.05. Age group, allowance, kind of residence, driving license, and driving experience have no statistically significant association with preventive behavior regarding RTI.

3. In this study, more than half of the respondents had moderate levels of knowledge about RTIs, 24.4 percent had good level and 11.3 percent had poor level. There was a statistically significant association between knowledge of respondents and their preventive behavior regarding RTIs with P-value= 0.028.

4. Regarding the perceptions of respondents, this study showed that, all the respondents had high or moderate levels of perception towards RTI hazards, and similarly with perceptions of the benefits of implementing of RTI prevention. With perception towards barriers to implementation of RTI prevention, the majority students had moderate levels; about 5.5 and 5.0 percent of students had high and low levels of perception respectively towards barriers to implementing RTI prevention. Of perception towards RTI prevention of respondents, all the respondents had good or moderate levels, the majority of them had good level. There was no statistically significant association between perception of benefit, barriers, or perception towards RTI prevention and preventive behavior regarding RTIs. Only the perception of respondents towards RTI hazards was significantly associated with preventive behavior. (P-value=0.011)

5. The results showed that although television was the highest media to preventive behavior regarding RTI of students, the descriptive result shows that only family members' influence was significantly associated with preventive behavior.(P-value=0.026).

6.2 Recommendation

Based on the findings of this research, the following recommendations are suggested.

6.2.1 Recommendation for Implementation

1. According the research finding. It was found that there was a significant association between the preventive behavior regarding RTIs of the respondents and

their knowledge. In order to reduce the road traffic injuries, the school-based educational program should be applied and public awareness campaign should be improved by the NTSC to be more effective. Therefore promoting general and purposeful broadcasting of content, special courses for young riders designed to make them conscious of their personal tendencies and the type of social context that affects their riding behavior could be helpful for this purpose.

2. This research showed that female students had better preventive behavior regarding RTIs than male students. Males, therefore, should be targeted to be made more aware about RTI prevention. For example, communication campaigns should highlight the dangers of unsafe behavior and should particularly target young males. Communication campaigns that employ persuasive or emotional messages are the most effective where young riders are concerned, and this action can be carried out by NGOs in coordination with the NTSC. These should place particular emphasis on issues such as speed, drunk driving, and mobile phone use, and the target audience should be young males.

3. This research found that there was a significant association between perception towards hazards of RTI and preventive behavior of students. In order to encourage preventive behavior of young riders, education and increased enforcement may be used simultaneously to begin with, with the Hanoi students association taking the lead.

4. Family leaders should provide more information about RTI prevention, and more discussion about the hazards of RTIs, and encourage especially young male drivers to implement preventive behavior.

6.2.2 Recommendation for further study

1. Since this study was cross sectional descriptive, only quantitative data was collected through the self-administered questionnaire. To obtain more information

about preventive behavior regarding RTIs, qualitative techniques are also needed to get in-depth information and to complement the qualitative research.

2. In this study, data was only collected in one university in Hanoi. Future research should involve a larger study group and target a more diverse population to give a more representative picture about the preventive behavior of motorcycle riders regarding RTIs in Vietnam.

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APPENDIX

QUESTIONNAIRES

FACTORS RELATED TO PREVENTIVE BEHAVIOR ON ROAD TRAFFIC INJURIES OF STUDENT MORTOCYCLE RIDERS AT HANOI MEDICAL UNIVERSITY IN VIET NAM

Dear Friends

Before you answer the questions below, I would like to thank you for responding in this study. And this information will be used only for study purposes and the confidentiality of your information is guaranteed. Therefore, please feel free to answer honestly. Do not write your name.

Part 1: Socio-demographic characteristics

Please fill in the blank or check (×) in the appropriate box to answer the question:

Q1. How old are you……...years

Q2. What is your gender?

□ 1. Male

□ 2. Female

Q3. What kind of residence do you live in?

□ 1 Dormitory at University

□ 2 Outside University

□ 3. With family

□ 4. Other (specify)… ……

Q4. How much is your allowance per month……....VND

Q5. Do you have driving license?

- 1. Yes
- 2. No

Q6. How long have you been driving motorcycles? ……..years

Q7.1 Have you had a road traffic injury in the past 2 years?

- 1. No
- 2. Yes

Q7.2 If yes, please specify how many times ……times.

Part 2: knowledge about road traffic injury prevention:

Q10. In Vietnam, legislation defines prohibited breath alcohol content (BrAC) as:

- 1. 40mg per little breath
- 2. 50mg per little breath
- 3. 60mg per little breath
- 4. 70mg per little breath

Q12. Which of the following statements is true?

- 1. Helmets can prevent or reduce head injuries
- 2. Helmets can prevent accidents
- 3. Helmets allow people to drive faster
- 4. Helmets cannot prevent head injuries

Q13. Which of the following is not a risk factor influencing crash involvement**?**

- 1. Driving between 2:00 am and 5:00 am
- 2. Driving while feeling sleepy
- 3. Lack of hospital care
- 4. Unsafe motorcycles (such as braking, handing, lighting…)

Q15. Which of the following may prevent a road traffic accident?

- 1. Wearing a crash helmet while driving
- 2. Drinking alcohol before driving
- 3. Driving at high speed
- 4. Using a safe motorcycle

Q16. What are the requirements for wearing a helmet?

- 1. Passengers only are required to wear helmets.
- 2. All motorcycle riders and passengers are required to wear helmets at all times.
- 3. Helmets are not required while driving on city streets.
- 4. Helmets are not required while driving on short distance

Q17. Which of the following statements about eye protection is true?

- 1. It is not needed if your motorcycle is equipped with a windshield.
- 2. It is only needed when riding in bad weather.
- 3. It should give a clear view to either side.
- 4. It is only needed when ridding on the highway

Q19. Which of following statements is true? When riding at night the rider should:

- 1. Move closer to the vehicle in front of you to use its lights to see farther down the road.
- 2. Keep ridding at your normal speed because slowing down would increase the chance of being struck from behind.
- 3. Reduce your speed because it is harder to see something lying in the road.
- 4. Try and reach their destination as quickly as possible

Q20. How can you avoid confusing other drivers?

- 1. Increase the following distance between your motorcycle and the vehicle in front of you if you are being tailgated
- 2. Make sure your turn signal turns off after you finish a turn.
- 3. Use your horn only in emergency situations.
- 4. Use your horn frequently

Q21. What is the major factor in accidents caused by motorcycles?

- 1. Following too closely
- 2. Lane sharing
- 3. Not being seen by other drivers
- 4. Wearing helmets.

Q22. What is the best way to stay out of trouble while riding a motorcycle?

- 1. Looking well ahead.
- 2. Avoiding high traffic density areas
- 3. By increasing the following distance between your motorcycle and the vehicle in front of you.
- 4. Avoiding wearing a helmet.

Q23. A motorcycle rider has an advantage over a car when passing parked vehicles because:

- 1. A motorcycle can accelerate faster than a car.
- 2. A motorcycle rider can avoid the problems of opening doors.
- 3. Motorcycles have a shorter stopping distance.
- 4. Use a wide turn

Q24. Which of the following statements is true about brightly colour, reflective helmets and clothing?

- 1. They should only be worn while riding at night.
- 2. They can make motorcycle riders easier to see.
- 3. They do not increase a motorcycle rider's safety.
- 4. They should only be worn while ridding at day time.

Q25. Which of the following statements is true for riders when they are ridding at night?

- 1. Make sure you are ridding slow enough so you can stop within the range of your headlights in an emergency.
- 2. Roll down your helmet' window so that the fresh air will help keep you awake.
- 3. If you are sleepy, drink coffee or other caffeine products.
- 4. Ridding motorcycle after drinking.

Q26. In Vietnam legislation sets the maximum legal motorcycle speed limited as:

- 1) 30 km/h for roads in a city
- 2) 40 km/h for roads in a city
- 3) 50 km/h for roads in a city
- 4) 60 km/h for roads in a city

Q27. In Vietnam, legislation defines a prohibited blood alcohol concentration (BAC) as:

- 1) 40mg per 100ml blood
- 2) 50mg per 100ml blood
- 3) 60 mg per 100ml blood
- 4) 80 mg per 100ml blood

Part 3: Perception

Please put the mark (×) in the column, you agree most.

1= Strongly Agree; 2= Agree; 3= Uncertain;

4= Disagree; 5= Strongly Disagree

Perception towards hazard of road traffic injury	**1**	**2**	**3**	**4**	**5**
Q28. Road traffic injury is a public health problem and a leading a cause of death in the world					
Q29. Motorcycle accidents cause severe injuries or permanent disability.					
Q30. Children may suffer permanent disability a road traffic accident.					
Q31. Brain injuries are a common cause of death in road crashes an involving motorcycles.					
Q32. I usually risk road traffic injury.					
Q33. Road traffic injury can lead to long-term absence from work.					
Q35. Road traffic injuries directly impact on health care services and costs of providing rehabilitation.					
Q36. Road crashes not only place a heavy burden on national and regional economies but also on households.					
Q37. Road traffic accidents have indirect costs, such as the value of lost household services and lost earnings of victims and survivors, caregivers and families.					

Perception towards benefit of implementation of preventive behavior of motorcycle rider.	**1**	**2**	**3**	**4**	**5**
Q38. Road traffic injuries can be prevent					
Q40. Wearing a motorcycle helmet correctly can reduce the risk of death or severe injury.					
Q41. Alcohol significantly impairs driving ability of adolescents-typically at lower blood concentration levels than is the case for adults.					
Q42. An increase in average speed is directly related both to the likelihood of a crash occurring and to the severity of the crash consequences.					
Q43. On a motorcycle riders and passengers should use a helmet.					
Q44. A good condition motorcycle causes fewer traffic accidents.					
Q45. Traffic laws are necessary for all drivers					
Q46. A motorcycle must have a regular check-up					
Q47. Using mobile phones when driving is a risk factor of road traffic accidents.					

Perception towards the barrier on implementation of preventive behavior against road traffic injuries	**1**	**2**	**3**	**4**	**5**
Q48. Wearing a helmet is uncomfortable					
Q49. It is difficult to follow the traffic laws and regulations					
Q50. It is not possible for you to have your vehicle check-up regularly					
Q51. Listening to music when driving is the young driver's style					
Q52. Wearing a helmet may harm child health					
Q53. Alcohol consumption by drivers put pedestrians and riders of motorized two-wheelers at risk					
Q54. Only 40 % of countries have a comprehensive helmet law and require helmet to meet a specific standard					
Q56. No accident occurs if there is clear visibility					
Q57. Preventive behavior may require my money and time.					

Part 4: Cues to action

Please fill in the blank or check (×) in the appropriate box to answer the question

Q58. Which of the following ways provide you information about road traffic injury prevention? (you can select more than one source)

- □ 1. Internet
- □ 2. TV
- □ 3. Newspaper
- □ 4. Health workers
- □ 5. Friends
- □ 6. Family member
- □ 7. Teachers
- □ 8. Attended driving safety training courses.
- □ 9. Radio

Part 5: Preventive behavior regarding road traffic injury of university student motorcycle riders.

Please put the mark (×) in the column, you agree most.

1= Never; 2= Rarely; 3= Sometimes; 4= Always.

Question	1	2	3	4
Q59. How often do you use a helmet while riding a motorcycle?				
Q60. Have you ever ridden a motorcycle faster than 40 km/h?				
Q61. Have you ever ridden a motorcycle after drinking alcohol?				
Q62. Have you ever ridden a motorcycle when drunk?				
Q63. Have you ever ridden a motorcycle after you took some medicine?				
Q64. Have you ever used a mobile phone while you were riding a motorcycle?				
Q65. Have you ever used an iPod while you were riding a motorcycle?				
Q66. Have you ever ridden a motorcycle while you felling sleepy?				
Q67. Have you ever ridden a motorcycle after you working over night?				
Q68. Have you ever ridden a motorcycle between 02:00am and 05:00 am?				
Q69. How often you break the traffic law?				

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