



UNIVERSITI PUTRA MALAYSIA

***PREVALENCE OF MOTORCYCLE CRASHES AND ITS ASSOCIATED
FACTORS AMONG POSTMEN IN PERAK***

**BY
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ABSTRACT

PREVALENCE OF MOTORCYCLE CRASHES AND ITS ASSOCIATED FACTORS AMONG POSTMEN IN PERAK

NORPARAH SAHIRAH BINTI HARUN

Introduction: In Malaysia, motorcyclist constitute to 58.7% of fatalities in 2010 on Malaysian road. Postmen who used motorcycle for mail delivery could be among those figures. However, there has been no study looking into this matter.

Objectives: The aim of this study is to determine the prevalence of motorcycle crashes among postmen in Perak.

Methods: A cross-sectional study was conducted among 258 postmen in Perak. Questionnaire was used to collect information on motorcycle crashes, unsafe riding behavior and perception towards causes of crashes. Data analyses used were Mann-Whitney test and Chi-square test.

Results: The prevalence of motorcycle crashes was 35.3%. Result indicated that those involved with motorcycle crashes was more frequently drinking (other than alcohol) ($p < 0.001$), eating ($p = 0.010$) and smoking ($p = 0.026$) while riding, speeding ($p = 0.03$), did not give signal when overtake other vehicle ($p = 0.050$) and overtaking other vehicle at the left side ($p = 0.003$). In addition, motorcycle tire and age of motorcycle (more than five years old) were among factors that perceived by the postmen as a causes of motorcycle crashes.

Conclusions: Prevalence of motorcycle crashes among postmen is high. This indicates that intervention program is needed to educate postmen on road safety behaviour to reduce the number of crashes.

Keyword: prevalence, motorcycle, crashes, postman

ABSTRAK

PREVALENS KEMALANGAN MOTORSIKAL DAN FAKTOR- FAKTOR YANG BERKAITAN DI KALANGAN POSMEN DI PERAK

NORPARAH SAHIRAH BINTI HARUN

Pengenalan: Di Malaysia pada tahun 2010 terdapat 58.7% kemalangan yang melibatkan kematian di kalangan penunggang motosikal. Posmen yang menggunakan motosikal untuk menghantar surat berkemungkinan besar termasuk didalam peratusan kemalangan tersebut. Tetapi tiada kajian dijalankan untuk mengkaji atau berkaitan dengan masalah ini.

Objektif: Objektif utama kajian ini adalah untuk menentukan prevelens kemalangan motosikal di kalangan posmen di perak.

Metedologi: Kajian keratan rentas dijalankan dikalangan 258 posmen di Perak. Borang soal selidik yang telah disahkan diguna pakai untuk mendapatkan maklumat berkaitan prevelens kemalangan motosikal, cara menunggang motosikal yang tidak selamat dan persepsi berkaitan penyebab kepada kemalangan motosikal. Maklumat yang diperolehi dianalisa menggunakan ujian Mann-Whitney dan ujian khi-kuasa dua.

Keputusan: Prevelens kemalangan motosikal dikalangan posmen di Perak adalah 35.3%. Kajian menunjukkan posmen yang terlibat dengan kemalangna motosikal kerap minum ($p < 0.001$), makan ($p = 0.010$) dan merokok ($p = 0.026$) semasa menunggang motosikal, menunggang melebihi kelajuan ($p = 0.03$), tidak memberi isyarat semasa memotong kenderaan lain ($p = 0.050$) dan memotong kenderaan lain di bahagian kiri ($p = 0.003$). Di samping itu, tayar motosikal dan usia motosikal (melebihi lima tahun) adalah faktor- faktor yang mempengaruhi kemalangan motosikal di kalangan posmen.

Kesimpulan: Prevelens kemalangan motosikal di kalangan posmen di Perak adalah tinggi. Keputusan ini menunjukkan program pencegahan diperlukan untuk mendidik posmen berkaitan tingkah laku yang selamat ketika di jalan raya untuk mengurangkan bilangan kemalangan motosikal di jalan raya.

Kata Kunci: prevalen, motosikal, kemalangan, posmen

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LIST OF ABBREVIATION

n	Frequency
χ^2	Chi square
df	Degree of freedom
IQR	Interquatile range
WHO	Wold Health Organization
CDC	Centre for disease control
MIROS	Malaysian Institute of Road Safety Research
UPM	Universiti Putra Malaysia
MVC	Motor vehicle Crash
LCE	Low certification education
MCE	Middle certificate education
HME	High certificate education
PMR	Penilaian Menengah Rendah
SPM	Sijil Pelajaran Malaysia
STPM	Sijil Tinggi Pelajaran Malaysia

CHAPTER 1

INTRODUCTION

1.1 Background

Traffic crashes in Malaysia have been increasing at the average rate of 9.7% over the last three 3 decades where the total number of road crashes had increase from 24,581 cases in 1974 to 414421 cases in 2010 (Royal Malaysia Police, 2011).

The increasing number of road crashes must be taken as serious public health problem because it involved public, then any health problem from it was considered as public health problem. Type of road crashes that killed most of road users are motorcycle crashes (World Health Organization, 2009).

Table 1.1: General road crashes in Malaysia (2009 - 2010)

				Casualties			
Year	Number of registered vehicles	Vehicles involved in road crashes	Total number of road crashes	Death	Serious	Minor	Total
2009	18933237	7056623	397330	6745	8849	15823	31417
2010	20006953	760433	414421	6872	7781	13616	28269

Source: Royal Malaysian Police (2011)

Figure 1.1 shows that the number of vehicle road crashes (all type of vehicle on the road) increasing by 7.2% in 2010. Besides that, total number of road crashes and casualties also increased. This figure shows that road crashes was rapidly increased by year and control measure needed to be done to reduce number of crashes among road users.

Table 1.2: Statistic of vehicle register in 2010

	REGISTERED VEHICLES				
Year	Private vehicle	Private motorcycle	Lorries/ vans	Buses	Taxis
2010	9017613	9368454	961839	68666	83712

Source: Royal Malaysian Police (2011)

Table 1.2 shows number of registered vehicle according to type of the vehicle. It shows that private motorcycle had higher number of registered vehicle compared to other type of vehicle. Motorcycle was recorded as high registered vehicle most probably because it was a convenient vehicle to be used (MIROS, 2011).

These registered vehicles also contribute to high road crashes cases as reported by Royal Malaysian Police in 2010. This situation was shown in Table 1.2 for statistic of vehicle involved in crashes. Statistic shows that private motorcycle and private vehicle have higher number of crashes recorded by Royal Malaysia Police.

Table 1.3: Statistic of vehicle involved in road crashes in 2010

VEHICLES INVOLVED IN ROAD CRASHES					
Year	Private vehicles	Private motorcycle	Lorries/ vans	Buses	Taxis
2010	511861	120156	69226	9580	9899

Source: Royal Malaysian Police (2011)

The World Health Organization (WHO, 2009) estimated that road traffic injuries will become the fifth leading causes of death by 2030 if preventive measures were not taken into action immediately. This estimation was done in its Global Status Report on Road Safety 2009.

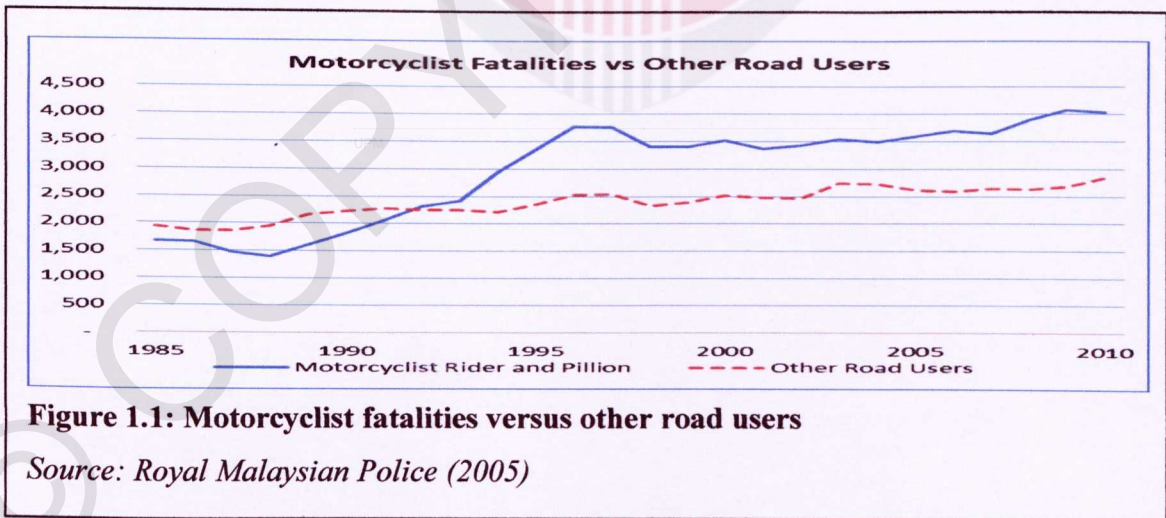


Figure 1.1: Motorcyclist fatalities versus other road users

Source: Royal Malaysian Police (2005)

Worldwide, there were about 1.2 million people killed in motor vehicle crashes (MVC) every year and MVC was the leading cause of death among people under 40 years of age (Weninger *et al.*, 2007). While in United State, MVA was the leading cause of death among those 5 to 34 age years (CDC, 2009). Therefore some occupation that using motorcycle as main vehicle such as postmen and food delivery for working must take priority of road safety aspect. Figure 1.2 shows the fatalities of motorcyclist versus other road users. It shows that fatality rate among motorcyclist was higher compared to other type of vehicle especially in 2010.

1.2 Problem statement

According to the Royal Malaysia Police statistic year 2010, Malaysia had a total of 414 421 road crashes with 6872 fatalities, 7781 serious injuries, 13 616 with minor injuries with the rest were vehicle damages. Amongst 120156 cases of motorcyclist crashes these were 6872 reported fatalities of private motorcycle. In 2010, there were 4036 cases where motorcyclists inclusive of pillion which constitute 58.7% of the total fatalities reported to police (Royal Malaysia Police, 2011). Motorcyclists comprised 43% of the road user population in 2009 and constitute 0.6 of the fatalities on Malaysian roads (Kulanthayan *et al.*, 2011).

While in 2010, total vehicle including motorcycle register in Malaysia were shown in Table 1.1. Higher numbers of crashes occurred among private vehicle and motorcyclist compared to other type of road users. Numbers of vehicle road crashes shown in Table 1.2. Data indicated that one of vehicle used which most lead to fatality in road crashes was motorcycle compared to other type of crashes. Postmen were known as common motorcycle users on road where they used motorcycle for mail delivery from one place to another place. Through this nature of work, they were constantly exposed to high risk condition and had high potential of getting involved in road crashes.

In China, a Chinese mathematician Meigu Guan had proposed several problems faced by Chinese postmen. He said that a postman needed to pick up mails at the post office, delivers them along a set of streets, and returns to the post office in such a hurry and they need to finish their work before going home. In practice, apart from the requirement of traveling to all streets, they needed to remember every street direction under their responsibility (Wang *et al.*, 2001). Therefore, this work practice might increase risk of road crashes among them.

In another study by Bentley *et al.*, (2000), 86% of employees mentioned in the questionnaire given that some aspects of road surface conditions and ill repair of surfaces had increased the risk of having crashes during delivery of mail. However, there was only limited information on motorcycle crashes among workers especially postmen.

1.3 Study justification

Number of crashes among motorcycle was higher compared to other types of vehicle and only limited study regarding the prevalence of motorcycle crashes and associated factor among postmen were conducted. Postmen were a type of high risk occupation in getting involved in motorcycle crashes. Therefore, results of this study regarding factors associated with road crashes among postmen while work would be useful as a baseline data and perhaps the delivery mail workers and researchers would come out with recommendation to improve work task and safety matter to prevent road crashes.

1.4 Conceptual framework

Conceptual framework shows that there were four groups of independent variables which were socio-demographic, working experiences, unsafe riding behaviours, and perception on causes that contributed to motorcycle crashes. Most factor shows significant association to motorcycle crashes as in study by Bentley *et al*, (2000). Result shows that reading letter and taking short cut were significantly contributed to crashes while working. Unsafe practice was also included as a routine habit among postmen.

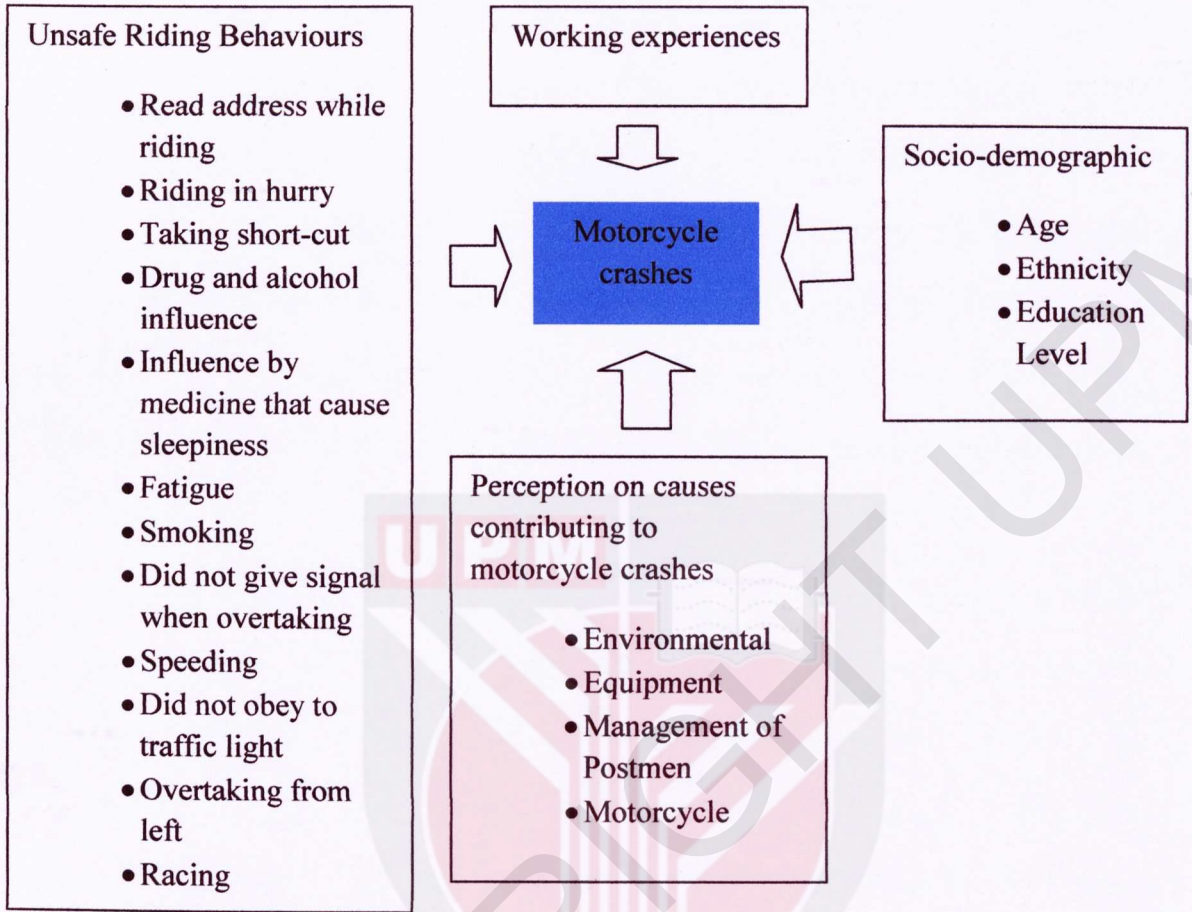


Figure 1.2: Conceptual framework

Legend



Dependent variable



Independent variables

The routine habits were drinking other than alcohol, eating and smoking while riding, not giving signal when overtaking and overtaking from left. In addition, fatigue, was an additional factor caused by mail delivery under sunshine. Drug and alcohol influence were based from study conducted by Kasantikul *et al.*, (2005) that stated alcohol-drinking riders were more likely to lose control of motorcycle and they were more likely to be in single vehicle crashes, to violate traffic control signal, and to be in non-intersection. Therefore, alcohol was proved to be the most outstanding cause factor.

Other than that, perception on environmental such as weather condition, equipment (bunch of letter) and management factors such as stress and improper training. In addition, study by Elloit *et al.*, (2007) stated that there were three factors that contributing to motorcycle crashes which were machine element (motorcycle), environmental element (traffic condition, road type and condition and weather condition), and human element (rider).

1.5 Study objective

1.5.1 General objective

To determine the prevalence of motorcycle crashes and its associated factors among postmen in Perak.

1.5.2 Specific objectives

- i. To determine the prevalence of motorcycle crashes of respondents.
- ii. To determine the distribution of socio-demographic (age, races, education level), working experiences, unsafe riding behaviours and perception on causes contributes to crashes.
- iii. To determine the distribution of contributing factors and body part injuries among respondents that ever had motorcycle crashes while working.
- iv. To determine the association between motorcycle crashes and socio-demographic (age, races, education level), working experiences, unsafe riding behaviours and perception on causes contributing to crashes.

1.6 Study hypothesis

There were a significant association between motorcycle crashes and socio-demographic, working experiences, unsafe riding behaviours and perception on causes contributing to motorcycle crashes.

1.7 Conceptual definitions

1.7.1 Motorcycle

Motorcycle was a vehicle with two wheels and an engine (Collins Cobuild, Advanced Learner's English Dictionary, 2003).

1.7.2 Postman

Postman was a man whose job was to collect and deliver letters and packages that were sent by post (Collins Cobuild, Advanced Learner's English Dictionary, 2003).

1.7.3 Motorcycle crash

Crash is an accident in which a moving vehicle hits something and is damaged or destroyed (Collins Cobuild, Advanced Learner's English Dictionary, 2003).

1.8 Operational definitions

1.8.1 Postman

Postman is a man whose job is to collect and delivery letters and packages that are sent by post from one place to another place by riding a motorcycle in Perak. Number of postmen obtained from list name provided by Human Resource Department of Pos Malaysia in Ipoh as Pos Malaysia Headquarter in Perak.

1.8.2 Motorcycle crash

Unpleasant event that happen to postman while riding motorcycle for delivery, sometime causing injury or death in working hour by self reported question using questionnaire. Motorcycle crash was determine from questionnaire. Example of question asked was "have you ever involve in crash while working as postman?".

1.8.3 Unsafe riding behaviours

Unsafe behaviours of postman while riding motorcycle that will lead to motorcycle crashes during mail delivery. Unsafe riding behaviours were determined from questionnaire. Example of question asked was “Did you have read letter address while riding motorcycle ?”.

1.8.4 Perception on causes contributing to motorcycle crashes

Perception on other than unsafe riding behaviour which are environmental factor and condition of motorcycle that will contribute to motorcycle crashes. Perception on causes contributing to motorcycle crashes were determined from questionnaire. Example of question asked was “Did you agree poor road condition while cause road crashes?”.

CHAPTER 2

LITERATURE RIVIEW

2.1 Motorcycle crashes

Malaysian Institute of Road Safety Research (MIROS), 2011 said that motorcycle has been the most preferable, convenient and affordable mode of transport many years. Statistics on 2009 showed that the ratio of other road users to motorcyclist fatalities is 1: 1.52. Each year, the number of registered motorcycles continue to grow rapidly, and each year at least 1% of them get involved in road crashes. The percentage is small, but the numbers are big enough to bring huge losses to the economic output of the country.

In Malaysia, small population of motorcycles (100-125cc) constitute more than half of total vehicles and contribute more than two third of casualties (death, hospitalized and slight injury) to total traffic crashes (Road safety research UPM Serdang, 2005).

2.2 Prevalence of motorcycle crashes

Previous study prevalence and determinants of non-standard motorcycle safety helmets amongst food delivery workers in Selangor and Kuala Lumpur done by Kulanthayan *et al.*, (2011). Finding from this study shows that 34% of food delivery in Selangor, Malaysia ever had involved in motorcycle crashes. There are 150 food delivery in Selangor and Kuala Lumpur were included as respondent. Data of crashes history were recorded by using questionnaire. The nature of work between food delivery is similar to postman because both of this occupation bring buch of bag or box at passenger sit and deliver something to consumer.

2.3 Body part injured

Shuaeib *et al.*, (2002) stated that head, face and neck are body injured during motorcycle crashes. Head recognize as the body part severely fatal and injury during an accident. Head injury contribute to more than 40% of motorcycle fatalities in Malaysia, 43% in Germany and 53% in United States. One of the effective control measure is wear protective helmet.

2.4 Factors for motorcycle crashes

Study of errors and violations in relation to motorcyclists' crashes risk in United Kingdom by Elloit *et al.*, (2007) that was published on 30 August 2006. state that there are three factors that contributing to motorcycle crashes which are machine element (motorcycle), environmental element (traffic condition, road type and condition and weather condition), and human element (rider). In the main study, postal questionnaires were used to measure demography and items about crashes involvement over the last 12 months of riding. This questionnaire was sent to a random sample of approximately 28,400 motorcyclists. The sample was required to consist of "active" motorcyclists and so the sampling frame used in the study was registered keepers of bikes that had been road taxed within the past 12 months.

In different study of identification of risk factors and countermeasures for slip, trip and fall accidents during the delivery of mail by Bentley *et al.*, (2001) said that socio-demographic (age), unsafe working behaviours, environmental factors (road and weather condition), management factors, equipment and also job and safety training are the factors contributing to crashes among postmen.

2.5 Socio-demographic factor

During the year 1995, 41,798 people lost their lives in motor vehicle crashes (MVC) in the United States (National Highway Traffic Safety Administration, NHTSA, 1996). Another 3,386,000 people were injured and 4,409,000 crashes involved property damage only. Previous studies by Norrison *et al.*, (1999) in United States have identified a number of demographic (age and sex), behavioral factors (risky driving practices, road violations) that increase an individual's risk for motor vehicle crashes.

2.6 Working experiences

In previous study of age and experience in motorcycling safety by Rutter in 1996. Results shows that years of riding experiences were found to be significant. Elderly with more experience riding motorcycle were less involved in motorcycle crashes compared to younger who had less experience riding motorcycle (Rutter *et al.*, 1996). In another studies of errors and violations in relation to motorcyclists' crashes risk have demonstrated that the risk of a motorcyclist having a crashes increases with exposure and falls with riding experience. However, experience and exposure provide limited information about how to improve rider safety (Elloit *et al.*, 2007).

2.7 Unsafe riding behaviours

Finding from slip, trip and fall accidents occurring during the delivery of mail shows that more than 11% of reports contribution of an unsafe behaviour to the crashes occurrence. The behaviour of reading letter addresses while riding was recorded as being a causal factor in 5% of delivery falls. A further 4% of reports mentioned taking short-cuts across grass area as contributing to crashes occurrence (Bentley *et al.*, 1998). In Royal Mail of United Kingdom, the discussion in small groups among 280 respondents, suggested that rushing on delivery was a major cause of crashes (Bentley *et al.*, 1998).

Study of errors and violations in relation to motorcyclists' crashes risk in United Kingdom found that speeding exceeding the speed limit on a country/ rural road, exceed the speed limit on a motorway and on a residential road. In addition, rider race away from traffic lights with the intention of beating others driver/rider and drink-rider are factors that contributing to motorcycle crashes (Elloit *et al.*, 2007).

2.8 Perception on causes that contribute to motorcycle crashes

There are 11 factors are included under perception on causes that contribute to motorcycle crashes. Five factor were included in previous study and the other six were factors from the postmen management office of Pos Malaysia which has crashes record of postmen (record regarding age of motorcycle and time table for motorcycle service).

2.8.1 Weather condition

Data from MIROS website stated that weather condition, particularly the adverse weather phenomenon, is one of the unsafe operation issues that could undermine the qualities in all aspects of road transportation and thus, increasing the risk of road crashes and casualties weather-related and to reveal that our road transportation is also made riskier by adverse weather conditions even though it is not as serious as snow related problems (MIROS., 2011).

2.8.2 Poor road surface condition

There are 86% of employees from total 280 respondents of Royal Mail in United Kingdom mentioned in a questionnaire given by researcher that some aspect of road surface conditions and ill repair of surfaces as increasing the risk of having a fall on delivery among delivery of mail. This finding is found in slip, trip and fall accidents occurring during the delivery of mail (Bentley *et al.*, 1998).

2.8.3 Equipment factor

Study among 280 mail delivery in United Kingdom regarding slip, trip and fall accidents occurring during the delivery of mail in 1998. The majority of postal delivery employees carry mail pouches. Davis *et al.*, (1983) suggests load carriers become less stable as weight of load and height at which it is held is increased. Delivery office manager also turning blind eye to unsafe practices such as over weight pouches or more than one mail pouch were carried by workers (Bentley *et al.*, 1998).

2.8.4 Management factor

Identification of risk factors and countermeasures for slip, trip and fall accidents during the delivery of mail study in United Kingdom among 1734 postal delivery stated that management of delivery mail concern with getting work done quickly compare to the safety issue that delivery mail may face. Management also not providing additional time or transport when the weather is poor (Bentley *et al.*, 2003).

2.8.5 Job and safety training

Identification of risk factors and countermeasures for slip, trip and fall accidents during the delivery of mail study in United Kingdom among 1734 postal delivery stated there is evidence this form of training may perpetuate the use of unsafe, time-saving working practices. Both employees and safety personnel believed this practice encouraged the passing on bad working habits (Bentley *et al.*, 2003).



CHAPTER 3

METHODOLOGY

3.1 Study location

Study location chosen was Perak, a state with 10 districts which were Kinta, Hilir Perak, Larut Matang and Selama, Kuala Kangsar, Batang Padang, Hulu Perak, Kerian, Manjung, Kampar and Perak Tengah. Perak was chosen as it was listed as one of the five states with highest number of motorcycle crashes. Five districts were included in this study which was Kinta, Hilir Perak, Larut Matang and Selama, Kuala Kangsar and Perak Tengah. These five districts had large number of postmen compared to the other five districts. Then, in these five districts, seven from 35 locations of Pos Malaysia offices were then selected which were Ipoh, Batu Gajah, Teluk Intan, Hutan Melintang, Taiping, Kuala Kangsar and Kampung Gajah.



Figure 3.1: Study location

Source : www.malaxi.com

3.2 Study design

A cross-sectional study design was used to determine prevalence of motorcycle crashes among postmen and also to determine association between motorcycle crashes and its associated factors.

3.3 Sampling

3.3.1 Sampling population

The study population of this study was postmen who worked in mail delivery service in Pos Malaysia in Perak state.

3.3.2 Sampling frame

Sampling frame was name lists of postmen obtained from Human Resource Department of Pos Malaysia in Ipoh as Pos Malaysia Headquarter in Perak.

3.3.3 Study sample

The inclusion criterion for study samples was postman that used motorcycle for mail delivery in Perak while supervisors (52) for each district were excluded from this study.

3.3.4 Sampling unit

The sampling unit for this study was a postman who fulfills the criteria and work in mail delivery service.

3.3.5 Sampling method

Simple random sampling was used to select the respondent. Respondents were randomly selected by using paper and bowl technique. A number was given representing each respondent. Then, 287 numbers were drawn from the bowl representing a final 287 respondents.

3.3.6 Sample size

In a previous study by Kulanthayan *et al.*, (2011) on prevalence and determinants of non-standard motorcycle safety helmets amongst food delivery workers in Selangor and Kuala Lumpur, from total of 150 respondents, the result shows that the proportion of motorcycle crashes was 0.34. This value was then inserted into equation of sample size as stated below.

$$N = \frac{Z^2_{1-\alpha/2} p(1-p)}{(d)^2}$$

P = proportion from previous study (0.34)

$Z_{1-\alpha/2}$ = statistic for a level of confidential (1.96)

d = desired precision (0.06)

$$N = \frac{(1.96)^2 \times (0.34)(1-0.34)}{(0.06)^2}$$

$$N = 239 \text{ respondents}$$

Source: Lemeshow *et al.*, (1990)

Therefore, after calculating using cross sectional one group formula, 239 respondents would be chosen from entire number of postmen in Perak. For the purpose of this study, sample size was added by 20% to overcome problem of drop out and incomplete returned questionnaire. Additional 20% of sample size was calculated as below.

$$\frac{20}{100} = 0.2$$

$$0.2 \times 239 = 48 \text{ respondents}$$

$$239 + 48 = 287 \text{ respondents}$$

Finally, a total 287 respondents were selected to be involved in this study.

3.4 Variables

3.4.1 Independent Variables

- i. Socio-demographic of respondents (age, ethnicity and level of education).
- ii. Working experiences
- iii. Unsafe riding behaviours
 - a) Read address of the letter while riding
 - b) Riding in hurry
 - c) Taking short-cut
 - d) Drug influence (alcohol intake, medicine, Heroin/Morphine and other type of drug)
 - e) Alcohol influence
 - f) Influence of medicine that cause sleepiness
 - g) Fatigue
 - h) Smoking while riding
 - i) Eating while riding
 - j) Drinking other than alcohol while riding
 - k) Did not give signal when overtaking other vehicle
 - l) Using phone while riding
 - m) Speeding
 - n) Did not obey the traffic light

o) Overtaking other vehicle at the left side

p) Racing with other vehicle

iv. Perception on causes contributing to motorcycle crashes.

a) Weather conditions (e.g. rain, temperature, fog)

b) Road condition

c) Amount of letter being carried

d) Stress from management

e) Absent of job and safety training

f) Hit by other vehicle

g) Age of motorcycle (more than five years)

h) Motorcycle break is malfunction

i) Poor motorcycle's tire condition

j) Motorcycle was not service according to timetable

k) Motorcycle that have been used have involved in crashes event before

3.4.2 Dependent variable

Motorcycle crashes

3.5 Data collection and study instrumentation

3.5.1 Data collection

A self-administered questionnaire was given to all respondent. Respondents were asked to answer the questionnaire in front of the researcher to make sure the questionnaire was well-understood by the all respondents. This questionnaire was used to obtain data on age, ethnicity, education, working experiences, crashes profile, unsafe riding behaviour and perception on causes that contribute to motorcycle crashes. Respondents were asked to indicate how often they committed any of the listed violation and responses were recorded on five point Likert scale ranging from “never” to “very often”.

3.5.2 Study instrumentation

A pre-tested and validated questionnaire in Malay version (refer annex 2) was used in this study. It contained four parts which were socio-demographic, working profile, crashes profile and contributing factor to motorcycle crashes (unsafe riding behavior and perception on causes contributing to motorcycle crashes).

The first part was socio-demographic. Respondents were asked to report their age (open ended question), ethnicity (Malay, Indian or Chinese) and education level

(primary school, secondary school, PMR/LCE, SPM/MCE, STPM/HCE, Certificate and Diploma).

The second part was working experience. Respondent were asked whether they had working experience as postman and how long they have work as postmen. Third part was the crashes profile. First question in accident profile was whether the respondent had ever involved in motorcycle crashes. They would be excused from answering the next questions in crashes profile if the answer for the first question was they never involved in crashes. In crashes profile, number of crashes, causes of the crashes, body part injuries and medical leave were asked.

The last part in the questionnaire was contributing factors to motorcycle crashes. This part was divided into two which were unsafe riding behaviour and perception on causes contributing to motorcycle crashes. In unsafe riding behaviour, it consisted of 16 types of unsafe riding behaviour and there were 11 types of perception on causes contributing to motorcycle crashes. The answers were recorded on five point Likert scale ranging from “never” to “very often” to indicate how often they committed any of the listed of violation and responses (Cheng *et al.*, 2011).

3.6 Quality control

3.6.1 Pre-test

Before collecting the data from the respondents, pre-test of the questionnaire was conducted among 30 postmen in Petaling Jaya, Selangor who had the same nature of work.

3.6.2 Validity questionnaire

Face validity estimated whether the test was appeared to be good measure for certain criteria. Validity was often assessed along with reliability test which the measurement can give consistent results.

3.6.3 Reliability test

To determine the reliability of the questionnaire, reliability test were conducted to make sure the questionnaire used was reliable for this study. Questionnaire was tested using Cronbach's Alphas test. In unsafe riding behaviour, this consisted of 16 types of unsafe riding behaviour with Cronbach's Alphas 0.8. There were 11 types of perception on causes contributing to motorcycle crashes with Cronbach's Alphas 0.8. Elloit *et al.*, (2007) stated that Cronbach's Alphas shows composite scales had good internal reliability for 0.70 or above.

3.8 Data analysis

All data collection was entered and analyzed using the Statistical Program for Social Science (SPSS) version 19. Tests were used to analyze the data were univariate and bivariate analysis.

3.8.1 Univariate analysis

Descriptive analysis was conducted to determine the prevalence of motorcycle crashes. Frequencies and percentages were presented for categorical and ordinal variable which were socio-demographic factors, working experience, crashes profile, unsafe riding behaviour and perception on causes contributing to motorcycle crashes.

3.8.2 Bivariate analysis

The association between categorical data was determined using Chi-square test (χ^2). Mann-Whitney U test was used to compare between ordinal and categorical variables. P value less than 0.05 was considered as statistically significant.

3.9 Study ethics

Ethical approval for the study was obtained from Medical Research Ethics Committee Faculty of Medicine and Health Science Universiti Putra Malaysia (refer annex 1). After that, each of respondents was recruited based on the voluntary participation. All of them was given the consent letter (refer annex 3) as an evidence that they were agreed to join this research.

All of research objectives and related information was explained to them by using information sheet (refer annex 4). All of the information given by respondent was kept confidential. They were explained on their right as respondent in this research where they can withdraw from the research at any time.

CHAPTER 4

RESULTS

4.1 Background

This study was carried out at Pos Malaysia in five districts in Perak. 258 out of 500 postmen in Perak were willing to participate in this study. The routine activities of all postmen started at 8.00 a.m. with sorted all the letter into each bit (work area). After that, around 10.00 a.m. all of them started to ride motorcycle to send the letter. They returned to office during the evening after all the letters had been sent. Data collection was done between 8.00 a.m. to 10.00 a.m. and each of them had completed the questionnaire within four to five minutes.

4.2 Response rate

There were 287 people selected from total of 448 postmen in Perak to participate in this study. From 287 only 258 postmen were willing to participate, that contributed to 89.9% of response rate. The remainders which were 10.1% were non response due to some factors such as on leaves and participated in work training.

4.3 Socio-demographic factors

Figure 4.1 shows the distribution of respondent by age. Most (46.1%) of the respondents fall under age group ranged from 20 – 29.9 years old, which meant most of the respondents were young. The minimum age was 20 years old while the maximum age among respondents was 56 years old.

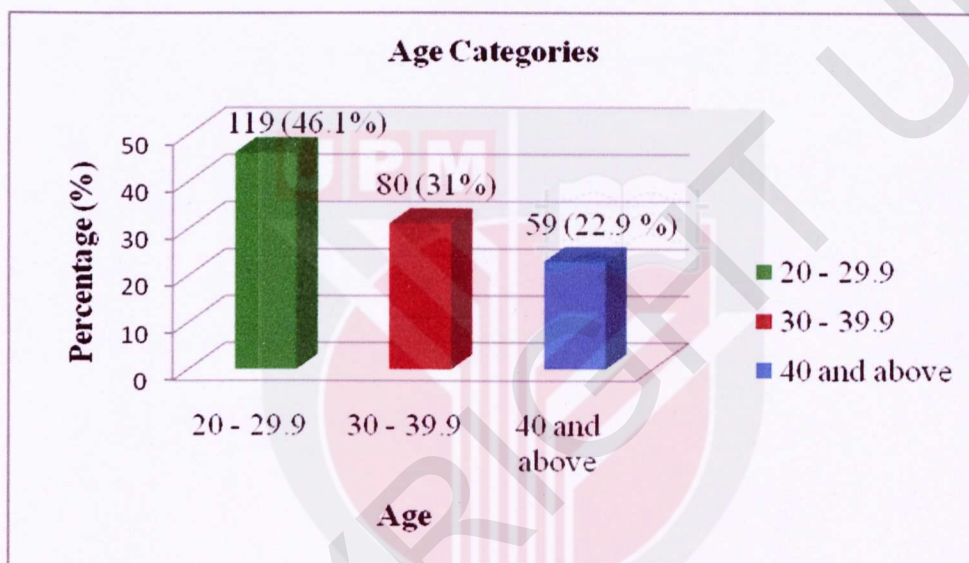


Figure 4.1: Distribution of respondents by age group

Figure 4.2 shows the distribution of respondents by ethnicity. Majority of the respondents were Malay with the percentage of 96.5% and only 3.5% were Indians which means only 9 of the respondent out of 258 are Indians.

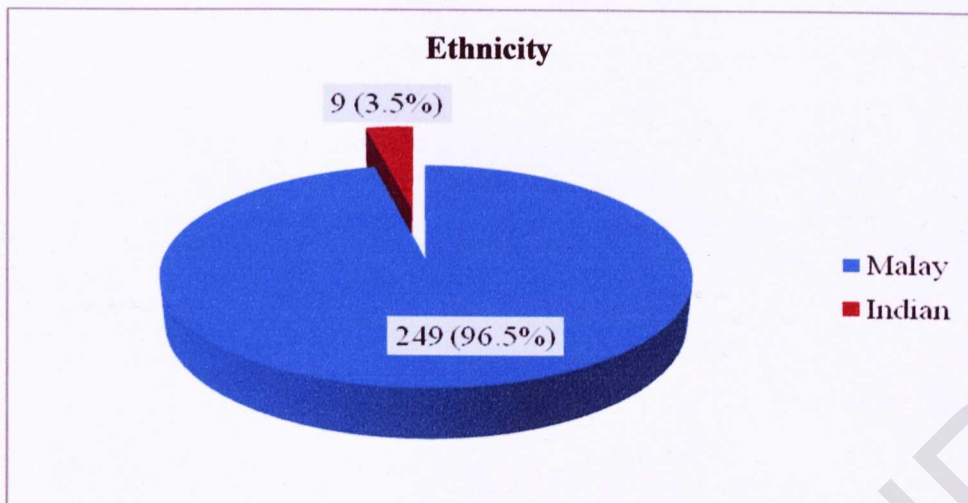


Figure 4.2: Distribution of respondents by ethnicity

Table 4.1 shows distribution of education level among respondent. Most 86.8% of respondents had finish SPM/ MCE compared to other five level of education. The data shows 0.8% respondents with primary school and diploma education who had worked as postman.

Table 4.1: Distribution of education level among respondent

Education Level	Frequency	Percentage
Primary School	2	0.8
PMR/ LCE	23	8.9
SPM/ MCE	224	86.8
STPM/ HME	4	1.6
Certificate	3	1.2
Diploma	2	0.8

N = 258

4.3 Working profile

Table 4.2 shows the working profile of respondents. More than half (57%) of respondent did not have working experience as postman and 41.9% of respondent had experience working as postmen for 10 years and above.

Table 4.2: Working profile of respondents

Working Profile (years)	Frequency	Percentage
Working before as a postmen		
Yes	147	57.0
No	111	43.0
Working experience as a postmen		
< 5 years	69	26.7
5 – 10 years	81	31.4
10 years and above	108	41.9

N = 258

4.4 Prevalence of motorcycle crashes

Table 4.3 shows that 35.3% of the respondents ever had crashes while working and most of them (64.7%) did not experience crashes while working as postman. Table 5 also shows the prevalence of a crashes among postmen in 2011. In 2011, 8.9% which were 23 people from total respondents had crashes.

Table 4.3: Prevalence of motorcycle crashes among postmen in Perak.

Motorcycle crashes	Yes		No		Total
	n	%	n	%	
Ever have crashes while working as postmen	91	35.3	167	64.7	258
Ever have crashes while working as postmen in 2011	23	25.3	68	74.7	258

N = 258

4.5 Profile of motorcycle crashes

Table 4.4 shows the distribution of crashes while working by respondents. Crashes profile in the questionnaire was answered by those that ever had crashes while working as postman. The question was related to years of crashes, number of crashes as well as factor that caused the crashes.

Based on Table 4.4, majority of the respondent experienced one crashes while working and surprisingly there was a respondent had involved in crashes for ten times.

Table 4.4: Distribution number of crashes while working by respondents

Number of crashes	Frequency (person)	Percentage (%)
0	167	64.7
1	60	23.3
2	16	6.2
3	7	2.7
4	5	1.9
5	2	0.8
10	1	0.4

N = 258

Figure 4.3 shows the distribution of injuries by body part caused by crashes with its respective percentage of respondents. There were seven categories of body part injuries.

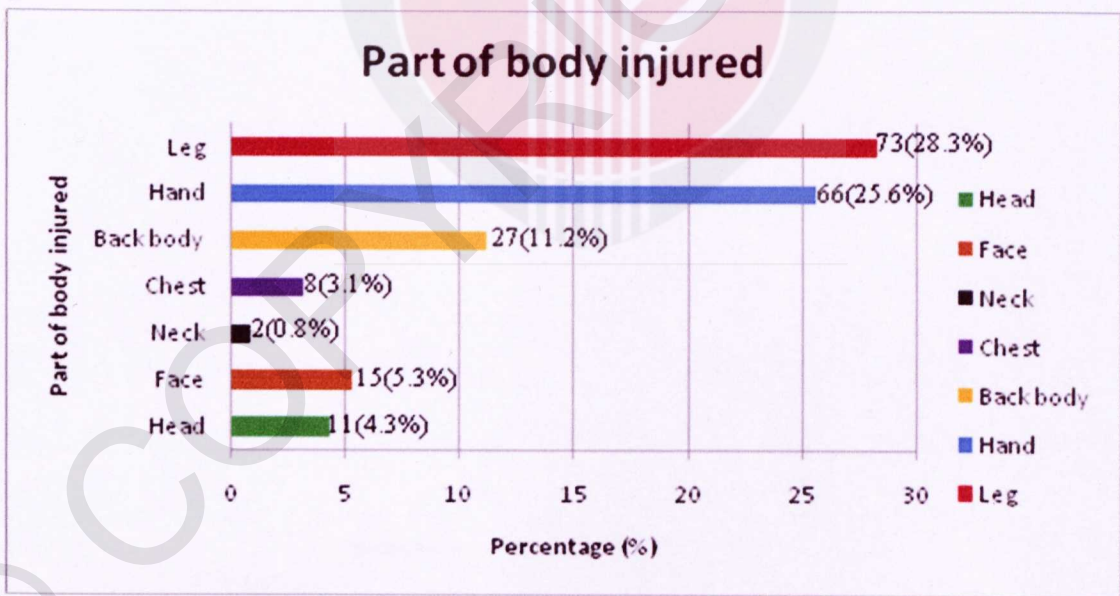


Figure 4.3: Distribution of respondents who had crashes by body part injuries

In overall, there were seven types of body part injuries included in this study. The highest percentage was leg with 28.3% followed by hand 25.6%% and the rare body part injured was neck with 4.3%.

Table 4.5: Factors contributed to crashes among postman who ever had involved in crashes while working

Factor contribute to crashes	Yes		No	
	n	%	n	%
Weather	18	19.8	73	80.2
Road condition	37	40.7	54	59.3
Own fault	25	27.5	66	72.5
Condition of motorcycle	9	9.9	82	90.1
Other road user fault	80	87.9	11	12.1
Employer fault	3	3.3	88	96.7

N = 91

According to the table above, most of the respondent (87.9%) agreed that others road user fault were the main contributing factor to crashes. On the other hand, majority of them (96.7%) did not agree that factor that contributed to crashes was employer's fault.

4.6 Unsafe riding behaviours of postmen that contribute to crashes

Table 4.6.1 and 4.6.2 show the unsafe riding behaviours of postmen that contributed to motorcycle crashes. There were total of 16 types of riding behaviours.

Table 4.6.1: Unsafe riding behaviours of postmen while working

Unsafe riding behaviours	Never		Rare		Sometime		Often		Very often	
	n	%	n	%	n	%	n	%	n	%
Read letter address	48	18.60	39	15.12	65	25.19	35	13.57	71	27.52
Riding in hurry position	91	35.27	62	24.03	62	24.03	33	12.79	10	3.88
Taking short-cut	86	33.33	64	24.81	70	27.13	31	12.02	7	2.71
Drug influence	258	100								
Alcohol influence	258	100								
Influence medicine that cause sleepiness	236	91.50	15	5.80	7	2.70				
Fatigue condition	100	38.80	87	33.70	59	22.90	10	3.80	2	0.80
N = 258										

Table 4.6.2: Unsafe riding behaviours of postmen while working (Continue)

Unsafe riding behaviour	Never		Rare		Sometime		Often		Very often	
	n	%	n	%	n	%	n	%	n	%
Smoking	194	75.19	44	17.05	14	5.43	6	2.33		
Eating	209	81.00	35	13.60	13	5.00	1	0.40		
Drinking	148	57.40	78	30.20	32	12.40				
No signal when overtaking other vehicle	145	56.20	71	27.52	40	15.50	2	0.78		
Using phone	164	63.60	72	27.90	21	8.10	1	0.40		
Speeding	143	55.40	56	21.70	36	14.00	21	8.10	2	0.80
Not follow the traffic light	196	75.97	49	18.99	13	5.04				
Overtaking other vehicle on the left side	127	49.22	99	38.37	25	9.69	5	1.94	2	0.78
Racing with other vehicle	258	100.0								

N = 258

All respondents had to answer this part of question. The purpose of this question was to determine unsafe riding behaviours among postmen that contributed to motorcycle crashes. Based on Table 4.6.1, 27.52% of respondents read letter address for next destination while riding to finish the task quickly.

Although they want to finish the task early, 35.27% were not in hurry condition meaning that they did not complete their task in a clumsy situation. None of the respondent had taken drug and alcohol and none of them were racing with others road user. While only few of them took medicine that influenced them to become sleepy.

Other than that, factors such as smoking, drinking and eating while riding the motorcycle, using phone, speeding, not follow the signal light, overtaking other vehicle at the left side also became factors that contributed to crashes but not as high as read letter address while riding.

4.7 Perception on causes contributing to motorcycle crashes

Table 4.7 shows the perception on causes contributing to motorcycle crashes among postmen. There were 11 causes including environmental factor, management and condition of motorcycle that contributes to motorcycle crashes.

Based on Table 10, most of the respondent had agreed that all of these factors contributed to motorcycle crashes except stress from management where most of them answered neutral compared to other type of scale. Most (25.97%) of the respondents were strongly disagreed that motorcycle that had been involved in crashes before were a contributing factor to the crashes.

Table 4.7: Perception on causes contributing to motorcycle crashes

Cause contributing to motorcycle crashes	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	n	%	n	%	n	%	n	%	n	%
	Weather are not in good condition	13	5.04	22	8.53	74	28.68	98	37.98	51
Road are not in good condition	6	2.33	11	4.26	30	11.63	141	54.65	70	27.13
Bring a lot of letter Stress from management	13	5.04	21	8.14	78	30.23	108	41.86	38	14.73
No road safety training for working purpose	34	13.18	35	13.57	95	36.82	65	25.19	29	11.24
Hit by other vehicle	53	20.54	44	17.05	54	20.94	69	26.74	38	14.73
Age of motorcycle (more than five years)	20	7.75	13	5.04	54	20.94	102	39.53	69	26.74
Motorcycle break is malfunction	31	12.02	37	14.34	47	18.22	98	37.98	45	17.44
Tire of motorcycle slippery	15	5.81	22	8.53	47	18.22	96	37.21	78	30.23
Motorcycle is not service according to timetable	12	4.65	20	7.76	42	16.28	107	41.47	77	29.84
Motorcycle use have involve in crashes event before.	30	11.63	43	16.67	45	17.44	74	28.68	66	25.58
Motorcycle use have involve in crashes event before.	67	25.97	53	20.54	44	17.05	64	24.81	30	11.63

N = 258

4.8 Association between motorcycle crashes and the contributing factors

Table 4.8, 4.9, 4.10 and 4.11 show the association between socio-demographic, unsafe riding behavior, perception on causes contributing to motorcycle crashes among respondents.

4.8.1 Association between socio-demographic factors and motorcycle crashes

Table 4.8 shows the association between socio-demographic factors included age group, ethnic or races and education level with motorcycle crashes. For age factor, Chi-Square Test shows that the p-value obtained was 0.463 which shown that there was no significant association between age group and motorcycle crashes.

Then, for ethnic group, Fisher's Exact Test shows that the p-value obtained was 1.000 which shows that there was no significance association between ethnic group and motorcycle crashes. Lastly, there was also no significant association between education level and motorcycle crashes with p-value of 0.719.

Table 4.8: Association between socio-demographic factors and motorcycle crashes

Socio-demographic	Motorcycle crashes				Total	χ^2	df	p-value
	Yes		No					
	n	%	n	%				
Age group						1.541	2	0.463
20-29.9	43	36.13	76	63.87	119			
30-39.9	31	38.75	49	61.25	80			
40 and above	17	28.81	42	71.19	59			
Ethnic group								1.000
Malay	88	35.34	161	64.66	249			
Indian	3	33.33	6	66.67	9			
Education level						0.130	1	0.719
< SPM	8	32.00	17	68.00	25			
SPM and above	83	35.62	150	64.38	233			

4.8.2 Association between working experience and motorcycle crashes

Table 4.9 shows the association between working experience and motorcycle crashes among respondents. Working experience had been categorized into three groups which were less and equal to 4.99 years and below, 5 – 9.99 years and 10 years and above.

Table 4.9: The association between working experience and motorcycle crashes

Working experience	Motorcycle crashes				Total	χ^2	df	p-value
	Yes		No					
	n	%	n	%				
					2.470	2	0.291	
≤ 4.99	19	27.54	50	72.46	69			
5 – 9.99	31	38.37	50	61.73	81			
10 above	41	37.96	67	62.04	108			

The association between working experience and motorcycle crashes had been analyzed using Chi-Square Test of Contingency. From the test, it shows that there was no significant association between working experience and motorcycle crashes where the p-value of 0.291.

4.8.3 The comparison between unsafe riding behaviours and motorcycle crashes

Table 4.10.1 and table 4.10.2 show the comparison between unsafe riding behaviours and motorcycle crashes among respondents. Both table reported the result of Mann-Whitney U test.

Table 4.10.1: The comparison between unsafe riding behaviours and motorcycle crashes

Unsafe riding behavior	Mean Rank		Z-value	p-value
	Yes	No		
Read address	131.29	128.52	-0.292	0.770
Riding in hurry position	140.16	123.69	-1.761	0.078
Taking short-cut	136.27	125.81	-1.119	0.263
Influence medicine that cause sleepiness	124.02	132.49	-1.800	0.072
Fatigue condition	133.52	127.31	-0.677	0.498
Smoking	140.06	123.75	-2.223	0.026*
Eating	140.63	123.44	-2.590	0.010*
Drinking	151.83	117.33	-4.013	< 0.001*

Note: *Significant at $p < 0.05$

Table 4.10.2: The comparison between unsafe riding behaviours and motorcycle Crashes (Continue)

Unsafe riding behavior	Mean Rank		Z-value	p-value
	Ever have Crashes			
	Yes	No		
Did not give signal when overtaking other vehicle	145.79	120.62	-2.898	0.004*
Using phone	132.60	127.81	-0.581	0.561
Speeding	146.43	120.28	-2.977	0.003*
Not follow the traffic light	136.89	125.47	-1.577	0.115
Overtaking other vehicle at the left side	140.69	123.40	-1.960	0.050*

Note: *Significant at $p < 0.05$

The result indicated that there were significant association between 6 types of unsafe riding behaviours with p-value of 0.026 for smoking, eating ($p = 0.010$), drinking ($p < 0.001$), did not give signal when overtaking other vehicle ($p = 0.004$), speeding ($p = 0.003$) and overtaking other vehicle at the left side ($p = 0.003$).

4.8.4 The comparison between perceptions on causes contributing to motorcycle crashes

Table 4.11 shows the comparison between perception on causes contributing to motorcycle crashes and motorcycle accident. On the last part of questionnaire, question was asked on the perception of postmen on causes contributing to motorcycle crashes while working. There were two factors that show significant association to motorcycle crashes which were the age motorcycle more than five years ($p = 0.043$) and motorcycle tire ($p = 0.012$).

Table 4.11: The comparison between perception on causes contributing to motorcycle crashes and motorcycle crashes

Causes contributing to motorcycle crashes	Median (IQR)	Mean Rank		Z-value	p-value
		Ever have Crashes			
		Yes	No		
Weather were not in good condition	4 (1)	126.90	130.92	-0.433	0.665
Road were not in good condition	4 (1)	124.74	132.10	-0.838	0.402
Bring a lot of letter	4 (1)	130.13	129.16	-0.105	0.916
Stress from management	3 (2)	134.58	126.73	-0.837	0.402
There were no road safety training for working purpose	3 (2)	130.36	129.03	-0.140	0.888
Hit by other vehicle	4 (2)	123.17	132.95	-1.055	0.292
Age of motorcycle (more than five years)	4 (2)	117.22	136.19	-2.024	0.043*
Motorcycle break was malfunction	4 (2)	117.85	135.85	-1.936	0.053
Motorcycle tire	4 (2)	114.58	137.63	-2.502	0.012*
Motorcycle was not service according to timetable	4 (3)	122.57	133.28	-1.131	0.258
Motorcycle that had been used had involved in crashes event before	3 (3)	133.09	127.54	-0.585	0.558

Note: *Significant at $p < 0.05$

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Background

This chapter reviewed and discussed the results of cross sectional study to assess the overall prevalence of motorcycle crashes and its associated factors among postmen in Perak. The first part, discussed on result of hypothesis testing while second part were study limitation, conclusion and recommendation on this study.

In this chapter, discussions were supported by supporting literature or contrasting literature. Therefore, explanation on whether the finding is similar or contrasts with the literature were also discussed.

5.1.1 Prevalence of motorcycle crashes

The first objective of this study was to determine the prevalence of motorcycle crashes among postmen in Perak. The results showed that prevalence of motorcycle crashes in five districts in Perak is 35.3%.

The prevalence of motorcycle crashes among postman was almost similar with previous study where the prevalence was 34% as reported by Kulanthayan *et al.*, (2011) among food delivery in Selangor. The high prevalence recorded in this study could be due the factors such as riding motorcycle every day for mail delivery, less protected and more vulnerable to road crashes with other vehicle. Furthermore, factors such as the intensity of traffic mix and lack of separation of these vulnerable groups from fast-moving motorized vehicles heighten the risk of injury for less-protected road users (Cheng *et al.*, 2011).

5.1.2 Distribution of socio-demographic and contributing factors

The second objective of this study was to determine distribution of socio-demographic, unsafe riding behaviours, perception on causes contributing to motorcycle crashes among respondents. In the distribution of socio-demographic, majority (96.5%) of respondent was Malay, followed by Indians (3.5%) and none of them was Chinese with range of age was between 20 until 29.9 years old.

The age range was the most common range for employment in Malaysia. Most (86.8%) of them have applied work as postman after finish SPM compared to other level of education. The higher education was diploma and primary school was the lowest education among them.

Factors that contributed to crashes were unsafe working behaviours, perception, road condition and management factor. Unsafe riding behaviour included reading letter address for next point, taking short cut, speeding, eating and drinking (other than alcohol) while riding, alcohol influence, drug influence, influence medicine that cause sleepiness, fatigue, bring bunch of letter, riding in hurry, smoking and using phone while riding, did not give signal while overtaking other vehicle, did not obey the traffic light, over taking from left side and race with other road users. Contributing factors of this study was based on previous study by Bentley *et al.*, (1998), slip, trip and fall accidents occurring during the delivery of mail.

From all factors under unsafe riding behaviours, reading letter address while riding have the highest score with 27.52% (very often) and 13.57% (often) of the respondents. Secondly, riding in hurry with 3.88% (very often) and 12.79% (often) and thirdly, taking shortcut with 2.71% (very often) and 12.02% (often).

The finding for reading address while riding and riding in hurry or rushing was supported by previous study on slip, trip and fall crashes occurring during the delivery of mail by Bentley *et al.*, (2000) who stated that 50% of the respondent voted reading address and 44% agreed that rushing while delivering the mail were the main reason caused them to involve in crashes. Respondent was aware of safe practise such as checking the address for next delivery point before they set off, but argued this would incur unacceptable time costs.

In this study, taking shortcut was the third highest factor that caused crashes but it was contrast from previous study by Bentley *et al.*, (2000) who stated that taking shortcut with 24% was fourth after carrying over weight delivery paunches of mail with 29%. Another factor was alcohol influence which was proven to be the most outstanding cause factor, with 393 drinking riders in United Kingdom were involved in crasheses where riders lose control of the motorcycle and crashed usually at weekend particularly at night (Kasantikul *et al.*, 2004). Finding from previous study were contradicted with this study because all of respondent admitted that they were not riding motorcycle under drug and alcohol influence as most of them were Malay and Muslim.

There were 11 factors that included under perception on causes contributing to motorcycle crashes which were weather conditions, road condition, amount of letter being carried, stress from management, absent of job and safety training, hit by others vehicle, age of motorcycle, malfunction of motorcycle break, poor motorcycle's tire condition, motorcycle was not service according to time table, motorcycle used has involved in crashes.

According to Table 4.7 in Chapter 4, 37.2% of the respondents agreed that they involved in crashes due malfunctioning of motorcycle break was malfunction, 30.2% of them were strongly agree. Then, 41.5% of them agreed that motorcycle tire was slippery and 29.8% of them were strongly agreed on this factor. Next, 54.7% agreed that the road condition was not in good condition and 27.1% of them were

strongly agreed. 39.5% agreed that got involved in motorcycle crashes from getting hit by other vehicle, while 26.7% of them were strongly agreed. Lastly, 28.7% of the respondents agreed that they got involved in motorcycle crashes due to the motorcycle that had not been serviced according to time table while another 25.6% were strongly agreed.

Perception on road condition that caused crashes was supported by Haslam *et al.*, (1998) who stated that road condition such as damaged walking surface, uneven paving and hole in paving was chosen by the respondent with the percentage of 86%. Most of the factors under perception were a new finding that were not studied by Bentley *et al.*, (2000) on identification of risk factors and countermeasures for slip, trip and fall crashes during the delivery mail. The new finding was based on the questionnaire answered by the respondent and the observation among the motorcyclist and interview with the motorcycle user who had experience in motorcycle crashes.

5.1.3 The distribution contributing factors and body part injured among respondents that ever have motorcycle crashes

The third objective was to determine the distribution of associated factors and body part injuries among respondents that ever have motorcycle crashes while working. Based on the result, most (87.9%) of postmen that ever have accident admitted that other road user fault was the main causes of crashes.

This finding was supported by Crundall *et al.* (2012) and Elliott *et al.*, (2007) which stated that studies of crashes statistics suggested that the motorcyclists were particularly vulnerable to collisions with other vehicles which pulled out of side roads onto a main carriageway, failing to give way to the approaching motorcycle because this typical response of the car driver was that they looked in the appropriate direction but simply failed to see the motorcycle.

Research indicated that leg was the most common body part getting injured during crashes (28.3%). This finding was supported by previous study of Bentley *et al.*, (1998) that stated leg was the most body part injured among respondents in Royal Mail in United Kingdom in 1998 with the percentage of 28.3%.

5.1.4 Association between motorcycle crashes and socio-demographic factor

The fourth objective was to determine the association between motorcycle crashes and socio-demographic factor. Socio-demographic factors included were age, races and education level. Differences between respondents in term of age, ethnicity and education level show no significant association to motorcycle crashes. Therefore, hypothesis regarding the significant association between motorcycle crashes and socio-demographic factors was rejected. This finding was supported by Bentley *et al.*, (1998) who stated that there was no clear effect of age on delivery fall incidence was observed.

On the other hand, previous study by Rutter *et al.*, (1996), the finding shows that age had been long recognized as one of the contributing factors in road crashes. There were new finding for ethnicity, education level since there had been no study looking into this matter.

5.1.5 Association between motorcycle crashes and working experience

Majority (41.9%) of respondent had worked as postmen for a long period of time which was within ten years and above. In this study, working experience was not significantly associated with motorcycle crashes. Therefore, hypothesis regarding the significant association between motorcycle crashes and working experience was rejected.

This finding was contradicted from previous study by Rutter *et al.*, (1996) on age and experience in motorcycling safety. Relatively, years of riding experience was found to be significant and elderly with more experience riding motorcycle were less experience a motorcycle crashes compared to younger, less experience riding motorcycle.

5.1.6 Association between motorcycle crashes and unsafe riding behaviours

The association between motorcycle crashes and unsafe riding behaviour were determined in third objective. Among 16 listed unsafe riding behaviour, only five of the behaviours show significant association to motorcycle crashes which were smoking, drinking and eating while riding, speeding and did not give signal when overtaking other vehicles.

Smoking, drinking, eating while riding were a new finding compared to previous study on identification of risk factors and countermeasures for slip, trip and fall accidents during the delivery of mail by Bentley *et al.*, (2000), Bentley *et al.*, (1998) and study of slip, trip, and fall accidents that occurred during the delivery of mail by Haslam *et al.*, (2001). This was because it was a habit among postmen that had been observed by researcher during the period of one month of data collection and also the feedback from interview with few of the respondents and postmen supervisor. They said that postmen brought water (other than alcohol) and also some snacks while riding because of hot weather and long hours on motorcycle.

Speeding behaviour was supported by Elloit *et al.*, (2007), who stated that speeding exceeding the speed limit on a country rural road, motorway and a residential road were the main cause of motorcycle crashes. In addition, it was also a

new finding that by not giving signal when overtaking other vehicles, the risk of getting involved in motorcycle crashes was increased among postmen.

Result from this study was contrast from previous study by Bentley *et al.*, (2000) who said that rushing and reading address were the most unsafe working behaviours as it would increased risk of having crashes while work. Bentley *et al.*, (1998) said that postmen in United Kingdom were rushing because Royal Mail had jobbed and finished policy. This policy allowed employees to go home immediately after deliver all the letter but in Malaysia even though they had finish delivered the entire letter, they were not allowed to go back before 5.00 p.m. Bentley *et al.*, (1998) also said that risk of having crashes was increased by reading letter address while working among postmen in Royal mail. This result was contrast from this study because in Malaysia, the jobbed and finish policy was not applied.

5.1.7 Association between motorcycle crashes and perception on causes contributing to motorcycle crashes

Age of motorcycle that more than five years and poor motorcycle's tire (slippery) showed significant association to motorcycle crashes with p-value of 0.043 and 0.012 respectively.

Based on the interview with the supervisor of postmen, they said that poor motorcycle's tire was the consequence of postmen behaviour. They did not service

their own motorcycle according to time table given by supervisor. Furthermore, each postman supposedly to check their own motorcycle before usage, but in such hurry, most of them would not checked their motorcycle and this condition had contributed to the significant association between poor motorcycle's tire and motorcycle crashes among postmen.

This finding was contrast from previous study by Bentley *et al.*, (2003) and Bentley *et al.*, (2000) where he recorded that reading letter addresses and rushing were the most factors associated to motorcycle crashes.

In summary, there were no significant associations between socio-demographic, working experiences, unsafe riding behaviour and perception on causes contributing to motorcycle crashes to motorcycle crashes. Only several factors under unsafe riding behaviours (drinking, eating, smoking and while riding, speeding, did not giving signal when overtaking other vehicle and overtaking from the left) shows significant association to motorcycle crashes. Perception on cause contributing to motorcycle crashes which were condition of motorcycle tire and age of motorcycle more than five years were failed to be rejected because p-value less than 0.05.

5.2 Study limitation

As this study used questionnaires as main instrumentation in getting information from the respondents, recall bias might occurred. This was because, respondents needed to recall information on crashes that occurred in the last six month before this study was conducted. Besides that, the questionnaire used was constructed by researcher and therefore the reliability was not same as standardized questionnaire but pre-test has been conducted to overcome reliability problem.

5.3 Conclusion

In summary, the prevalence of motorcycle crashes among postmen in five districts in Perak was high (35.3%) compared to previous study by Kulanthayan *et al.*, (2011) and leg was recorded as the most common body part getting injured in a motorcycle crashes. Neck was recorded as rare body part getting injured during crashes. There were 5 unsafe working behaviours out of 16 which were smoking, drinking, eating, speeding and not giving signal when overtaking others vehicle and 2 out of 11 (age of motorcycle more than five years and condition of motorcycle tire) on perception of other factor and motorcycle crashes that showed significant association with motorcycle crashes.

Therefore, intervention program should be conducted to reduce the number of crashes and prevent any worst body part injury happen among postmen during working time.

5.4 Recommendation

Recommendation in this study was based on hierarchy of control. Elimination, substitution and engineering control was not applicable in this study. Administrative control and personal protective equipment was most suitable and applicable for this matter.

In administrative control, based on my previous interview with supervisor of postmen at Ipoh, Perak he said that Post Malaysia have implemented a merit system for each of postman job performance. If the postman got a low merit score compared to standard level, he would not be included in the list of increased bonus. This system had took into account the discipline of time which was time of come and back from work and also the number of letter failed to reach the customers. According to him, safety performance was not included in merit system. Therefore, my first recommendation was to have a merit system for safety performance. Factors that needed to be considered under safety were number of accident, use of safety helmet and safety maintenance of motorcycle which was condition of motorcycle whether in good condition or not.

Based on the questionnaire, most of postmen suggested having a new motorcycle since they had used the old motorcycle for a long time. As referring to this matter, researcher had observed and checked the condition of the motorcycle. The condition was worst because some motorcycle break was not functioning, and

most of the motorcycle tires were in poor condition. Researcher also had referred this matter to the supervisor and also officer who responsible to manage the motorcycle conditions. They said that postman were not serious in taking care of their motorcycle therefore the motorcycle was always not in a good condition. They realized that the age of motorcycle was already more than five years and now they were in the process to have new motorcycle but not all of them will get it. Privilege was given to postman who had motorcycle that in a very worst condition.

Management of Post Malaysia should provided job and safety training to all employees especially for the new recruitment of employees. According to Bentley *et al.*, (1998) and Bentley *et al.*, (2000), job and safety training were believed to bad working habits among employees. Training included safety while riding such as did not drinking and eating while riding, did not speeding if not necessary and gave signal while overtaking other vehicle or at a junction.

Personal protective equipment was useful to protect body part if anything unexpected happen and substantially reduced injuries to motorcyclists. In addition, as referring to the result of the questionnaire analysis, hand and leg were the most common body part injured during the accident. Protective equipment and clothing which can be implemented were wearing riding boot, protective trousers, protective jacket, body armour (elbow pads, shoulder pads, knee pads, etc) and safety glove.

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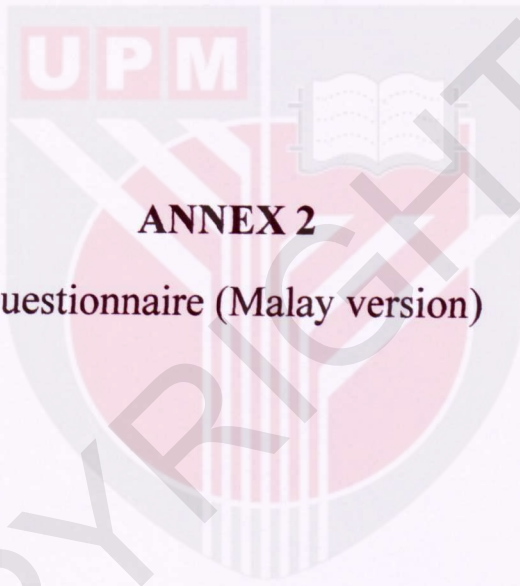
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ANNEX 1

Approval letter from Medicine Research Ethic Committee



ANNEX 2

Questionnaire (Malay version)

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NO. SIRI :



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UNIVERSITI PUTRA MALAYSIA
BERILMU BERAKTI

FAKULTI PERUBATAN DAN SAINS KESIHATAN
UNIVERSITY PUTRA MALAYSIA

BORANG SOAL SELIDIK – KEMALANGAN MOTOSIKAL

Panduan: Sila isi semua maklumat yang diperlukan dan tandakan (√) bagi jawapan yang berkaitan pada ruang yang disediakan. Kejujuran dan kerjasama anda amatlah dihargai.

A. MAKLUMAT SOSIO-DEMOGRAFIK

- 1) Umur : _____ (Tahun)
- 2) Bangsa :
 - Melayu
 - China
 - India
 - Lain-lain
- 3) Tahap pendidikan :
 - Tamat sekolah rendah
 - PMR / LCE
 - SPM / MCE
 - STPM / HCE
 - Lain-lain (sila nyatakan) _____

B. MAKLUMAT PEKERJAAN

- 4) Pernahkah anda bekerja sebelum ini?
 - Ya : Nyatakan pekerjaan anda sebelum ini: _____
 - Tidak
- 5) Berapa lamakah anda telah bekerja sebagai posmen ? : _____ (tahun)

C. MAKLUMAT KEMALANGAN MOTOSIKAL

- 6) Adakah anda pernah terlibat didalam kemalangan motosikal semasa bekerja?
- Ya (Jika Ya, sila jawab soalan 7 dan seterusnya)
 - Tidak (Jika Tidak, ke Bahagian D)
- 7) Adakah anda pernah terlibat di dalam kemalangan motosikal semasa bekerja pada tahun lalu (2011)?
- Ya
 - Tidak
- 8) Adakah anda pernah terlibat di dalam kemalangan motosikal semasa bekerja pada tahun ini (2012)?
- Ya
 - Tidak
- 9) Adakah anda pernah terlibat didalam kemalangan motosikal semasa bekerja dalam tempoh 6 bulan yang lalu?
- Ya
 - Tidak
- 10) Adakah anda pernah terlibat di dalam kemalangan motosikal semasa bekerja dalam tempoh 3 bulan yang lalu?
- Ya
 - Tidak
- 11) Adakah anda pernah terlibat di dalam kemalangan motosikal semasa bekerja dalam tempoh 1 bulan yang lalu?
- Ya
 - Tidak

- 12) Nyatakan tarikh terakhir anda mengalami kemalangan motosikal semasa bekerja.

Tarikh terakhir kemalangan motosikal semasa bekerja: _____

- 13) Nyatakan bilangan kemalangan motosikal semasa bekerja yang pernah dialami sepanjang bekerja sebagai postmen.

Bilangan kemalangan motorsikal : _____ (kali)

- 14) Adakah anda melaporkan kepada majikan sekiranya anda terlibat didalam kemalangan motosikal?

- Ya
 Tidak

- 15) Tandakan (√) bahagian badan anda yang pernah tercedera akibat kemalangan motosikal semasa bekerja yang pernah anda alami:

Bil	Bahagian badan yang tercedera	Ya	Tidak
a)	Kepala		
b)	Muka		
c)	Leher		
d)	Dada		
e)	Belakang Badan		
f)	Tangan		
g)	Kaki		
h)	Lain-lain: (Nyatakan):		

16) Apakah faktor utama kemalangan-kemalangan motosikal yang anda alami?

Bil	Faktor Kemalangan	Ya	Tidak
a)	Cuaca		
b)	Keadaan jalanraya		
c)	Kecuaian sendiri		
d)	Keadaan motosikal		
e)	Kecuaian pengguna jalanraya lain		
f)	Kecuaian majikan		
g)	Lain-lain (Nyatakan):		

17) a) Adakah kemalangan tersebut menyebabkan anda tidak dapat bekerja?

- Ya (Jika Ya, sila jawab 18 b)
- Tidak (Jika Tidak, ke Bahagian D)

b) Nyatakan bilangan hari cuti sakit yang paling lama yang pernah diperolehi dari mana-mana kemalangan yang pernah anda alami:

Cuti sakit paling lama: _____ (hari)

D. FAKTOR-FAKTOR KEMALANGAN MOTOSIKAL

18) Nyatakan tahap kekerapan anda melakukan **AMALAN** di dalam pernyataan di bawah ketika menunggang motosikal. **BULATKAN** jawapan anda pada nombor samada 1, 2, 3, 4, atau 5 di petak tahap kekerapan bagi setiap pernyataan (a) hingga (q). Nilai bagi skala tahap kekerapan adalah seperti berikut:

1 = tidak pernah melakukan amalan tersebut

2 = jarang-jarang sekali melakukan amalan tersebut

3 = kadang-kala melakukan amalan tersebut

4 = kerap melakukan amalan tersebut

5 = sangat kerap melakukan amalan tersebut

Bil	Amalan ketika menunggang motosikal semasa bekerja	Skala Tahap Kekerapan				
		1	2	3	4	5
a)	Membaca alamat ketika menunggang motosikal	1	2	3	4	5
b)	Terburu-buru	1	2	3	4	5
c)	Mengambil jalan singkat	1	2	3	4	5
d)	Menunggang didalam pengaruh dadah	1	2	3	4	5
e)	Menunggang didalam pengaruh alkohol	1	2	3	4	5
f)	Menunggang ketika mengantuk kerana kesan ubat	1	2	3	4	5
g)	Menunggang di dalam keletihan	1	2	3	4	5
h)	Menunggang sambil merokok	1	2	3	4	5
i)	Menunggang sambil makan	1	2	3	4	5
j)	Menunggang sambil minum (selain alkohol)	1	2	3	4	5
k)	Memotong kenderaan tanpa memberi isyarat	1	2	3	4	5
l)	Menggunakan telefon bimbit semasa menunggang	1	2	3	4	5
m)	Menunggang motosikal melebihi kelajuan	1	2	3	4	5
n)	Melanggar lampu isyarat	1	2	3	4	5
o)	Memotong kenderaan dari lorong sebelah kiri	1	2	3	4	5
p)	Berlumba dengan kenderaan lain	1	2	3	4	5
q)	Lain-lain (Nyatakan) : _____	1	2	3	4	5

- 19) Nyatakan tahap persetujuan anda terhadap pernyataan di bawah bagi **sebab-sebab kemalangan motosikal** di kalangan posmen. **BULATKAN** jawapan anda pada nombor samada 1, 2, 3, 4, atau 5 di petak skala tahap persetujuan bagi setiap pernyataan (a) hingga (l). Nilai bagi skala tahap persetujuan adalah seperti berikut:

1 = sangat tidak setuju

2 = tidak setuju

3 = neutral

4 = setuju

5 = sangat setuju

Bil	Pernyataan	Skala Tahap Persetujuan				
		1	2	3	4	5
a)	Keadaan cuaca yang tidak baik.	1	2	3	4	5
b)	Keadaan jalan yang tidak sempurna.	1	2	3	4	5
c)	Membawa bilangan surat yang banyak.	1	2	3	4	5
d)	Tekanan daripada pihak pengurusan .	1	2	3	4	5
e)	Tiada latihan keselamatan jalanraya semasa bekerja.	1	2	3	4	5
f)	Dilanggar kenderaan lain.	1	2	3	4	5
g)	Usia motosikal melebihi 5 tahun.	1	2	3	4	5
h)	Brek motosikal rosak.	1	2	3	4	5
i)	Keadaan Tayar motorsikal.	1	2	3	4	5
j)	Motorsikal tidak di periksa (service) mengikut jadual.	1	2	3	4	5
k)	Motorsikal yang digunakan pernah terlibat dengan kemalangan yang terdahulu.	1	2	3	4	5
l)	Lain – lain (Nyatakan): _____	1	2	3	4	5

-TERIMA KASIH -



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ANNEX 3

Respondent consent letters (Malay version)

BORANG PERSETUJUAN RESPONDEN

TAJUK KAJIAN : Prevalens kemalangan motosikal dan faktor-faktor yang berkaitan di Perak.

PENYELIDIK : NORPARAH SAHIRAH BINTI HARUN

Saya.....No.K/P.....
alamat.....
..... bersetuju untuk menyertai kajian bertajuk seperti di atas.

Saya telah membaca dan memahami isi kandungan kajian berdasarkan apa yang telah dinyatakan di dalam 'PENERANGAN KEPADA RESPONDEN' yang telah dilampirkan bersama surat kebenaran ini dan penerangan tambahan daripada penyelidik.

Saya juga faham bahawa segala maklumat yang diberikan dan segala keputusan yang saya perolehi adalah sulit dan hanya akan digunakan untuk tujuan penyelidikan dan rujukan penyelidik.

Saya faham bahawa saya mempunyai hak untuk menarik diri dan juga mempunyai hak untuk menarik semula keizinan pada bila-bila masa sekiranya perlu apabila merasa tidak selesa pada mana-mana ujian atau aktiviti yang dijalankan oleh penyelidik semasa kajian dijalankan dan tiada sebarang tindakan boleh dikenakan ke atas saya atas tindakan tersebut.

Tandatangan Tandatangan
(Responden) (Saksi)

Tarikh : Tarikh :

Saya mengesahkan bahawa saya telah menjelaskan kepada responden sifat dan tujuan penyelidikan klinikal yang tersebut di atas.

Tarikh Tandatangan
(Penyelidik)

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ANNEX 4

Information Sheet (Malay version)

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PENERANGAN KEPADA RESPONDEN

TAJUK KAJIAN :

Prevalens kemalangan motosikal dan faktor-faktor yang berkaitan di Perak.

Terima kasih kerana membantu kami di dalam kajian ini.

1. Apakah kajian ini?

Kajian ini adalah berkaitan dengan faktor-faktor yang menyebabkan kemalangan motorsikal kepada posmen. Kemalangan yang sering berlaku di jalan raya adalah kemalangan motorsikal samaada melibatkan kematian atau tidak, oleh yang demikian pekerjaan yang terlibat dengan penggunaan motorsikal seperti posmen perlu diambil perhatian untuk mengelakkan golongan ini terlibat di dalam kemalangan terutama sewaktu bekerja.

2. Apakah tujuan kajian ini?

Kajian dijalankan bertujuan untuk mengkaji prevalen kemalangan motorsikal dikalangan posmen dan mengkaji faktor-faktor yang boleh menyebabkan mereka terdedah kepada kemalangan motorsikal. Kajian ini menentukan faktor-faktor posmen terdedah kepada risiko kemalangan motorsikal.

3. Berapa ramai responden yang terpilih?

Responden akan dipilih dari kalangan posmen yang bekerja di Perak. Seramai 287 posmen akan dipilih sebagai responden untuk kajian ini.

4. Apakah jenis ujian yang akan dijalankan?

Semua responden akan diberi borang soal selidik untuk diisi sendiri oleh responden.

5. Adakah bayaran dikenakan?

Pengkaji akan menanggung segala pembiayaan ujian yang akan dijalankan dan tiada sebarang bayaran dikenakan terhadap setiap responden.

6. Adakah maklumat dijamin sulit?

Semua maklumat yang diberikan oleh responden di dalam borang kaji selidik adalah dijamin sulit. Tiada huraian individu akan dibuat pada mana-mana bahagian di dalam kajian atau penerbitan, ia hanyalah untuk kegunaan penyelidikan sahaja.



7. Adakah hak anda?

Kajian ini melibatkan anda sebagai peserta secara sukarela. Oleh itu, peserta mempunyai hak untuk menarik diri dari penyertaan dalam kajian ini pada bila-bila masa sekiranya peserta merasa tidak selesa untuk memberikan maklumat kepada pengkaji.

8. Apakah yang harus anda lakukan?

Anda dikehendaki menandatangani borang penyertaan responden yang menyatakan minat anda untuk menyertai kajian ini. Ianya boleh dilakukan setelah anda membaca dan memahami isi kandungan penerangan ini. Berang penyertaan responden haruslah dikembalikan kepada penyelidik sebelum ujian dijalankan. Sekiranya anda mempunyai sebarang kemuskilan, penyelidik akan membantu untuk memberi maklumat yang selanjutnya.

9. Siapakah yang akan saya hubungi jika ada sebarang soalan untuk diajukan sewaktu kajian dilakukan?

Penyelidik Norparah sahirah binti Harun (019-4654717) atau penyelia Dr. Samiah binti Mohd Said (03-89472815).

Terima Kasih diatas kerjasama dan bantuan anda.

NORPARAH SAHIRAH BINTI HARUN

Penyelidik

B.Sn. Kesihatan Persekitaran dan Pekerjaan

Jabatan Kesihatan Persekitaran dan Pekerjaan

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