An Evaluation on the Compliance to Safety Helmet Usage among Motorcyclists in Batu Pahat, Johor

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Abstract

This paper presents methods on how to determine the level of practice of usage of safety helmet among motorcyclist in Batu Pahat and to identify the target group who are most likely to violate the safety helmet law among. A questionnaire study was carried out in urban and rural Batu Pahat. A total of 185 respondents were interviewed and the data was analyzed using the statistics. Six variables were found to be significant at percent level ($p < 0.05$): gender, education level, type of safety helmet, distance of travel, riding experience and location of travel. Practice of safety helmet usage among motorcyclist in Batu Pahat was found to be higher for female riders, higher educated riders, full shell helmet users, travelling at a distance of 1 km to 10 km, riders having good practice and riders in the town area. All the variables above are contributing factors in the practice of helmet usage among motorcyclists in Batu Pahat. Subsequently, the road safety programs and enforcement teams should be more focused on male riders, rider with low education levels, half shell helmet riders, 10 km and below distance, riding experience for 10 years above and rural riders based on their lower practice of using safety helmet.

Keywords: safety helmet use, motorcyclist, road accident, statistical analysis

1. INTRODUCTION

Commonly, there are two categories of transportation system which is public and private transportation. For instance, cars and motorcycles are known as private transport. Motorcycle is a commons motor vehicle among Malaysian motorist as their private transport. Ironically, motorcyclists are more prone to crash injuries than car drivers because motorcycles are unenclosed, leaving riders vulnerable to contact hard road surfaces. Compared to cars, motorcycles are more dangerous. Per kilometer traveled, the number of deaths on motorcycles is about 27 times the number in cars. Deaths have been rising in recent years up 75 percent between the all-time low in 1997 and 2003. Motorcycles often have excessive performance capabilities, including especially rapid acceleration and high top speeds. Motorcycle is less stable than cars in emergency braking and less visible [1].

Therefore to increase safety, it is vital to have a good understanding of how casualties and injuries occur. Then it may be possible to take effective remedial action to reduce the likelihood of casualties and minimize the severity of injuries to motorcyclist during an accident.

The total numbers of registered motorcycle were 4328117 (year 1997) rose to 6164953 in year 2003. Within these 6 years the number of total accident indefinitely decreased (Table 1). Therefore in order to reduce fatalities involving motorcyclist, safety helmets should be worn properly. If this problem is addressed, the number of head – injury related fatalities among motorcyclist can be reduced significantly. Hopefully, a study on the practice of safety helmet usage among motorcyclist will be able to identify the target groups who careless about using safety helmets and to decide how far the level of the safety helmet usage among motorcyclist [2].

Table 1: Motorcyclist involved in road accident

Year	Registered motorcycle	Motorcyclist		Total Accident
		Death	Casualties	
1997	*4 328 117*	*3 286*	*34 593*	*37 879*
1998	4 692 183	2 981	34 536	37 519
1999	5 082 473	2 960	32 238	35 198
2000	5 356 604	3 118	30 109	33 227
2001	5 609 351	2 971	30 348	33 319
2002	5 859 195	3 034	26 167	29 201
2003	6 164 953	3 166	30 832	33 998

Source: Royal Malaysian Police (PDRM), 2003 [3]

1.1 Problem Statement

Based on the increasing number of road accident among motorcyclist indicates the need for a study on the practice of safety helmet usage among motorcyclist. For the casualties by vehicles in Batu Pahat, fatalities of motorcyclist less than 250 cc was 73.8% while fatalities of motorcyclist more than 250 cc was 1.3%. On the other hand, the fatalities of cars were only 13.2%. Besides that, for the notices issued by types of offences which involved safety helmet at Batu Pahat in year 2004 was 11.8%, compared with other notices issued such as (24.2%) license, (10.6%) road junction, (3.1%) safety belt and etc. On the other hand, from January to August 2005, there were 7.5% offences which involved safety helmet, compared with other notices issued such as (29.1%) license, (10.0%) road junction, (3.8%) safety belt and etc. Within these 2 years, there were number of offences decrease which involved usage of safety helmet about 4.3% [4].

Basically, to ensure the motorcyclist getting minimal head injury and to reduce number of fatalities caused by serious head injury from road crashes, its vital that skull is needs to be protected with a safety helmet. Therefore, a study on the compliance practice usage of safety helmet among motorcyclist is needed.

2. METHOD AND INSTRUMENT

2.1   Sample Size

The mode developed by Rubinson and Neutens (1997) is used to determine the sample size at sites. The formula as;

$$N = \left(\frac{z}{e} \right)^2 (p)(1-p) \qquad (1)$$

N is sample size, z is the standard score corresponding to a given confidence level, e is the proportion of   sampling error in a given situation, p is   the estimated proportion or incidence of cases in the population.   Based from the calculation, there were 174 minimum sample sizes but for this study only 185 sample sizes were chosen.

1.2 Instruments Use

The data for this study was collected through interviews using a questionnaire. Motorcyclists were questioned on their helmet usage practice. The questionnaire was developed based on previous studies as in [2]. A questionnaire consisting of five sections namely background, knowledge, attitude, general and others was designed to collect the data. The survey was carried out in town areas and outside-town areas of Batu Pahat for the period of December 2005 to February 2006 in the morning and afternoon for weekdays and weekends. Based on the basic statistics, the sample size of 185 respondents was determined for a three-month period of the study. From this number, 90 were chosen from uptown areas and 95 from downtown areas. After collection was complete, the data were analyzed using the Statistical Package for Social Sciences Software (SPSS). Since there was only one observer involved in the field, human error subjectivity due to differing standard in identifying compliance levels can be minimized.
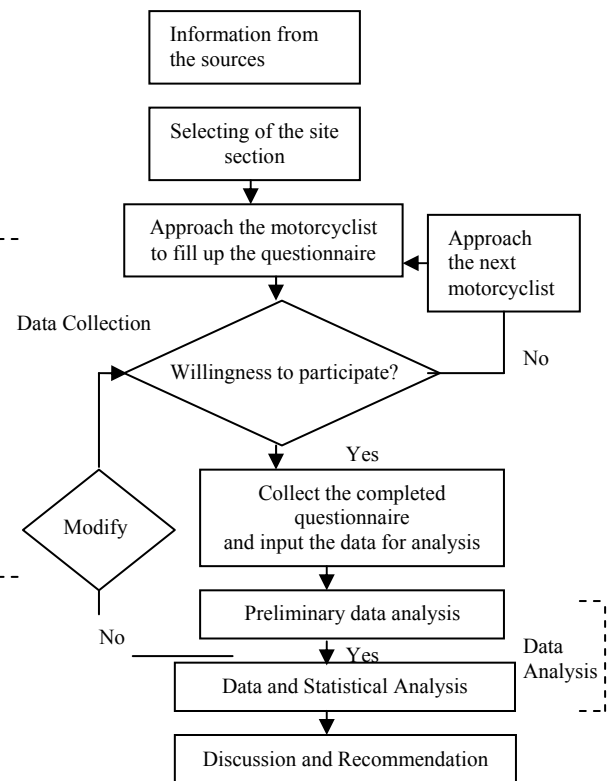

Fig. 1: Methodology of study flow chart

3. RESULT AND STATISTICAL ANALYSIS

The evaluation and analysis of data was carried out using the Statistical Package for Science Software (SPSS) Version 11.5. Univariate analysis performs chart. All these are to define the percentage of descriptive statistics. While bivariate analysis performs chi-square test which is to determine the hypotheses of the test results.

3.1 Univariate Analysis
3.1.1   Practice of safety helmet usage

Fig. 2 shows the percentage of safety helmets compliance usage among motorcyclist. The results show that the group which do not comply with safety helmet usage is more than half (57%) compared with the group that does (43%).

3.1.2 Gender, Education Level, Type of Helmet, Travel Distance and Location

Fig. 3 shows the percentage of gender among motorcyclist who practices safety helmet usage. Result shows more than half (69.7%) male motorcyclist involved in this activity compared to the female motorcyclist

47

(30.3%). Fig. 4 shows the percentage of education level among motorcyclist who practices safety helmet usage. Result shows, lower education respondents more than half (72.4%) involved in this activity compared to higher education respondents (27.6%).

Fig. 5 shows the percentage of type of helmet among motorcyclist who practices safety helmets usage. Result shows more than half (53%) were using full shell compared to half shell (43.8%). However, about 3.2% respondents had a missing data. Fig. 6 shows the percentage of travel distance among motorcyclist who practices safety helmets usage. Result shows, (67%) were travelling between 1 km and 10 km distance and (24%) were traveling 11 km to 20 km. Others travel above 20 km (9%). Fig. 7 shows the percentage of travel location among motorcyclist who practices safety helmets usage. Result shows, outside-town respondents were more than half (51.4%) involved in this activity compared to town respondents (48.6%).
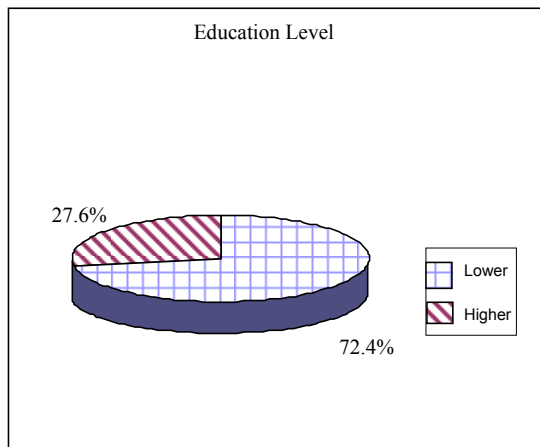

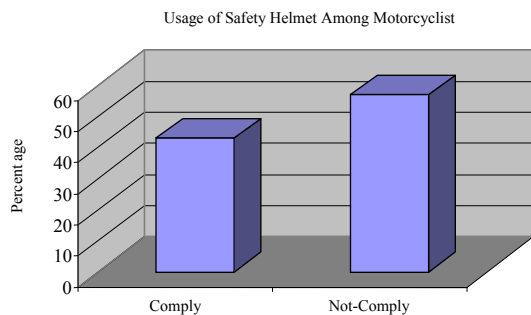Fig. 4: Pie chart of education level among motorcyclist

Fig. 2: Bar chart of percentage compliance of safety helmets usage
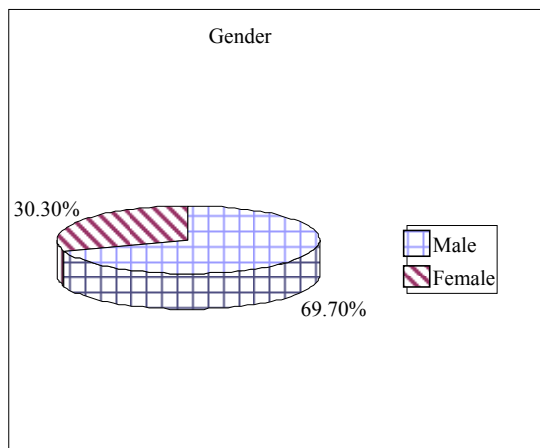

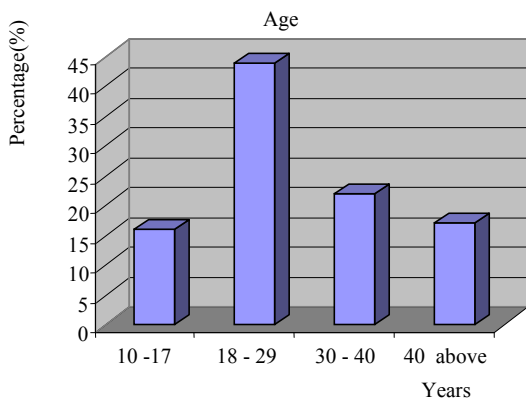Fig. 5: Pie chart of percentage gender of motorcyclist

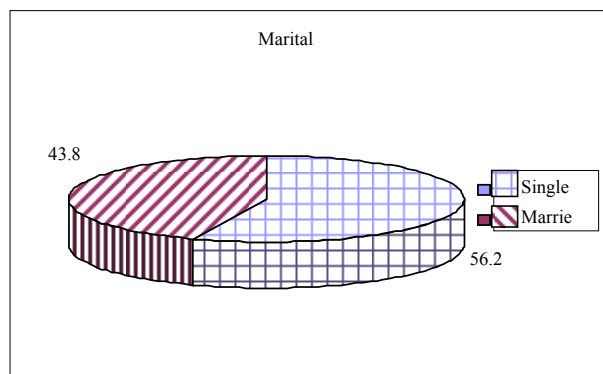Fig. 3: Bar chart of percentage age of motorcyclist

Fig. 6: Pie chart of percentage marital status

3.2 Bivariate Analysis
3.2.1 Gender

Table 2 shows the compliance to safety helmet usage among motorcyclist for gender. Results show that compliance is lower (29.5%) for male respondents compared with female respondents (73.2%). This shows that the male respondents were not likely to comply with safety helmet usage compared to female respondents (p<0.05).
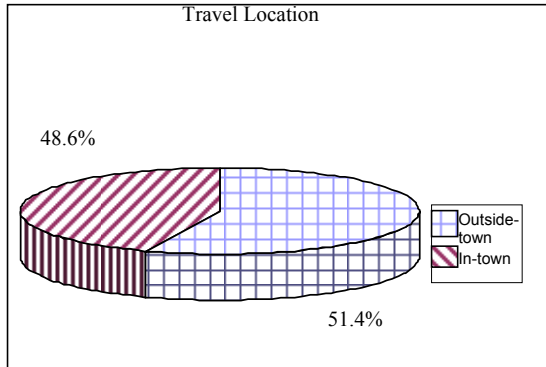

Fig. 7: Pie chart of riding location among motorcyclist

Table 2: Compliance practice usage of safety helmets by gender (n=185)

Gender	Comply	(%)	Not-Comply	(%)
Male	38	29.5	91	70.5
Female	41	73.2	15	26.8
Total	79	42.7	106	57.3

(χ^2 = 30.557, df = 1, p = 0.000)

3.2.2 Education level

Table 3 shows the compliance to safety helmet usage among motorcyclist for education level. The compliance is lower (34.3%) for low education respondents compared with high education respondents (64.7%). It is also shows that, lower educations respondents are higher (65.7%) not comply with safety helmet usage compared to higher education respondents (35.3%).

Table 3: Usage of safety helmets by education level (n=185)

Education level	Comply	(%)	Not-Comply	(%)
Lower	46	34.3	88	65.7
Higher	33	64.7	18	35.3
Total	79	42.7	106	57.3

(χ^2 = 13.932, df = 1, p = 0.000)

3.2.3 Type of helmet

Table 4 shows the compliance to safety helmet usage among motorcyclist for type of helmet. The compliance practice usage of safety helmet is higher (52.0%) for full shell respondents compared with half shell respondents (34.6%). This shows that the half shell respondents were less likely to comply with safety helmet usage compared to full shell respondents (p<0.05).

Table 4: Usage of safety helmets by type of helmet (n=179)

Type of Helmet	Comply	(%)	Not-Comply	(%)
Full Shell	51	52.0	47	48.0
Half Shell	28	34.6	53	65.4
Total	79	44.1	100	55.9

(χ^2 = 5.491, df = 1, p = 0.019)

3.2.4 Travel distance

Table 5 shows the compliance to safety helmet usage among motorcyclist for travel distance. The compliance is higher (62.5%) for 20 km above travel distance respondents compared with 11 km to 20 km travel distance respondents (61.4%) and 1 km to 10 km (34.1%). It is also show that the distance ranging 1 km to 10 km contributes 65.9% respondents who do not comply with the practice usage of safety helmets.

Table 5: Usage of safety helmets by travel distance (n=183)

Travel Distance (km)	Comply	(%)	Not-comply	(%)
1- 10	42	34.1	81	65.9
11-20	27	61.4	17	38.6
20 above	10	62.5	6	37.5
Total	79	43.1	104	56.9

(χ^2 = 12.456, df = 2, p = 0.002)

3.2.5 Location

Table 6 shows the compliance to safety helmet usage among motorcyclist for location. The compliance practice usage of safety helmet is higher (63.3%) for town area respondents compared with outside-town respondents (23.2%). This shows that the outside-town respondents were not likely to comply with safety helmet usage compared to urban respondents (p<0.05).

Table 6: Usage of safety helmet by location (n=185)

Location	Comply	(%)	Not-Comply	(%)
Town areas	57	63.3	33	36.7
Outside-town areas	22	23.2	73	37.8
Total	79	42.7	106	57.3

(χ^2 = 30.488, df = 1, p = 0.000)

3.2.6 Riding Experience

Table 7 shows the compliance to safety helmet usage among motorcyclist for riding experience. The compliance is higher (61.4%) for 1 to 5 years riding experience respondents compared with 6 to 10 years and 10 years above riding experience respondents (40.0% and 17.5%). This shows that the 10 years above riding experience respondents were not likely to comply with safety helmet usage compared with 10 years and below riding experience respondents (p<0.05).

Table 7: Usage of safety helmet by riding experience (n=169)

Riding experience (year)	Comply	(%)	Not-Comply	(%)
1 to 5	51	61.4	33	38.6
6 to 10	18	40.0	27	60.0
10 above	7	17.5	33	82.5
Total	76	45.0	93	55.0

(χ^2 = 29.137, df = 2, p = 0.000)

4. DISCUSSION

It is universally accepted that vehicle crashes cannot be totally prevented, but that the resultant injuries and severity can be prevented or minimized by protective devices like the safety helmets, properly used

for motorcyclist. This study was therefore undertaken to determine the level on the usage of safety helmet among motorcyclist in the district of Batu Pahat and to identify the target groups who are most likely to violate the safety helmet law.

From this study, it was found that motorcyclist riding in town areas were more likely to comply with usage of safety helmet usage among motorcyclist compared with motorcyclist riding in outside-town areas. This is most probably due to the motorcyclists' perception of lower enforcement activity in outside-town areas compared with town areas. The enforcement activity tends to be lower in the outside-town areas due to limited resources and the larger spatial coverage to be undertaken by enforcement teams. This could explain the lower compliance level in outside-town areas.

The relationships between gender and compliance to safety helmet usage among motorcyclist have been analyzed. This study shows that female respondents are more likely to comply with the compliance practice usage of safety helmet compared with male respondents. This finding is supported as in [5] showing that helmet usage among female riders was higher compared with the male riders. Harlos, *et al* (1998) [6] and Fisher and Lindenmayer, (1998) [7] also reported that the compliance level of male riders was lower compared with female riders.

Next for types of helmet, the results obtained rejected the null hypothesis. Thus there is a difference between type of helmet and compliance to safety helmet usage among motorcyclist. This study also found that there is a strong relationship between compliance practice usage of safety helmet among motorcyclist and distance traveled. This finding is comparable with Hurt, *et al* (1981) [5] and Allegrantre and Mortimer (1985) [8] who considered the length of the intended trip as the most important criteria in determining helmet usage. Both studies suggested that helmet usage was higher for long distance trips compared with shorter trips. The higher usage of safety helmets for longer distance trips could be due to better perception of accident risk and exposed to a

higher risk of an accident. This in turn could probably be reason why compliance to safety helmet usage among motorcyclist increases with trip length as in this study.

5. CONCLUSION

Based on the findings in the study, it can be concluded that the gender, education level, type of helmet, travel distance, riding experience and the riding location are contributing factors in the compliance to safety helmet usage among motorcyclist in Batu Pahat. Therefore, the road safety programs and enforcements teams should be more focused on male riders, lower educated riders, half shell helmet riders, 10 km and below distance, riding experience for 10 years above and rural riders based on their lower compliance to safety helmet usage.

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