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**THE FACTORS RELATED TO THE PREVENTIVE
BEHAVIORS OF ACCIDENTS AND INJURIES
DUE TO MOTORCYCLE RIDING AMONG
ADOLESCENTS IN BANGKOK**

PANTIP SANGPRASERT

อภินันท์นาสาร

จาก

มหาวิทยาลัยมหิดล ม.มหิดล

**A THESIS SUBMITTED IN FULFILLMENT
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At present, there is a marked increase in the number of deaths and injuries involving adolescents in motorcycle accidents. It is believed that this death and injury rate can be decreased through the introduction of an informative education program. This research study looked at the current preventative behaviors practiced by adolescents in relation to accidents and injuries sustained whilst riding a motorcycle. The target group age-range coincides with the age-range of students attending vocational educational colleges. 276 adolescents from 4 technical colleges of vocational education, were selected as the sample group. Questionnaires, containing a range of multiple choice questions requiring responses on the predisposing, enabling and reinforcing factors were distributed. Pearson's product moment correlation coefficient was used to test the relationship between the predisposing, enabling and reinforcing factors and the preventive behaviors, with a level of reliability of 99%.

Conclusions from this study show that of the three levels of adolescents behavior (good, fair and poor) 52.5% of the sample displayed a fair level of behavior concerning the prevention of accidents and injuries whilst riding a motorcycle. Predisposing factors of knowledge and attitude concerning the prevention of accidents and injuries whilst riding a motorcycle, showed a positive relationship to preventive behaviors, with a level of significance of .01 and with a moderate level knowledge of 63.8%. Enabling factors for this study were composed of: (1) the roadworthy condition of the motorcycle, which had a positive relationship with preventive behaviors, and a level of significance of .01 (2) years of riding experience and (3) Alcohol and drug consumption, which showed a negative relationship with preventive behaviors, with a level of significance of .01. Other factors include accident experience and commuting distance, which showed a nonrelationship to preventive behaviors with a level of significance of .01. Reinforcing factors used in this study were: receiving information and advice on accident prevention and injuries sustained whilst riding a motorcycle. These showed a positive relationship to preventive behaviors, with a level of significance of .01.

The results of this study will benefit college nurses, health teachers, transportation authorities, traffic police and others who promote accident prevention knowledge and advise and educate adolescents in communities, on ways to improve and promote preventive behaviors concerning accidents and injuries sustained whilst riding motorcycles.

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คำสำคัญ : พฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์, วัยรุ่น

พานทิพย์ แสงประเสริฐ : ปัจจัยที่มีความสัมพันธ์กับพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์ของวัยรุ่น ในกรุงเทพมหานคร (THE FACTORS RELATED TO THE PREVENTIVE BEHAVIORS OF ACCIDENTS AND INJURIES DUE TO MOTORCYCLE RIDING AMONG ADOLESCENTS IN BANGKOK) คณะกรรมการควบคุมวิทยานิพนธ์ : อุษาพร ชาวลิตนิธิกุล, M.P.H., ไข่มุกข์ มลิตอง, M.P.H., จริยาวัตร คมพยัคฆ์, ศ.ค., 67 หน้า ISBN 974-664-083-6

ปัจจุบันพบว่าวัยรุ่นจำนวนมากต้องเสียชีวิตและได้รับบาดเจ็บและความสูญเสียจากการได้รับอุบัติเหตุจากการขับขี่รถจักรยานยนต์จำนวนมาก ผู้วิจัยจึงสนใจศึกษาพฤติกรรมและปัจจัยที่มีความสัมพันธ์กับพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์ของวัยรุ่นในกรุงเทพมหานคร โดยเลือกศึกษาวัยรุ่นในวิทยาลัยเทคนิค สังกัดกรมอาชีวศึกษา กระทรวงศึกษาธิการ จำนวน 276 คน เก็บรวบรวมข้อมูลโดยการให้กลุ่มตัวอย่างตอบแบบสอบถามเกี่ยวกับ ปัจจัยนำ ปัจจัยเอื้อ ปัจจัยเสริมและพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์ วิเคราะห์ข้อมูลโดยการคำนวณอัตราส่วนร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน ทดสอบความสัมพันธ์ของตัวแปร โดยใช้ค่าสัมประสิทธิ์สหสัมพันธ์ของเพียร์สันที่ระดับความเชื่อมั่น 99%

ผลการวิจัย พบว่า กลุ่มตัวอย่าง ร้อยละ 52.5 มีพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์ อยู่ในระดับปานกลาง ปัจจัยนำ ได้แก่ ความรู้และทัศนคติเกี่ยวกับการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์ มีความสัมพันธ์ทางบวกกับพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บอย่างมีนัยสำคัญทางสถิติ กลุ่มตัวอย่างร้อยละ 63.8 มีความรู้เกี่ยวกับการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์อยู่ในระดับปานกลาง ปัจจัยเอื้อ ได้แก่ สภาพรถจักรยานยนต์ มีความสัมพันธ์ทางบวกกับพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บอย่างมีนัยสำคัญทางสถิติ ส่วนประสมการขับขี่รถจักรยานยนต์ การดื่มเครื่องดื่มที่มีแอลกอฮอล์และการใช้ยา มีความสัมพันธ์ทางลบกับพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บอย่างมีนัยสำคัญทางสถิติ ประสมการณ์การได้รับอุบัติเหตุและระยะทางในการขับขี่ไม่มีความสัมพันธ์กับพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บ ปัจจัยเสริม ได้แก่ การได้รับข้อมูลข่าวสารและคำแนะนำเกี่ยวกับการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์ มีความสัมพันธ์ทางบวกกับพฤติกรรมการป้องกันอุบัติเหตุและการบาดเจ็บอย่างมีนัยสำคัญทางสถิติ

จากผลการวิจัยครั้งนี้ พยาบาลชุมชน พยาบาลประจำวิทยาลัย นุคกลางทีมสุขภาพ ครูพลานามัย เจ้าหน้าที่กรมการขนส่งทางบก เจ้าหน้าที่ตำรวจ ตลอดจนเจ้าหน้าที่ที่เกี่ยวข้องควร ใช้กลวิธีต่างๆ ในการให้ความรู้และส่งเสริมทัศนคติที่ดีในการป้องกันอุบัติเหตุและการบาดเจ็บจากการขับขี่รถจักรยานยนต์แก่วัยรุ่น ในสถานศึกษาและในชุมชนเพื่อให้มีพฤติกรรมการขับขี่รถจักรยานยนต์ที่ปลอดภัยและสามารถเผยแพร่ความรู้แก่วัยรุ่นในชุมชนต่อไป

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CHAPTER I

Introduction

Background and Significance of the Study

During the last decade, Thailand has undergone a period of transformation in which substantial economic and technological development has occurred. Transportation technology has given rapid rise to the number of motor vehicles, roadways and highways which is of fundamental importance to the country's sustained development. Motor vehicles have played a crucial part in this transformation, bringing both advantages, as well as disaster to Thai daily life. According to the Health Statistics Division (1996:66), road accidents are the second most fatal, noninfection cause of death within the population. As the number of fatal accidents continues on it's upward spirals. Studies show that motorcycles are a major cause of road accidents, with one third of the fatalities and injuries being attributed to accidents involving motorcycles(Police Traffic Division, 1995). It was also found that 90% of all motorcycle accidents are attributed to poor riding behaviors (Department of Health, Ministry of Public Health, 1990:2).

Loss from road accidents is enormous. Each year, two million accident cases are being admitted to hospitals throughout the country, using 20-50% of all available hospital beds as well as adding over one hundred billion baht to national medical treatment costs(Vichit Boonyahotara, 1987:17). Accordingly, there is not much less tangible loss of vital organs which leave the victims a burden to the family for life (Sawitree Jivongkool and Sangvnsil Ratanalart, cited in Prakrit Promayon, 1986:119).The Bureau of National Accident Prevention (1996:2), shows that 72%of motorcyclists between the age of 15- 24 years tend to be involved in more accidents than those from

other age groups. Boldness, risk-taking, excessive speed, and with little regard for personal safety are just some of the characteristics associated with this high-risk age group. As well, motorcyclists from this age group are usually unskilled in the art of motorcycle riding, and are thus, unable to make adjustments in times of emergency (Prapronsri Nakarin, 1986 and Vichit Boonyahotara, 1984, cited in Maneerat Teeravivait, 1995:2).

Adolescence is an age in which changes to the physical, psychological, and sociological development are most noticeable, and can be termed as one of life's most critical periods. It is a time in which adolescents display compulsive behaviors, which are attributed to an increased activity of the endocrine gland (Srirun Kaukangvon, 1995:384). The behavior of those in adolescent years puts them high on the list of those likely to undergo health problems. Accidents are especially likely to occur among them (Blum and Beer, 1990:to289-294 cited in Chuleepron Sonsri, 1997:12).

Research regarding the causes of accidents reveals that motorcyclists between the age of 15-24 years are more likely to be involved in accidents than any other age group. This is predominantly due to their reckless, risk-seeking behaviors, their inexperience, their tendency to drive fast, and their disregard for safety(The Nation of Prevention Office, 1996). Studies on the application of protection motivation theory on motorcycle accident preventive riding behavior research, indicate a large number of teenagers who possess motorcycles are also students in Technical Colleges and 70% of these students rode motorcycles to school and home. Another study found that 68% of technical students were involved in accidents (Bangon Prapasasut, 1997:2), whilst a similar study conducted on the development of safety behavior riding by male technical college student in Rayong province indicated 13.8% were pron to accidents (Pririn Samutsan, 1996:2).

Considering these reasons, it can be stated that adolescence are a group whose behavior create a high risk of motorcycle accidents. The research, as a community nurses who is responsible for providing and caring of this and other groups, decided to study the relative factors concerning the prevention of accidents and injuries whilst riding

motorcycles. The results of this study should assist nurses, teachers and others who can utilize the findings as guidelines for promotion of the preventive behaviors of motorcycle accidents and injuries to students.

Conceptual Framework

Conceptual framework of this study is adapted from phase 4 of the PRECEDE model (Green & Kreuter, 1991:24) on the basis of cumulative research on health and social behavior. Literally hundreds of factors have the potential to influence a given health behavior. The PRECEDE model groups them according to the educational and organizational strategies likely to be employed in a health promotion program to bring about behavioral and environmental change. The three broad groupings are predisposing factors, reinforcing factors, and enabling factors.

Predisposing factors are internal factors including a person's or population's knowledge, attitudes, beliefs, values, and perceptions that facilitate or hinder motivation for change. In this study, the predisposing factors refer to knowledge on accident prevention, and attitude towards accident prevention. Knowledge is an important index of good health behavior (Becker, 1965). The study of Umnoy Nagkau (1991:b), on the factors concerning motorcycle accidents in Bangkok showed that motorcycle riders who were on low level with knowledge of preventive accidents and injuries, had high risk opportunities for accidents at 1.7 times more than the group who were on high level with knowledge. Kumrai Tunchaisri (1993:25) found 3.4 times high risk of accidents difference between two groups of low and high level with knowledge. Considering, the factors involving in motorcycle accidents of the 15-24 years old riders Surachai Jrimkool (1986 :18) mentioned that the group of low level with knowledge to prevent accidents were on high risk of accidents at 3.6 times more than the comparable group who were on high level with knowledge. For attitude, a conceptual idea or belief in something or situation which is motivated behaviors, it was found that the group agreeable to infringing upon rules of the

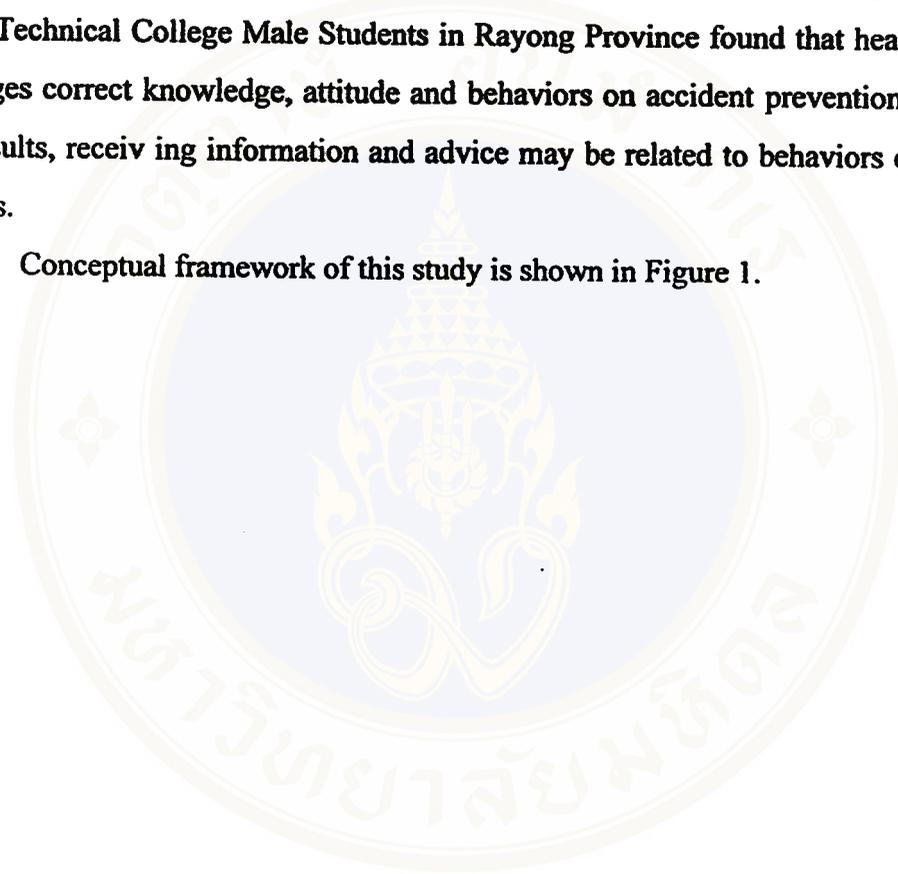
road had a high risk of motorcycle accidents than unagreeable group at 9.2 times (Kumrai Tunchaisri,1993:b). Moreover, Wanida Kumjustdutsakaun(1986:16)stated that motorcycle riders with injuries from accidents had an inappropriate attitude for riding such as no need to have a rear vision mirror (18.3%).

Enabling factors are external factors including those skills, resources, or barriers that can help or hinder the desired behavioral changes as well as environmental changes. They can be viewed as vehicles or barriers, created mainly by societal forces or systems. Facilities and personal or community resources may be ample or inadequate. These may be income or health insurance, and supportive or restrictive laws and statutes . In this study, the enabling factors refer to years of riding experience, accident experience, alcohol and drug consumption, roadworthy condition of motorcycles, and commuting distance. Study of Pririn Samutsan(1997:133) toward the development of safe motorcycle riding behaviors of male Technical college students at Rayong, showed that experience in motorcycle riding accidents was an important factor influencing safety mindness of rinding behavior increasingly while consumption of alcohol was a factor influencing safety mindness of riding behavior decreasingly. Wanida Mathalug (1991: d) found that failure to check motorcycle equipment before riding was related to the severity of injuries: checking equipment timely at 78.3% was harmonious with Kumrai Tunchaisri (1993: 25) who found no rear vision mirrors had a more high risk of accidents, 2.3 times, than equipped motorcycles.

Reinforcing factors are external factors including rewards received, and the feed-back the learner receives from others following adoption of the behavior. This may encourage or discourage continuation of the behavior. In this study, the reinforcing factors refer to receiving information and advice on prevention of accidents and injuries sustained whilst riding a motorcycle. The study of Virailug Kittivongsopa(1992:80-85) titled the Effectiveness of Health Education Program on Motorcycle Accident Prevention Among Secondary School Students in Ubonratchathani Province found that receiving information and advice including having activities increases safety behaviors of motorcycle riders. In

harmony with other studies such as a study of Bangon Prapasasut (1998) titled the Application of Theoretical Motivation on Behaviors of Preventive Accidents Whilst Riding Motorcycles Among the First Year of Technical College Students in Metropolis, Pririn Samutsan (1997) titled the Development of Safety Mind of Riding Motorcycle Behaviors Among Technical College Male Students in Rayong Province found that health education encourages correct knowledge, attitude and behaviors on accident prevention. Regarding these results, receiving information and advice may be related to behaviors of preventive accidents.

Conceptual framework of this study is shown in Figure 1.



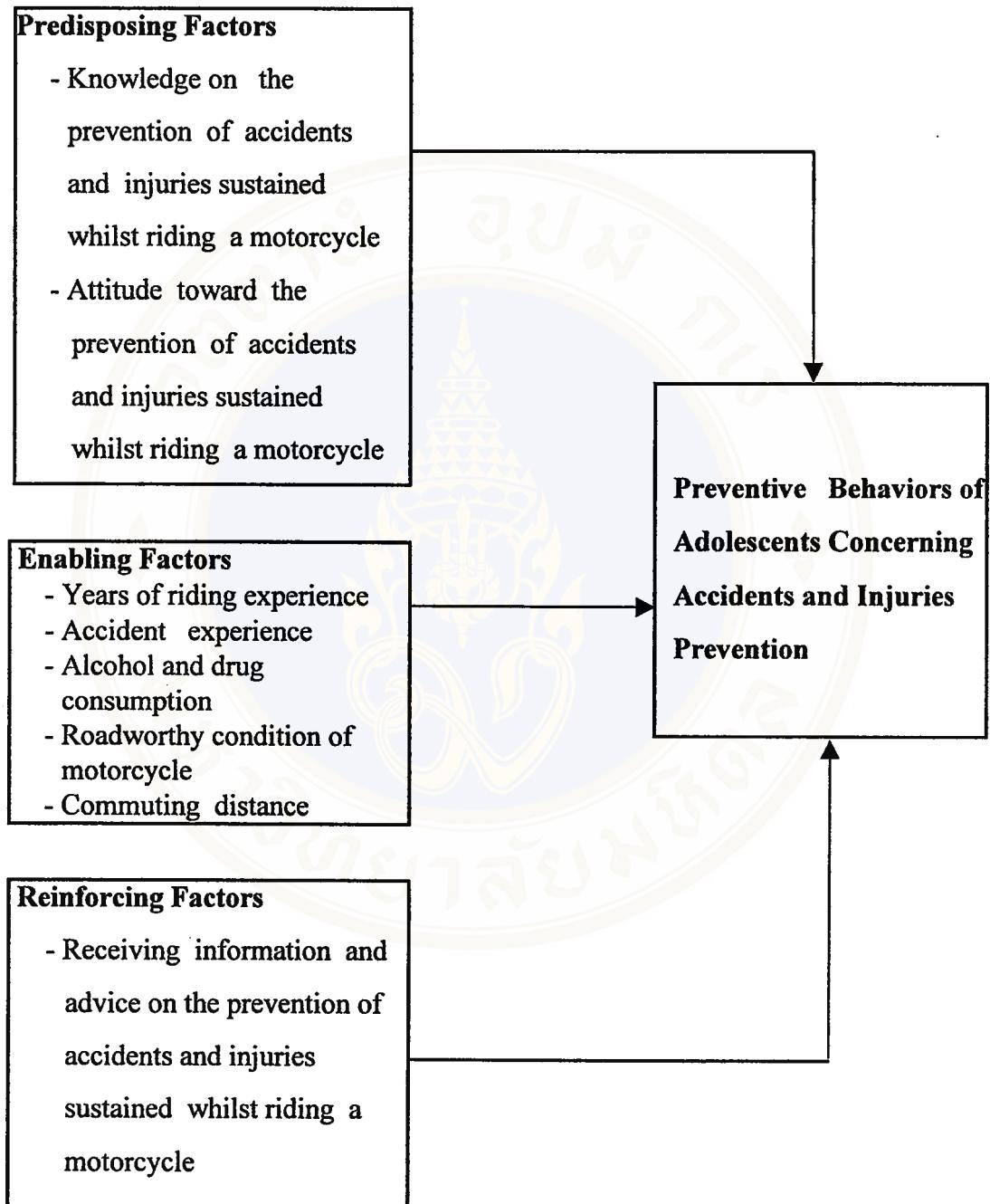


Figure 1 Factors Concerning the Prevention of Accidents and Injuries whilst Riding a Motorcycle, Adapted from the PRECEDE Model (Green and Kreuter, 1991)

Purpose of the Study

The objectives of the study were to identify:

1. The preventive behaviors of adolescents in Bangkok concerning accidents and injuries sustained whilst riding a motorcycle.
2. The factors relating to the preventive behaviors of adolescents concerning accidents and injuries sustained whilst riding a motorcycle.

Scope of the Study

This study explored the relative factors concerning the preventive behaviors of adolescent students attending technical colleges in Bangkok Metropolis enrolled in academic year 1999, and who commuted to and from their colleges by motorcycle.

Expected Outcomes

1. To serve as guidelines for health teams such as school nurses, community nurses, and teachers involved in educating students on how to prevent motorcycle accidents and promoting preventive behaviors concerning accidents and injuries sustained whilst riding a motorcycle.
2. To serve as guidelines for administrators in their task of promoting preventive behavior among adolescent students.
3. To provide a means on how to reduce motorcycle accidents, which is subject to further discussion.

Definition of Terms

1. **Preventive behavior** refers to action taken by adolescent students in preventing the causes of accident whilst riding a motorcycle, including checking the roadworthy condition of the motorcycle before riding, ensuring that a safety helmet is worn whilst riding a motorcycle, observing traffic rules and regulations, using turn

indicator lights or hand signals when changing lanes, not cutting in on other traffic, not riding two motorcycle abreast, and not carrying more than one pillion passenger.

2. Knowledge refers to knowledge of the prevention of accidents and injuries whilst riding a motorcycle inclusive of causes and results of accidents, observing traffic rule, and strategy of the prevention of accidents and injury.

3. Attitude refers to the concept towards the prevention of accidents and injuries whilst riding a motorcycle.

4. Years of riding experience refers to the number of years that the respondent has been riding a motorcycle.

5. Accident experience refers to the degree of involvement in an accident, and sustaining either slight, mild, or severe levels of injuries requiring admittance to hospital.

6. Alcohol and drug consumption refers to consumption of any form of alcohol or substance that either stimulates or inhibits the central nervous system one hour prior to riding a motorcycle.

7. Roadworthy condition of motorcycle refers to the existence/completeness condition and functionality of a motorcycle's equipment, e.g., front and rear lights, turn indicator lights, rear vision mirror, breaks, horn, wheels and tires.

8. Commuting distance refers to the number of kilometers commuted to and from places of learning per day.

9. Receiving information and advice refers to information concerning the prevention of accidents and injuries sustained whilst riding a motorcycle inclusive of instruction, and persuasion from father-mother, teachers, traffic police, friends, television, radio, newspapers, advisory brochure/leaflet/posters, and participation in preventive riding activities.

CHAPTER II

Literature Review

This study examined the factors relating to preventive behaviors of accidents and injuries due to motorcycle riding among adolescents in Bangkok. The literature review for this study was as follows:

1. Development of adolescents
2. Factors related to motorcycle accidents among adolescents
3. Conceptual framework of the study

Development of Adolescents

“Adolescence” comes from the Latin verb *adolescere*, which means “to grow,” or “to grow to maturity.” As Horrocks has defined it, “Adolescence is both a way of life and a span of time in the physical and psychological development of an individual. It represents a period of growth and change in nearly all aspects of the child’s physical, mental, social, and emotional life. It is a time of new experiences, new responsibilities, and relationships with adults as well as peers (Horrocks, J.E., 1995:218-221).

The average age of adolescence, extends from 13 to 21 years for girls, and for boys, from 14 to 21. Thus, girls have a year longer to be adolescents and a year less to be children (Horrocks, J. E., 1995:2). Consequently, adolescence may be divided into two subdivisions, early and late. The dividing line between early and late adolescence is 17 years. This holds true for boys who mature later than girls just as it does for girls (English, H.B., cited in Hurlock, B.E., 1967:2). Arnold Gesell & Luella Colihas divide adolescence into three subdivisions, early adolescence from 11 to 13 years for girls, 13 to 15 for boys, middle adolescence from 13 to 17 years for girls, 15 to 19 for boys, and late adolescence from 17 to 21 for girls, and 19 to 21 for boys (Arnold Gesell & Luella Coli cited in Prayunesri

the adolescent form doing what he desires, etc. Evidence seems to indicate that adolescence is not to be thought of as unduly stressful period. Common emotional patterns in adolescence are fear, worry, anxiety, anger, annoyances, frustrations, envy, curiosity and happiness. Beside, intellectual development is a time of experiment and indulging in both right and wrongful experiences with no thought given to the outcome of one's actions (Srirun Kaukangvan, 1995:384). Early adolescence is a time when a great deal of thought is given to analyzing situations and late adolescence is a time when more reason is applied to any given situation, with many indications of approaching adulthood (Sucha Chunam, 1990: 134).

3. Sociological and economic changes, the change is in to “socialization,” that is the process of learning to conform to group standards, norms, and customs. It is the ability to behave in accordance with social expectations. As Child has pointed out, socialization is a broad term for the whole process by which behavioral potentialities of enormously wide range, is led to develop actual behavior which is confined within a much narrower range of what is customary and acceptable for him according to the standards of his group. Social acceptance usually called popularity (Child, I. L., cited in Hurlock, B.E., 1967:116-117). The adolescent is more selective in the choice of his friends and he cultivates fewer friendships than he had as a child. This is especially true of girls, whose social groups are usually smaller and more sharply defined than those of boys (Dunphy, D.C. cited in Hurlock, B.E., 1967:122). Economic change, in the relation to the norm for the group, guarantees that the adolescent will be the center of attention in his group. He is judged not only by what he has but also by what he and the members of his family are in the community (Stone, C. L. cited in Hurlock, B.E., 1967:175).

Factors related to motorcycle accidents among adolescents

“Accident” means an unfortunate occurrence or mishap, especially one resulting in an injury (Webster, Noah, 1979). Studies of Irwin, et al, in showed that 60% of the mortality rate was from accidents involving motorcycles (Irwin, et al., 1990:339-355).

The contributing factors of motorcycle accidents are as follows:

20/11-1
1. Sex

The study of Vichit Boonyahotara titled Accident in Developing Countries showed that there were five times more accidents involving males than accidents involving females (Vichit Boonyahotara, 1994:27). Male adolescents tend to ride fast and in a fashion designed to show riding prowess with little concern for safety (C.D.C, 1990 cited in Chureepon Sonsri, 1997:17).

2. Age

There were two times more road accidents involving adolescents than adults (Vichit Boonyahotara, 1994:27). A study conducted by The Bureau of National Accident Prevention showed that 75% of teenagers between 15 and 24 years of age, who possess a motorcycle, were killed or injured each year as a result of motorcycle accidents (The Bureau of National Accident Prevention, 1996:2).

3. Knowledge

Knowledge indicates good health behavior (Becker, 1965:7). The study by Umnoy Nagkau showed that the riders of motorcycles who had a low level of knowledge of accidents prevention were at a high risk of accidents as 1.7 times more than the groups who had a high level of knowledge (Umnoy Nagkau, 1991:b). In addition, the study by Kumrai Tunchaisri (1993:25) showed that students who ride motorcycles, who had a low level of knowledge of accident and injury prevention, had 3.4 times greater risk of accidents than the students who had high level of knowledge.

4. Attitude

Attitude is a belief, concept, or idea that involves a psychological response in humans toward anything, anyone and any situation (Prapapen Suwan, 1977:1). Attitude relates to extrovert behaviors (Kothandapani,1971:9). Studies by Kumrai Tunchaisri found that those groups of motorcycle riders students willing to infringe road rules had a 9.2 times higher risk of motorcycle accidents than unwilling groups (Kumrai Tunchaisri, 1993:b). Moreover, Wanida Kumjustdutsakaun (1986:16) found that motorcycle riders

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who received injuries from accidents had an inappropriate attitude for riding, for example, no need to have a rear vision mirror (18.3%), considering accidents as being unfortunate (54.2%) and road rule being unimportant (24.6%). So it can be seen that attitude is related to preventive behaviors accidents and injuries while riding a motorcycle.

4. Years of riding experience

Years of riding experience is the time spent in riding. The more time given in riding experience the greater the knowledge and skills which may be decrease the number of road accidents. This point is made in a study by Kumrai Tunchaisri, titled A Comparative Study of Factors Involving Motorcycle Accidents of Secondary School Students showed that the group of students who rode for less than one year, were involved in 2.8 times more motorcycle accidents than the group who had ridden for one year or more (Kumrai Tunchaisri, 1993: b). Furthermore, the study by Surachai Jrimkool showed that the driver age group of 15-24 years old who rode for less than three years, were involved in 3.5 times more motorcycle accidents than the group who had ridden for seven years or more (Surachai Jrimkool, 1986:18).

6. Accident experience

Accident experience tends to increase awareness of the preventive behaviors, because of fear of the consequence of human behaviors. A study by Bangon Prapasasut, titled The Application Theoretical Motivation on Behaviors of Preventive Accidents Whilst Riding Motorcycles Among the First Year of Tecniquecal Students in Metropolis, showed that accident experience had a positive relationship to the prevention of motorcycle accidents (Bangon Prapasasut, 1997: 133)

7. Alcohol and Drug consumption

Excessive consumption of alcohol, e.g. liquor, beer, wine, or whisky can lead to alcoholism, psychosis, paralysis and accident. The study by Prarinda Jirakunpatana showed that 25% of the motorcycle riders who consumed alcohol before riding, were involved in a motorcycle accident (Prarinda Jirakunpatana, 1993:49). Drugs are used for medical purposes that change the function of body enabling them to a comfortable rest,

such as chlorpheniramine, antihistamines, paracetamol, and etc. The peak of their effect is approximately one hour after consumption (Kumpron Srivatanakool, 1984:310). Alcohol and drugs consumed to stimulate or inhibit central nervous system, influence physical and psychological controls with an effect on consciousness and possibly cause stupor. These may be a cause of motorcycle accidents.

8. Roadworthy condition of motorcycle

The maintaining of a motorcycle in roadworthy condition is important. Equipment such as front lights, rear lights, turn lights, rear-vision mirrors, brakes, tires/wheels, should always be checked before riding to know condition of motorcycle. Many accidents are directly attributable to faulty or absent equipment. The study by Kumrai Tunchaisri found that students who rode a motorcycle with out rear-vision mirrors were 2.3 times more often involved in accidents than students who rode a motorcycle with rear-vision mirrors (Kumrai Tunchaisri, 1993;b). Moreover, the study by Rumpa Huthaithum found that 62.5% of those motorcycle riders who had not always checked the roadworthy condition of the motorcycle were involved in accidents (Rumpa Huthaithum, 1995:72).

9. Commuting distance

Riders who rode longer distances used more conscious concentration than those who rode in shorter distance. Symptoms such as changed body condition and discomfort from commuting long distances, such as muscle fatigue, eyesoreness, headaches, all influence riders who may be involved in accidents whilst riding a motorcycle. The study by Rumpa Huthaithum showed that the motorcycle riders who rode a long distance were two times more likely to be involved in accidents than the motorcycle riders who rode a short distance (Rumpa Huthaithum, 1995:b).

10. Receiving information and advice

Receiving information and advice influences the improvement of knowledge and attitude toward preventive behaviors of accidents. Information and advice is received from posters, newspapers, television, radio, participation in activities, etc. The studies of three researchers showed that receiving information and advice and, participation in

activities concerning accident prevention decreased the risk of road accidents, and increased awareness whilst riding a motorcycle (Virailug Kitivongsopa, 1992:80-85, Bangon Samutsan, 1997:d, and Vipada Junepnookool, 1995:b, respectively).

11. Behaviors

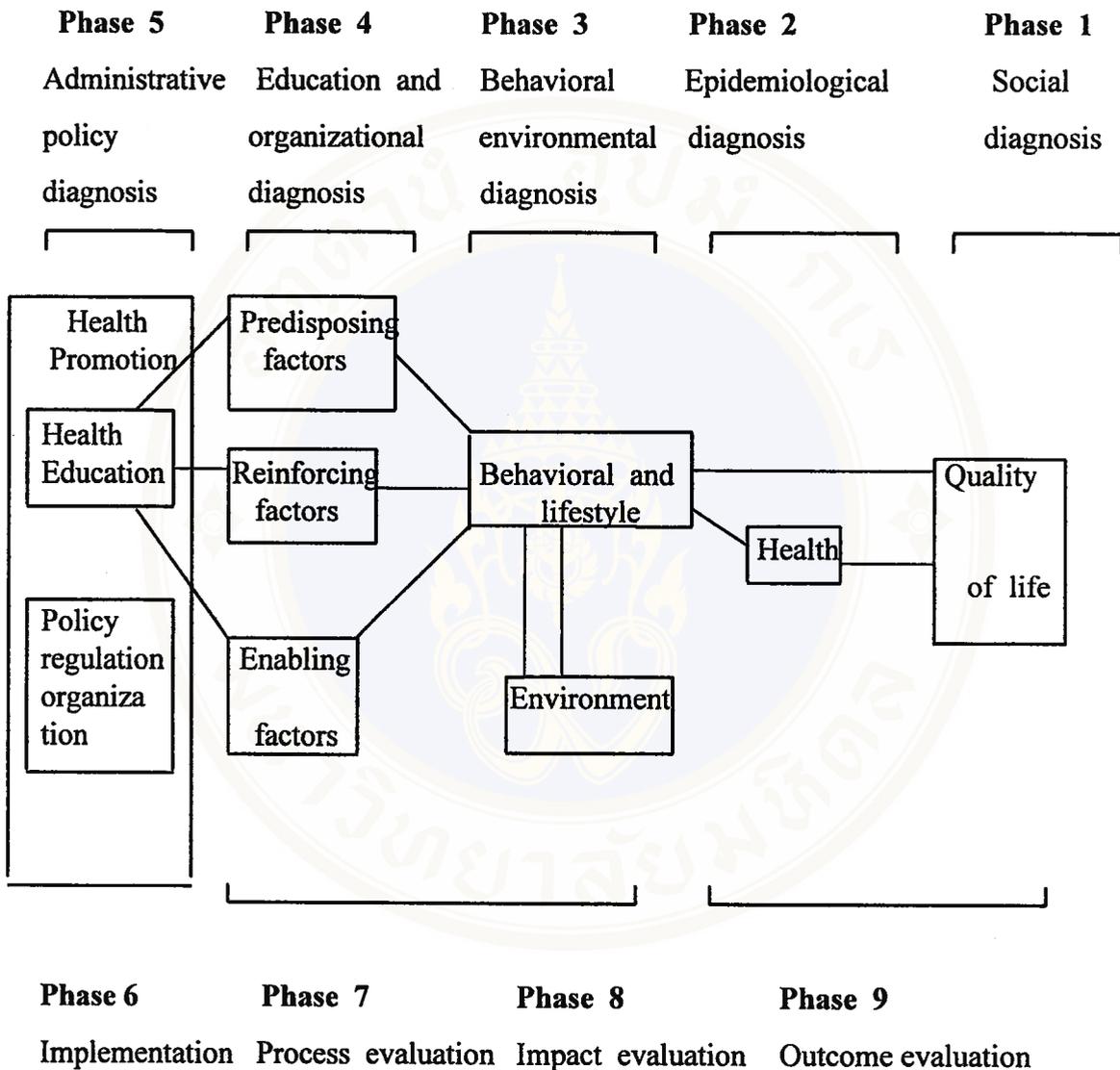
Behaviors are actions and reactions in the activities of life. According to the Health Statistic Division, 90% of all road accidents are attributable to poor riding behaviors (Public Health Statistic, 1990:2). In addition, the study by Rumpa Hathaithum showed that riders who have unsafe riding behaviors were three times more often involved in motorcycle accidents than riders who have safe riding behaviors (Rumpa Hathaithum, 1995:64).

This literature review shows that the preventive behaviors of motorcycle accidents and injuries are as follows: compliance with road traffic rules, compliance with traffic safety helmets laws which decreases severity of accidents and the mortality rate from brain injuries, checking the roadworthy condition of motorcycle before riding such as front lights, rear lights, turn lights, rear vision mirror, brakes, wheels / tires and horn.

Conceptual framework of the study

The conceptual framework of the study was adapted from phase 4 of the PRECEDE framework. This PRECEDE is an acronym for Predisposing Reinforcing Enabling Cause in Educational Diagnosis and Evaluation (Green & Kreuter, 1991:24) see figure 2.

PRECEDE



PROCEED

Figure 2 The PRECEDE-PROCEED Model for promotion planing and evaluation

Source : Green and Kreuter, 1991: 24

Predisposing factors are internal factors including a person's population knowledge, attitudes, beliefs, values, and perceptions that facilitate or hinder motivation for change. The factors used in this study were knowledge and attitude concerning the prevention of motorcycle accidents and injuries.

Enabling factors are external factors: those skills, resources, or barriers that can help or hinder the desired behavioral as well as environmental changes. They can be viewed as vehicles or barriers, created mainly by societal forces or systems. Enabling factors in this study were those external factors that support or inhibit the preventive behaviors of adolescents concerning motorcycle accidents and injuries sustained whilst riding a motorcycle. They were years of riding experience, accident experience, alcohol and drug consumption, roadworthy condition of motorcycle, and commuting distance.

Reinforcing factors are external factors, the rewards received, and the feedback the learner receives from others (friends, teachers, physician, parent, etc) following adoption of the behavior, which may encourage or discourage continuation of the behavior. Reinforcing factors in this study were information, instruction or persuasion from a parent, teacher, traffic police or friend, from television, radio, newspapers, posters, and participation in motorcycle accident prevention activities.

CHAPTER III

Methodology

This descriptive research studied the factors related to the preventive behaviors of adolescents sustained accidents and injuries whilst motorcycle riding in Bangkok. The methodology was as follows:

Population and sampling

Population was adolescents aged between 15 and 25 years, studying at the Technical Colleges, The Department of Vocational Education in Bangkok, during the academic year 1999.

Sample were students who commuted to and from colleges by motorcycle.

The sample size was computed using Kerlinger and Padhazer, Formula (1973)

$$\frac{n}{k} = 30$$

n = number of sample size

k = number of independent variables

$$n / 9 = 30$$

$$n = 9 \times 30$$

$$n = 270$$

Sampling technique

A multi-stage sampling technique was used in this research as follows:

1 Selection of area

At the time of the study Bangkok comprised of four major areas which are Vongloun area, Krungthon area, Burapa area, and Chaopaya area, respectively (Community Development Planning, Bangkok, 1998).

2 Selection of technical college

There were two technical colleges in Vongloun area, one technical college in Krungthon area, two technical colleges in Burapa area, and one technical college in Chaopaya area. One technical college was selected from each area as follows:

Major Area of Bangkok	Technical Colleges
Vongloun	Kranjanapisai Changthongloun Technical College
Krungthon	Rajsitharam Technical College
Burapa	Minburi Technical College
Chaopaya	Donmoang Technical College

Sample were students who commuted to and from colleges by motorcycle.

Instrumentation

Self-administered questionnaires were used for data collection. The questionnaires consisted of 5 parts as follows:

Part 1 Characteristic of the sample comprised of sex, age, level of education, field of education, ownership of motorcycle, insurance, driving license, and traffic violations.

Part 2 Predisposing factors comprised knowledge and attitude concerning the prevention of motorcycle accidents and injuries.

Knowledge comprised a 14-item multiple-choice test with each item having 5 choices. A correct response was given a score of 1 whilst an incorrect response was given a zero score. Level of knowledge was graded according to the tested score in the following orders:

Grading score	Level of knowledge
0 - 4	poor
5 - 9	fair
10 - 14	good

Attitude comprised a 15 item questionnaire with each item having a 3-choice rating scale. The questionnaire allowed both positive and negative responses on the prevention of accidents and injuries. The responses were scored as follows:

Response	Favorable	Unfavorable
Agree	3	1
Uncertain	2	2
Disagree	1	3

Part 3 Enabling factors consisted of yes/no, and open-ended questions which comprised years of riding experience, accident experience, alcohol and drug consumption, roadworthy condition of motorcycle, and commuting distance. The responses were given score as follows:

Response	Score
Yes	0
No	1
Regularly checked the condition of motorcycle before riding	3
Irregularly checked the condition of motorcycle before riding	2
Never checked the condition of motorcycle before riding	1

Response	Score
the motorcycle was fully equipped	1
the motorcycle was not fully equipped	0
the motorcycle was in good condition	3
the motorcycle was in fair condition	2
the motorcycle was in poor condition	1

Part 4 Reinforcing factors consisted of receiving information and advice on the prevention of motorcycle accidents and injuries whilst riding a motorcycle inclusive of instruction and persuasion from father, mother, teachers, traffic police, friends, television, radio, newspapers, brochure, leaflet, posters, and participation in preventive riding activities. The responses were scored as follows:

Response	Score
Yes	1
No	0

Part 5 Preventive behaviors of adolescents concerning accidents and injuries prevention

Response	Score
Positive (appropriate behavior)	1
Negative (inappropriate behavior)	0

Grading score	Level of behavior
0 - 5	poor
6 - 10	fair
11 - 15	good

Validity

Content validity

The instrument was validated by 5 experts as follows:

- 2 Experts in health behavior
- 2 Community health nurses
- 1 Traffic police

Reliability

1. The Kuder-Richardson-20 (Yuphin Junthakna, 1994:127) was performed to measure reliability of knowledge.

$$r_{tt} = \frac{n}{n-1} \left[1 - \frac{\sum pq}{s_t^2} \right]$$

n = The number of items in questionnaire = 14

p = Ratio of correct responses = 0.0031

q = Ratio of incorrect responses = 0.0009

S_t^2 = The variance of whole score = 0.6710

r_{tt} = Reliability of questionnaire = 0.70

2. Chronbach's alpha coefficient(cited in Yuwadee Rucha et al.,1994:127) was performed to measure reliability of attitude.

$$\alpha = \frac{n}{n-1} \left[1 - \frac{\sum S_i^2}{S_t^2} \right]$$

n	=	The number of items in questionnaire	= 15
S _i ²	=	The variance of each item	= 0.0347
S _t ²	=	The variance of scoring person	= 0.0064
α	=	Reliability of the instrument	= 0.8

Data collection

The self-administered questionnaire was distributed to three hundred adolescents in four technical colleges who daily rode motorcycle to and from their colleges. Two hundred and seventy-six completed questionnaires were returned to the investigator.

Data Analysis

SPSS/PC⁺ was performed for data processing. Pearson product moment correlation coefficient was performed to analyze the relationship between predisposing factors, enabling factors, and reinforcing factors, in relation to the preventive behaviors of adolescents concerning motorcycle accidents and injuries.

CHAPTER IV

Results

This descriptive research focused on the factors related to preventive behaviors regarding motorcycle accidents and injuries among adolescents. The sample consisted of 276 technical vocational colleges students, 15-25 years old, in Bangkok. The results of this study, were presented as follows:

- Part I** **Characteristics of the sample**
- Part II** **Predisposing factors**
- Part III** **Enabling factors**
- Part IV** **Reinforcing factors**
- Part V** **Preventive behaviors**
- Part VI** **The relationship of predisposing factors, enabling factors, reinforcing factors and the preventive behaviors**

Part I Characteristics of the Sample**Table 1 Demographic and Background**

Characteristics	Number (n=276)	Percent
Sex		
Male	264	95.7
Female	12	4.3
Age (years)		
15 - 19	222	80.4
20 - 24	53	19.2
> 24	1	0.4
Level of education		
Certificate in Vocational Education	141	51.1
Diploma in Vocational Education	135	48.9
Field of Study		
Mechanical	61	22.1
Electrical	56	20.3
Technical production	26	9.4
Electronics	25	9.1
Welding	23	8.3
Industry	22	7.9
Architecture	20	7.2
Construction	18	6.5

Table 1 Demographic and Background (Continued)

Characteristics	Number (n=276)	Percent
Field of Study (Continued)		
Printing	11	4.0
Computer science	7	2.5
Communications	5	1.8
Repair and maintenance	2	0.7
Period of Study		
Daylight	220	79.7
Twilight	56	20.3

Table 1 shows that most of the sample are male (95.7%), whereas only 4.3% are female. The ages of the sample are mostly 15-19 years (80.4 %). 51.1% are studying toward certificate education and 48.9% are studying toward diploma education. The fields of study are mechanical (22.1%) and electronics (20.3%). Most of them study in daylight classes (79.7%).

Table 2 General Background Concerning Motorcycle Riding

Characteristics	Number (n=276)	Percent
Ownership of Motorcycle		
Yes	136	49.3
No	140	50.7
belonging to		
Father	120	43.5
Brother	16	5.8
Relative	4	1.4
Possession of Insurance		
Yes	216	78.3
No	60	21.7
Reason for not having insurance		
No time to do	36	13.0
Not the owner	20	7.3
Unrealized for the need	4	1.4
Possession of Driving license		
Yes	152	55.1
By examination	145	52.5
By purchase	7	2.5
No	124	44.9
Reason for not having Driving license		
Underage	69	24.9
Unrealized for the need	30	10.9
No time to do	25	9.1

Table 2 General Background Concerning Motorcycle Riding(Continued)

Characteristics	Number (n=276)	Percent
Violation of Traffic		
No	58	21.0
Yes*	218	79.0
Not wearing a safety helmet	95	34.5
Infringement traffic regulations	74	26.7
No driving license	49	17.8
Punishment *		
Paying fine	172	62.3
Being confiscated license	25	9.1
Being warned	21	7.6

* Answer > 1 item

Table 2 shows that about half the sample (50.7%) are not the owner of the motorcycle. The motorcycles are possessed by father (43.5%), brother (5.8%) and relative (1.4%), respectively. Most of the motorcycles are insured (78.3%), whereas 21.7% are not insured, the reasons for the latter are : no time to do (13.0%), not the owner (7.3%) and the need not realized (1.4%). More than a half (52.6%) of sample have a driving license which only 2.5% get by examination. The reasons for not having license are underage (24.9%), unrealized for need (10.9%) and no time to do (9.1%), respectively.

Most of the sample have committed a traffic violation (79%) for not wearing a safety helmet (34.5%), infringement of traffic regulations (26.7%). They are punished by paying fine (62.3%), their license being confiscated (9.1%) and being warned (7.6%).

Part II Predisposing Factors**Table 3 Knowledge of Motorcycle Accident and Injuries Prevention**

Knowledge	Correct answer		Incorrect answer	
	Number (276)	Percent	Number (276)	Percent
1. Recognition about no U-turn signs	248	89.9	28	10.1
2. Recognition about no Parking signs	213	77.2	63	22.8
3. Recognition about loss through accidents	201	72.8	75	27.2
4. Characteristic of high risk riding	195	70.7	81	29.3
5. Rule on carriage of pillion passengers	179	64.9	97	35.1
6. Rule on overtaking	172	62.3	104	37.7
7. Rule on riding on roundabout	167	60.5	109	39.5
8. Major cause of death and injuries form motorcycle accident	166	60.1	110	39.9
9. Rule on making a turn	99	35.9	177	64.1
10. Rule of carriage of passenger with load limit	97	35.1	179	64.9
11. Safety distance between vehicle while riding	96	34.8	180	65.2
12. Riding in heavy traffic	78	28.3	198	71.1
13. Riding speed in urban area	62	22.5	214	77.5
14. Riding speed in rural area	53	19.2	223	80.8

Table 3 shows that the first three areas of correct answers towards knowledge of accidents and injuries prevention are : recognition about no U-turn (89.%), recognition

about no Parking (77.2%) and recognition about loss though accidents (72.8%). The first three areas of incorrect answers towards knowledge of accidents and injuries prevention are : riding speed in rural area (80.8%), riding speed in urban area (77.5%) and riding in havy traffic (71.1%), respectively.



Table 4 Level of Knowledge on Motorcycle Accidents and Injuries Prevention

Level of knowledge	Number (n=276)	Percent
High (10 - 14 score)	40	14.5
Moderate (5 - 9 score)	176	63.8
Low (0 - 4 score)	60	21.7

$$\bar{x} = 7.4 \quad SD = 2.56$$

Table 4 shows that 63.8% of the sample have a moderate level of knowledge on motorcycle accidents and injuries prevention. Approximately twenty two percent of the sample have a low level of knowledge and the remaining (14.5%) attain high level of knowledge.

Table 5 Attitude towards Motorcycle Accident and Injury Prevention

Attitude	Agree		Uncertain		Disagree	
	Number	Percent	Number	Percent	Number	Percent
	(n=276)		(n=276)		(n=276)	
1. It is necessary to wearing safety helmets while riding a motorcycle.	256	92.8	10	3.6	10	3.6
2. Increasing in awareness after receive of the losses of accidents.	220	79.7	39	14.1	17	6.2
3. It is necessary to check roadworthy condition before riding a motorcycle.	212	76.8	49	17.8	15	5.4
4. Both rider and passenger should be punished for not wearing safety helmets.	161	58.3	71	25.7	44	15.9
5. If the rider remains alert, it is acceptable to ride at high speed, without fear of accident.	117	42.4	81	29.3	78	28.3
6. Wearing a safety helmet is boring.	90	32.6	82	19.7	104	37.7
7. Riding two motorcycle abreast is acceptable on the empty road.	87	31.5	104	37.7	85	30.8
8. Rear vision mirrors are not necessary as it is easy for the rider to turn and look behind.	58	21.0	61	22.1	157	56.9
9. Consumption alcohol dose not influence the motorcycle rider's performance.	55	19.9	45	16.3	176	63.8
10. High risk riding is acceptable among peer group.	52	18.8	52	18.8	172	62.3
11. Riding at high speed on a curved road to indicates skills is acceptable behavior.	47	17.0	46	16.7	183	65.9
12. To cut in or to ride across the path of oncoming traffic shows a high skill level.	41	14.9	39	14.1	196	71.0



Table 5 Attitude towards Motorcycle Accident and Injury Prevention (Continued)

Attitude	Agree		Uncertain		Disagree	
	Number	Percent	Number	Percent	Number	Percent
	(n=276)		(n=276)		(n=276)	
14. Drugs such as amphetamine will stimulate the C.N.S. the rider and increases the ability to ride longer distances.	35	12.7	39	14.1	102	73.2
15. Compliance with traffic laws is out of date.	32	11.6	52	18.8	192	96.6

$\bar{x} = 36.5$ S.D. = 5.7

Table 5 shows that the first three areas of acceptable responses towards accident and injury prevention are: necessity to wear helmet (92.8%), increasing in awareness after receive loss of accidents (79.7%) and necessity to check roadworthy condition befor riding a motorcycle(76.8%). The first three areas of unacceptable responses in attitudes are: felling out of date to compliance with traffic laws (96.6%), Drugs such as amphetamine will stimulate the C.N.S. the rider and increases the ability to ride longer distances (73.2%), and to cut in or to ride across the path of oncoming traffic shows a high skill level (71%).

Part III Enabling Factors**Table 6 Driving Experience**

Enabling factors	Number (n=276)	Percent
Years of riding experience		
0-3	121	43.8
4-6	97	35.1
7-9	39	14.1
>9	19	6.9
Commuting distance per day (k.m.)		
1-10	121	43.8
11-20	64	23.3
21-30	38	13.8
> 30	53	19.2
Accident experience		
No	77	27.9
Yes	199	72.1
severity of accident		
Minor injury	129	46.7
Moderate injury	58	21.0
Major injury	12	4.4

Table 6 Driving Experience (continued)

Enabling factors	Number (n=276)	Percent
cause of accidents		
Careless	138	50.0
Poor condition of road	55	19.9
Consumption of alcohol before riding	47	17.0
consumption of drugs before riding	28	10.1

Table 6 shows that (43.8%) of the sample have riding experience of 0-3 years, and commuting distance of 1-10 k.m.per day. 72.1% of the sample have had an accident experience, for which 46.7% of them got only minor injuries. Half of the sample experienced accidents due to careless, poor condition of road (19.9%), consumption of alcohol (17%) and consumption of drugs (10.1%), respectively, which are inappropriate behaviors.

Table 7 Riding Behaviors

Enabling factors	Number (n=276)	Percent
Alcohol consumption before riding		
No	200	72.5
Yes	76	27.5
Type of alcohol		
Liquor	70	25.3
Beer	6	2.2
Drug consumption before riding		
No	216	78.3
Yes	60	21.7
Type of drugs		
Cold medication	45	16.3
Antipyretic medication	10	3.6
Antihistamine	5	1.1
Checking of motorcycle before riding		
Regular checked	74	26.8
Irregular checked	172	62.3
Never checked	30	10.9

Table 7 Riding Behaviors (Continued)

Enabling factors	Number (n=276)	Percent
Roadworthy condition of motorcycle		
Fully equipped	114	41.1
Not fully equipped*	162	58.6
Typical lack of equipment		
Rear vision mirror	74	26.8
Horn	39	14.1
Turn lights	36	13.0
Rear lights	10	3.6
Front lights	3	1.1

*Answer > 1 item

Table 7 shows that 27.5% of the sample consumed alcohol before riding such as liquor (25.3%), beer (2.2%). Approximately twenty two percent of the sample consumed drugs before riding such as cold medications (16.3%), antipyretic medication (3.6%) and antihistamine (1.1%), respectively. In addition, 62.3% of the sample indicated that they irregularly checked the motorcycle before riding whilst 26.8% of the sample said that they regularly checked the motorcycle before riding. 10.9% of the sample said that they never checked the motorcycle before riding. Responses to roadworthy condition of the motorcycle shows that 58.6% of the motorcycle are not fully equipped. Typical lack of equipment are a rear vision mirror, horn, and turn lights (26.8%, 14.1% and 13.0%), respectively.

Part IV Reinforcing Factors

Table 8 Receiving Information and Advice Concerning the Prevention of Motorcycle Accidents and Injuries

Information and Advice	Yes		No	
	Number (n=276)	Percent	Number (n=276)	Percent
1. Wearing a safety helmet whilst riding a motorcycle	254	92.0	22	8.0
2. Compliance with traffic laws	274	89.5	29	10.5
3. Avoiding consumption of alcohol before riding	243	88.0	33	12.0
4. Check on the condition of the motorcycle and it's equipment before riding	228	82.6	48	17.4
5. Avoiding consumption of drugs before riding	206	74.6	70	25.4

Table 8 shows that one month prior to this study, the sample received information and advice concerning motorcycle accidents and injuries prevention, namely wearing a safety helmet whilst riding a motorcycle (92.0 %), compliance with traffic laws (89.5%), avoiding consumption of alcohol before riding (88.0%), checking on the condition of the motorcycle and it's equipment before riding (82.6%), and avoiding consumption of drugs before riding (74.6%), respectively.

Table 9 Sources of Information

*Sources of Information	Number	Percent
Parents	149	53.9
Television	108	39.1
Teachers	74	26.8
Friends	70	25.3
Radio	65	23.5
Traffic police	64	23.1
Newspapers	63	22.8
Brochure / leaflet / posters	23	11.6

*Answer > 1 item

Table 9 shows that, for this sample, the important sources of information and advice concerning the prevention of motorcycle accidents and injuries are their parents (53.9%), teachers (26.8%) and their friends (25.3%). However, the media are also important sources of information such as television (39.1%), radio (23.5%) and newspapers (22.8%), respectively.

Table 10 Participation in Activities Concerning the Motorcycle Accidents and Injuries Prevention

Activity	Number (n=276)	Percent
Participation in activity		
No	241	87.3
Yes	35	12.7
Type of activity		
Drunk not Riding Program	20	7.3
Boy Scouts Taining Program	8	2.9
Road Safety Program	5	1.8
Traffic Police Training Program	2	0.7

Table 10 shows that 87.3% of the sample do not participate in any accident prevention activity, and only 12.7% of the sample participate in such as “drunk not riding” program (7.3%), boy scouts training program (2.9%), road safety program (1.8%), and traffic police training program (0.7%), respectively.

Part V Preventive Behaviors

Table11 Preventive Behaviors of Accidents and Injuries due to Motorcycle Riding

Behaviors	Practiced		Not practiced	
	Number (n=276)	Percent	Number (n=276)	Percent
Promotive behavior				
1. Drive carefully when approach to intersection	245	88.8	31	11.2
2. Giving signal for changing lanes	218	79.0	58	21.0
3. Checking roadworthy condition of motorcycle before riding	223	80.8	53	19.2
4. Wearing a safety helmets	211	76.4	65	23.6
5. Riding on left lane except for changing lane	205	74.3	71	25.7
6. Not riding with faulty function of equipment	178	64.5	98	35.5
7. Not riding motorcycle if in poor health	177	64.1	99	35.9
Non-Promotive behavior				
1. Riding over the speed limit	158	57.2	117	42.4
2. Riding whilst angry or frustrated	149	54.0	127	46.0
3. Carrying more than one passenger	146	52.9	130	47.1
4. Riding two motorcycle abreast	133	48.2	143	51.1
5. Racing on the empty road at night	98	35.5	178	64.5
6. Riding through red traffic light	96	34.8	180	65.2
7. Riding whilst under the influence of alcohol	79	28.6	197	71.4
8. Immedialy overtaking in other motorcycles	75	27.2	201	72.4

Table 11 shows that the first three areas of preventive behaviors concerning motorcycle accidents and injuries of this sample group are : riding carefully when

approach to intersection (88.8%), giving signal for changing lanes (80.8%) and checking the roadworthy condition of motorcycle before riding (79.0%), respectively. Whereas, over a half of the sample still have non preventive behaviors for example riding over speed limit (57.2%), riding whilst being angry or frustrated (54.0%) and carrying more than one presenter (52.9%), respectively.



Table 12 Levels of Behaviors on motorcycle Accidents and Injuries Prevention

Levels	Number (n=276)	Percent
Good (11 - 15 score)	117	42.4
Fair (6 - 10 score)	145	52.5
Poor (1 - 5 score)	14	5.1

$\bar{x} = 9.89$ S.D = 2.96

Table12 shows that 52.5% of the sample have a fair level of preventive behaviors and 42.4% have a good level whilst 5.1% have a poor level, respectively.

Part VI The Relationship of Predisposing Factors, Enabling Factors, Reinforcing Factors and the Preventive Behaviors

Table13 The Correlation Coefficient Between the Predisposing Factors, the Enabling Factors, Reinforcing Factors and the Preventive Behaviors

Variable	Correlation coefficient
Predisposing factors	
Knowledge on the Prevention...	.265**
Attitude toward the Prevention...	.310**
Enabling factors	
Years of Riding Experience	-.135 **
Accident Experience	.010 ^{ns}
Alcohol and Drugs Consumption...	-.199 **
Roadworth Condition of Motorcycle...	.190**
Commuting Distance	.032 ^{ns}
Reinforcing factors	
Receiving Information and Advice...	.185**

**p < .01

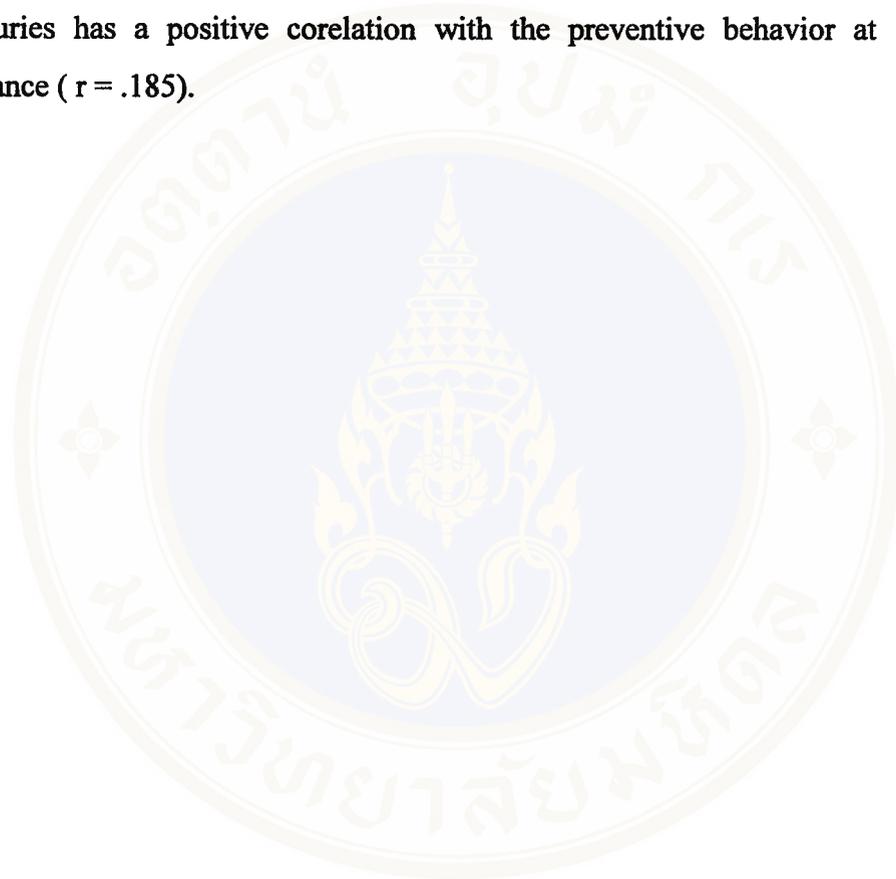
ns = not significant

Table 13 shows that the knowledge and attitude are found to have positive correlation with the preventive behavior concerning motorcycle accidents and injuries at .01 level of significance ($r = .265$ and $.310$ respectively).

The roadworthy condition of motorcycle has a positive correlation with the preventive behavior concerning motorcycle accidents and injuries at .01 level of

significanc ($r = .190$). However, years of riding experience and consumption of alcohol and drugs have a negative correlation with the preventive behavior concerning motorcycle accidents and injuries at .01 level of significance ($r = .135$ and $.199$).

Receiving information and advice on the prevention of motorcycle accidents and injuries has a positive correlation with the preventive behavior at .01 level of significance ($r = .185$).



CHAPTER V

Discussion

The objective of this study was to find the factors relating to the preventive behaviors of adolescents attending technical vocational education colleges in Bangkok toward motorcycle accidents and injuries. The headings for discussion are:

1. Characteristics of the sample
2. The preventative behaviors of adolescents concerning accidents and injuries sustained whilst riding a motorcycle
3. Factors related to the preventive behaviors of adolescents

1. Characteristics of the Sample

This study shows that most of the sample were male (95.7%) while only 4.3% were female. There are mostly aged 15 to 19 years (80.4%) with a mean age of 18 years. Approximately a half of the sample were studying toward certificate of vocational education with in the majority studying in the field of mechanics (22.1%). The sample in this study were studying both daylight and twilight classes, with 79.7% of the sample attending daylight classes. A bare majority (50.7%) of the sample did not own the motorcycles used in daily commuting, the motorcycle belong to the father (43.5%), brother (5.8%) or a relative (1.4%). It was found that 21.7% of the sample did not have insurance for various reasons: no time to do (13.0%), not the owner (7.3%) and unrealized need (1.4%). Responses concerning possession of the motorcycle licenses show that 55.1% possessed a driving license, 52.5% having under gone testing and 2.5% purchasing their license. Of the 44.9% indicated as having no license, 24.9% were because of underage, 10.9% had no time to do it and 9.1% did not realize the need. The sample responses

indicated that 79.0% have violated traffic regulations with the most frequent of these not wearing a safety helmet(34.5%), infringement traffic regulations (26.7%) and no driving license (17.8%). Most punishment of violators (62.3%) were paying fine, being confiscated license (9.1%) and being warned (7.6%).

The above statistics indicate that lack of knowledge is a major cause of traffic accidents involving motorcycles. The non possession or purchase of licenses are contributing factors to this lack of knowledge as sample members in this category had not undergone any form of testing.

Most of the sample (63.8%) have a moderate level of knowledge on the prevention of motorcycle accidents and injuries, a low level (21.7%) and only 14.5% with a high level. 89.9% have a good knowledge of traffic signs and symbols, while knowledge of the loss through accidents and high risk riding is 72.8% and 70.7%, respectively. Whereas knowledge concerning speed limits in urban and rural areas is poor, 22.5 % and 19.2%, respectively.

The sample had an acceptable attitude towards accidents and injuries prevention in respect to it being out of date to comply with traffic laws (96.6%), necessary to wear helmet (92.8%) and increasing awareness after receiving the loss through accidents (79.7%). Some of the sample had an unacceptable attitude towards accidents and injuries prevention's such as if the rider remaining alert, it being acceptable to ride at high speed (42.4%), boring to wear safety helmets (32.6%) and it being acceptable to ride two motorcycles abreast on the empty road (31.5%).

Most of the sample lack a practical knowledge of traffic laws which led to a tendency to adopt incorrect and illegal riding practices. Although there was a feeling among some of the sample that laws on the compulsory wearing of safety helmets, were oppressive the majority showed an acceptable attitude, to noncompliance with laws on the wearing of safety helmets, which are the most common traffic violation. A study by Bangon Prapasasu (1997:2) concerning the attitudes of technical college students who rode a motorcycle, indicated that 55.7% of students agreed that to wear a safety helmet helped to

decrease the severity of head injuries whilst 41.3% and agree that it helped to decrease accident mortality and injury rates. However, 55.7% of the students disagreed with government regulations claiming that it was a personal decision not to wear a safety helmet, giving reasons that it restricted vision, and it's heavy, hot, uncomfortable and inconvenient to carry or store whilst riding.

Regarding years of riding experience, it was found that 43.5% of the sample have ride a motorcycle for at least three years with a mean of 4.6 years, and 43.9% commute from 1 to 10 km./ day. 72.1% of the sample have been involved in accidents, 46.7% of the sample have sustained minor injury requiring selfcare, 21.0% have sustained moderate level injuries requiring treatment from doctor and 4.4% have sustained injuries which required admittance to hospital. Responses from half of the sample show that carelessness was the major cause, whilst 17.0% indicated causes associated with alcohol consumption, and 10.1% indicated causes though consumption of stimulant drugs. 27.5% of the sample have consumed alcohol before riding a motorcycle such as liquor (25.3%) and beer (2.2%).

Regarding the roadworthy condition of the motorcycle, responses showed that 86.2% of the sample believed that brakes must be in good condition. In addition, the front (84.4%) and rear (82.2%) lights must be in good condition too. On the other hand equipment such as turn lights(3.6%) and horn (4.4%) indicated to be in poor condition in need of repair. Approximately 60 % of the motorcycles'equipment were not fully equipment such as lack of a rear vision mirror (26.8%). 26.8% of the sample indicated that they checked the condition of the motorcycle every time before riding, while 62.3% of the sample indicated that they only sometimes checked the condition of the motorcycle, and 10.9% never checked them before riding.

The above discussion shows that many the sample lack motorcycle riding experience, are unlicensed to ride, do not comply with the road rules, consume alcohol, and ride motorcycles with equipment in poor condition . Individually and collectively these factors are leading causes of road accidents.

Most of the sample received information and advice about motorcycle accidents and injuries such as, wearing a safety helmet while riding (92%), avoiding consumption of alcohol and drugs before riding (88% and 74.6% respectively). The important sources of information and advice for the sample concerning the prevention of accidents and injuries were their parents (53.9%), teachers (26.8%) and their friends (25.3%). However, the media were also important resources of information such as television (39.1%), radios (23.5%) and newspapers (22.8%), respectively. Moreover, 87.3% of the sample did not participate in any accident prevention activities on programs, meaning that only 12.7% of the sample did participate. These suggests that there are few or no activities in their colleges or that they are simply not interested in such matters.

2. The Preventive Behaviors of Adolescents Concerning Accidents and Injuries

Sustained whilst Riding a Motorcycle

The preventive behaviors were classified into three levels: good, fair and poor. Results showed that 52.5% of the sample had a fair level in preventive behaviors and 42.4% had a good level whilst 5.1% had a poor level, respectively. The first three areas of preventive behaviors concerning motorcycle accidents and injuries were riding carefully when approaching or intersection (88.8%), giving signals for changing lanes (80.8%) and checking the roadworthy condition of a motorcycle before riding (79.0%), respectively. However, over a half of the sample still had of non preventive behavior such as riding over speed limit (57.2%), riding whilst being angry or frustrated (54.0%) and carrying more than one presenter (52.9%), respectively.

Similar studies conducted in the U.S.A. on the riding behaviors of adolescents found that aggressiveness, risk-taking, reckless riding, non observance of speed limits and ignorance in matters of safety may be involved in causing accidents and injuries (Centers for Disease Control,1990)

3. Factors Related to the Preventive Behaviors of Adolescents

3.1 Hypothesis 1 Predisposing factors ; knowledge and attitude toward the prevention of accidents and injuries sustained whilst riding a motorcycle related to the preventive behaviors of accidents and injuries.

3.1.1 Knowledge concerning the prevention of motorcycle accidents and injuries have a positive correlation with the preventive behavior concerning accidents and injuries sustained whilst riding a motorcycle at .01 level of significance ($r = .265$). This shows that the knowledge about the prevention of accidents tends to increase a good riding behaviors (Becker, 1997:7). Prapapen Suwan (1983: 35) suggests that knowledge and behaviors are related parts of intervention good health behavior. The study by Umnoy Nagkau (1991:b), considering the factors concerning motorcycle accidents in Bangkok showed that motorcycle riders who had a low level of knowledge of preventing accidents and injuries, had a 1.7 times higher risk of accidents than the group who had a high level of knowledge. Kumrai Tunchaisri (1993:25) found a 3.4 times higher risk of accidents between two groups with low and high level of knowledge. In discussing, the factors involved in motorcycle accidents of 15-24 year old riders, Surachai Jimkool (1986:18) mentioned that the group with a low level of knowledge of preventing accidents at a 3.6 times were high or risk of accident than the group who had a high level of knowledge of preventive behaviors. Thus, knowledge is an important factor in preventing accidents and injuries.

3.1.2 Attitudes concerning the prevention of motorcycle accidents and injuries have a positive correlation with the preventive behavior concerning such accidents and injuries at .01 level of significance ($r = .310$). An attitude, is a conceptual idea or belief in something or some situation which motivates behaviors. Kumrai Tunchaisri (1993:b) found that the group willing to infringe upon road rules had a 9.2 times higher risk of motorcycle accidents than an unwilling group. Wanida Kumjustdutsakaun (1986:16) stated that motorcycle riders who received injuries from accidents had inappropriate riding attitudes such as no need to have rear vision mirror (18.3%), seeing

accidents as unfortunate events (54.2%) and considering road rules unimportant (24.6%). So it can be stated that attitudes towards preventive behaviors is an important factor in preventing motorcycle accidents and injuries.

3.2 Hypothesis 2 Enabling factors ; years of riding experience, accident experience, alcohol and drugs consumption, roadworthy condition of motorcycle, and commuting distance related to preventive behaviors concerning motorcycle accidents and injuries.

3.2.1 Years of riding experience have a negative correlation with the preventive behavior concerning motorcycle accidents and injuries at .01 level of significance ($r = .135$). This shows that those who have been riding a motorcycle the least amount of time tend to increase good riding behaviors, whilst who have been riding for a longer time tend to become careless and may be involved in accidents. This result is similar to result from a study conducted by Prakit Promayon (1987:88), that the drivers of motor vehicles in Bangkok who had more experience driving were involved more road accidents than who had the less experience driving.

3.2.2 Accidents experience shows no significant relationship with the preventive behaviors of adolescents concerning motorcycle accidents and injuries. Those of the sample who had been involved in accidents had not become more careful as a result. This may be due to the fact that those involved in accident reported only minor injuries. These findings are similar to a study on motor vehicle driving conducted by Prakit Promayon (1987:88), but are opposite to the findings of Bangon Samutsan (1997:68) who found that the students riding motorcycles, who had been in accidents, consequently had fewer accidents whilst motorcycle riding.

3.2.3 Consumption of alcohol and drugs have a negative correlation with the preventive behavior concerning motorcycle accidents and injuries at .01 level of significance ($r = .199$). This shows that such consumption tends to decrease safety behavior when riding a motorcycle, which agrees with a study conducted by Bangon Samutsan (1997:138) on riding a motorcycle which showed that for the 27.5% of the

sample who had been involved in accidents, the consumption of alcohol and drugs was implicated. Similarly, the consumption alcohol and drugs tends to be involved with accidents (Sirikan Promkunakon,1980:117), being the initial stimulation of the body's central nervous system 15-30 minutes after consumption, peaking one hour after consumption, followed by stupor and fatigue (Kumpron Srivrittanakun, 1984:310).

3.2.4 The roadworthy condition of the motorcycle has a positive correlation with the preventive behavior concerning motorcycle accidents and injuries at .01 level of significance($r = .190$). This shows that those who check their motorcycles prior to riding show a tendency toward safe behavior. From this study, it may be concluded that motorcycles kept in good condition, including the completeness of equipment, help decrease the risk of road accidents involving motorcycles.

3.2.5 Commuting distance shows no significant relationship with preventive behaviors of adolescents concerning motorcycle accidents and injuries. This suggests that commuting distance does not influence the preventive behaviors of adolescents concerning motorcycle accidents and injuries.

3.3 Hypothesis 3 Reinforcing factors ; receiving information and advice on the prevention of motorcycle accidents and injuries related to preventive behaviors concerning motorcycle accidents and injuries.

Receiving information and advice on the prevention of motorcycle accidents and injuries has a positive correlation with the preventive behavior concerning accidents and injuries at .01 level of significance ($r = .185$). This shows that sample members who received information and advice on accident prevention tend to show good preventive behavior. The study by Virailug Kittivongsopa (1992:80-85) titled The Effectiveness of Health Education Program on Motorcycle Accident Prevention Among Secondary School Students in Ubonratchathani Province found that receiving information and advice, including having activities, increased safety behaviors of motorcycle riding . In harmony with other studies such as that by Bangon Prapasasut (1998), titled The Application of Theoretical Motivation on Behaviors of Preventive Accidents Whilst Riding Motorcycles

Among the First Year of technical students in Bangkok Metropolis and by Pririn Samutsane (1997) titled The Development of Safety Mind of Riding Motorcycle Behaviors Among Technical College Male Students in Rayong Province found that health education encouraged a more correct knowledge, attitudes and behaviors on preventive accidents on riding motorcycle in students.



CHAPTER VI

Conclusion

Summary of the Study

This descriptive research is a study of the factors related to the preventive behaviors of accidents and injuries due to motorcycle riding among 276 adolescent students attending 4 Technical Colleges of Vocational Education in Bangkok, who enrolled in the year 1999. The eight week data collection period, extended from 20 April 1999 to 15 June 1999. Questionnaires comprising of five parts, were distributed to the study sample. The questionnaires were designed to extract the following data: (1) characteristics of the sample, (2) predisposing factors : knowledge and attitude on the prevention of accidents and injuries sustained whilst riding a motorcycle, (3) enabling factors: years of riding experience, accidents experience, alcohol and drug consumption, roadworthy condition of motorcycle, commuting distance, (4) reinforcing factors: receiving information and advice on the prevention of accidents and injuries, (5) preventive behaviors of adolescents concerning accidents and injuries prevention. Data were analyzed using percentage, ratio, mean and standard deviation, after which Pearson product moment correlation coefficient was performed with a level of reliability of 99% to analyze the relationship between predisposing factors, enabling factors, and reinforcing factors, in relation to the preventive behaviors of adolescents concerning accidents and injuries using SPSS / PC⁺. The finding are as follows:

1. Most of the sample involved in this study are male with a mean age of 18 years, studying towards the certificate of education in the field of mechanics in daytime classes. Most of the motorcycles used in daily commuting belong to father, 78.3% of motorcycle are insured, 44.9% of the sample do not possess a driving license, giving the

following reasons: underage (24.9%), unrealized need (10.9%) and no time to do get one (9.1%). Driving licenses are obtained by the following methods: tested (52.5%) and purchased (2.5%). Responses also showed that 79.0% of sample have been apprehended for violation of traffic regulations with most indicating not wearing a safety helmet and mostly of they were punished by paying a fine (62.3%).

2. The majority (63.8%) of the sample attain a moderate level of knowledge regarding accident and injuries prevention. Attitude towards the prevention of accidents and injuries sustained whilst riding a motorcycle show that majority of the sample have a fair to good levels of preventive behaviors, the first three areas of acceptable responses towards accident and injury prevention are: necessity to wear helmet (92.8%), increasing in awareness after receive loss of accidents (79.7%) and necessity to check roadworthy condition before riding a motorcycle (76.8%).

3. About 44% of the sample have riding experience of 0-3 years, and commuting distance of 1-10 k.m./day. 72.1% of the sample have accident experience and 46.7% sustained only minor injuries. A half of the causes of accidents due to carelessness, poor condition of the road (19.9%), consumption of alcohol (17%) and consumption of drugs (10.1%), which are inappropriate behaviors. 27.5% have consumed alcohol before riding such as liquor (25.3%), beer (2.2%). In addition, 21.7% of the sample have consumed drugs before riding such as cold medications (16.3%), antipyretic medication (3.6%). The condition of the motorcycle shows that only 26.8% of the sample regularly check the motorcycle before riding whilst 62.3% a majority responded with irregular checks, and 10.9% of the sample said that they never check the motorcycle before riding. Responses showed that half of roadworthy condition of the motorcycles are incompletely. The roadworthy lack equipment such as rear vision mirrors, horn, and turn lights (26.8%, 14.1% and 13.0%), respectively.

4. Information and advice received on the prevention of accidents and injuries whilst motorcycle riding show that in one month prior to this study the sample received information and advice concerning accident and injury prevention namely wearing a safety

helmet whilst riding a motorcycle, compliance with traffic laws, avoiding consumption of alcohol before riding, checking on the condition of the motorcycle and its equipment before riding, and avoiding consumption of drugs before riding, respectively.

5. Factors related to the preventive behaviors are as follows

Knowledge and attitude are found to have a positive correlation with the preventive behavior concerning accidents and injuries at .01 level of significance ($r = .265$ and $.310$ respectively).

The roadworthy condition of motorcycle has a positive correlation with the preventive behavior concerning accidents and injuries sustained whilst riding a motorcycle at .01 level of significance ($r = .190$). However, years of riding experience and consumption of alcohol and drugs are negatively correlated with the preventive behavior concerning accidents and injuries sustained whilst riding a motorcycle at .01 level of significance ($r = .135$ and $.199$ respectively).

Receiving information and advice on the prevention of accidents and injuries have a positive correlation with the preventive behavior concerning such accidents and injuries at .01 level of significance ($r = .185$).

Implications and Recommendations

This study shows that 42.4% of the sample have a good behavior level, whilst 52.5% have a fair behavior level, and 5.1% a poor behavior level. 14.5% of the sample showed a high knowledge level, with 63.8% a moderate level, and 21.7% a low knowledge level.

The poor behavior includes riding over speed limit, riding whilst being angry or frustrated, not wearing a safety helmet, purchase the driving license or carrying more than one passenger and careless in driving. The researcher would like to encourage those institutions and government authorities dealing in road safety matters to increase their efforts in educating those considered to be in the high risk group such as adolescent

students. This can be done expediently by assisting and supporting those in immediate contact with the high risk group as follows:

1. School administrators involved in policy planning concerning road safety matters can implement a check that student motorcyclists possess the required license, provide instruction on road safety matters pertaining to motorcyclists, and conduct frequent training periods and tests aimed at increasing road safety knowledge of student motorcyclists.

2. College nurses, health teachers and boy scout teachers who have access to students can educate them on the importance of accident prevention measures and legal possession of driving licenses. The education method could include the media, and facilities that are presently at the colleges such as slides, pictures/posters, cinematography, etc.

3. Transportation authorities involve in the selling of licenses to be subject to punishment, this being strictly administered on any offenders. Temporary licenses to be issued to underage adolescents.

4. The community health nurse should be provided with facilities to enable the active promotion of preventive behaviors of accidents and knowledge concerning the safe riding of motorcycles. Points to be covered should include: insurance, the wearing of safety helmets and the necessity to under go proper driving license testing. All media resources should be used such as television, radio, newspapers, etc should be used to encourage good riding behaviors of motorcyclists.

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APPENDIX A

List of Experts

1. Dr. Vason Silpasuwan
Assoc. Professor Level 9, Department of Health Education and Behavioral Sciences, Faculty of Public Health, Mahidol University.
2. Dr. Suree Chanthamolee
Assoc. Professor Level 9, Department of Health Education and Behavioral Sciences, Faculty of Public Health, Mahidol University.
3. Dr. Chounchom Charoenyooth
Assoc. Professor Level 9, Department of Public Health Nursing, Faculty of Nursing, Mahidol University.
4. Panudda Priyatruk
Assoc. Professor Level 9, Department of Public Health Nursing, Faculty of Nursing, Mahidol University.
5. Jirote Rianrou
Pol. Capt., 2nd Highway Police Station, 2nd Subdivision Highway Police Station.

APPENDIX B

Consent Form

My name is Pantip Sangprasert, a masters degree student at Faculty of Nursing, Mahidol University. I am studying about the factors related to the preventive behaviors of accidents and injuries due to motorcycle riding among adolescents in technical vocational colleges in Bangkok. You are one of the adolescents invited to participate in the study.

The study involves questionnaires about your preventive behavior concerning accidents and injuries sustained whilst riding a motorcycle. The information from the study will help nurse and teachers involved in educating students for promotion of the preventive behaviors of accidents and injury sustained whilst riding a motorcycle.

Any information obtained in this study will remain confidential. You will not be reported. You are also free to answer questionnaires, and are free to withdraw at any time. Your answers to this questionnaires will not affect yourself. There is no cost, nor will there be any payment to you for participating in this study. Thank you very much.

Pantip Sangprasert



BIOGRAPHY

NAME	Mrs. Pantip Sangprasert
DATE OF BIRTH	16 May 1966
PLACE OF BIRTH	Lopburi, Thailand .
INSTITUTION ATTENDED	Mahidol University, 1985-1989 Bachelor of Nursing Science Mahidol University , 1997-1999 Master of Nursing Science (Community Health Nursing)
POSITION & OFFICE	1985-1999, Division of Medical Nursing. Department of Nursing, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok. Position : Nurse 1999-Present , Division of Hypertension, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok. Position : Assistant Researcher Nurse