CHARACTERISTICS OF SEAT BELT USE IN JAKARTA

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Abstract: The enforcement of safety belt use in Indonesia has been started from 5 May 2004. This paper will discuss the characteristics of safety belt use in Jakarta. The data collection was carried out through interview using a prepared questionnaire. 50 respondents were drawn randomly using list of Jakarta's fixed phone customer. The first group of questions was about several personal, occupational, health, trip characteristics of the respondents. The second group of questions was about level of safety belt use, level of information received, willingness to wear safety belt, perceived firmness of existing law enforcement, perceived usefulness of safety belt use and perceived effectiveness of existing law. Statistical relationships between variables from the first group and variables from the second group were measured. The results of the research might be used to formulate initial plan of seat belt use promotion strategy.

Key Words: safety belt use, Jakarta, statistical relationships, respondent characteristics and attitudes

1. INTRODUCTION

The enforcement of safety belt use in Indonesia has been started from 5 May 2004. This is to implement article 23 paragraph 1e of Law No.14/1992 about Traffic and Road Transport, i.e. that whilst driving a four or more wheels vehicle in a road, a driver is required to use seat belt. On the paragraph 2 of the same article, the front seat passenger is also required to wear the seat belt. One might notice that it took 12 years before the safety belt use law is implemented as the explanation of the law states that the implementation of the law should be in stages. This seems to be interpreted as can be postponed until the law enforcement officers are ready. This paper will discuss the characteristics of safety belt use in Jakarta.

2. LITERATURE REVIEW

Shinar (1993) summarized several demographic and socioeconomic factors that were indicated by previous research to be influencing the safety belt use rate, i.e. age, gender, education, socioeconomic level, race, health condition, job satisfaction, life satisfaction, behaviour and car age. Some of these factors were included in this research, with consideration on the appropriateness of the factor for Jakarta's case.

In the USA, there are two type of safety belt law, i.e. primary and secondary laws. Each of the state has its own law. In a primary law, a police is allowed to stop a motorist solely for being unbelted (Shults et al, 2004), whilst in a secondary law, a seat belt use enforcement is only

permitted after a stop for another violation (Ulmer et al, 1995). Developing an awareness on the importance of safety belt use is a matter of behavioural change. Therefore, it took a considerably long period of time to be achieved. In 1984, the safety belt use rate in the USA was about 20%. Five years later, in states where primary law, secondary law and no law were implemented, the safety belt use rates were about 70%, 50% and 35% respectively (Escobedo et al, 1992). This indicates that although primary law was the most effective enforcement to increase the safety belt use rate, in the states in which no safety belt law were implemented, there was an increase in the safety belt use rate. This might be affected by other promotion measures.

Streff et al (1992) based on a research at Michigan, USA, stated that a combination of public information, education and law enforcement might increase the safety belt use rate significantly. However Jhonston et al (1994) stated that in the USA, incentive was more effective measure compared to education. Calisir and Lehto (2002) stated that there was no significant relationship between the perceived usefulness of safety belt and the safety belt use rate. Hong et al (1998) and Shin et al (1999) the behaviour of other people can have a major impact on our behaviour. This implies that an effective way to affect people's safety belt use might be to prove good examples of real-life belt use. Parents that always use belts and enforce use by their children will probably raise adult belt users.

3. METHODOLOGY OF DATA COLLECTION

The data collection was carried out through interview using a prepared questionnaire. 50 respondents were taken randomly using list of Jakarta's fixed phone customer, i.e. 10 respondents each from 5 different regions of Jakarta (North, South, West, East and Central). One might argue that sample size of 50 is too small to represent about 9,000,000 population of Jakarta. It is statistically proved that as the sample size increase, it will better represent the population. However, since the respondents were taken randomly, it means that the probability of each individual to be selected was the same and therefore to some extent can guarantee representation.

The interviews were conducted by phone on October 2004. The respondent did not have to be the person who was registered in the list, but any adult who responded to the call. The following is the complete list of the question:

- *Personal data*: sex, age, race, marital status, number of dependants, education, address (to confirm the one in the list), length and status of residence, monthly expenses
- *Occupational data*: profession, type of company/institution, number of employees, position, division, length of employment, main working environment (indoor or outdoor), job satisfaction
- *Health data*: type of disability, type of health problem, smoking habit/environment, drug/drink addiction, general health condition, pregnancy
- *Car and typical daily trip data*: type/brand/engine size/type of fuel/production year of the car, type of safety belt, the availability of children car seat, length of typical daily trip, driver or passenger
- *Safety belt use*: level of safety belt use (with reason), level of information received, willingness to wear safety belt, perceived firmness of existing law enforcement, perceived usefulness of safety belt use, perceived effectiveness of existing law.

4. METHODOLOGY OF DATA ANALYSIS

As mentioned in the previous chapter the first group of collected data was about several personal, occupational, health, trip characteristics of the respondents. The second group of collected data was about level of safety belt use, level of information received, willingness to wear safety belt, perceived firmness of existing law enforcement, perceived usefulness of safety belt use and perceived effectiveness of existing law. For both groups, some descriptive statistics will be provided. Statistical relationships between variables from the first group and variables from the second group were measured.

The dataset consists of several different types of variable. The numerical variables consist of both discrete variables and continuous variables. There were also a lot of categorical variables involved. Different types of variables require different statistical techniques. The Pearson and the Spearman correlation analyses can be used to measure relationships between numerical variables. However, the Pearson correlation was only carried out if normality in data distribution was satisfied. Alternatively, a Spearman correlation was used as this is a non-parametric technique that is distribution free. Spearman's method works by assigning a rank to each data in each variable separately. Then the sums of the squares of the differences in paired ranks (d_i^2) are calculated according to Equation (1) in which *n* is the number of observations. A value of r_s near 1 indicates good agreement; a value near 0, poor agreement (Lewis (2003)).

$$r_{s} = 1 - 6 \frac{d_{1}^{2} + d_{2}^{2} + \dots + d_{n}^{2}}{n(n^{2} - 1)}$$
(1)

If the measure of association involves at least one categorical variable, coefficient of contingency could be used. This is the most widely used measure of association for contingency tables with different numbers of rows and columns (NCHRP (2002)). Let O_{ij} be the number of observations and E_{ij} be the expected frequencies associated with row *i* and column *j* simultaneously (a cell) then the chi squared value can be calculated as follow:

The problem with using the Chi-squared Test for Independence is the lack of a common scale. Since their probabilities vary depending on their degrees of freedom, Chi-squared values cannot be directly compared. In contrast coefficient of contingency does not depend on the degrees of freedom (NCHRP (2002)). If N denotes the total number of observations from all samples, the coefficient of contingency can then be calculated as follows (Press et al (2002)):

$$C = \sqrt{\frac{\chi^2}{\chi^2 + N}} \tag{3}$$

If C is close to 1.0, this indicates a strong dependency between the two variables; when it is close to 0.0, the numbers across each row (first variable) are in the same proportions to each other as the column totals (second variable), thus indicating independence.

5. DATA ANALYSIS

5.1 Descriptive Analysis

70% of the respondents are male. In terms of the general population, the sample might be bias. However it might represent the driving population of Jakarta. The age of respondents were between 22 and 55, but 62% of them were between 31 and 40 years old (Figure 1). Therefore 66% of them had only just lived at their existing residences for 10 years or less. Numbers of dependants were between 0 and 5 and most of them (60%) were 2 (Figure 2). Therefore the fact that 56% of the owned cars were minibus/MPV (multi purpose vehicle)/SUV (sport utility vehicle) with at least seven seats (Figure 3) should be understood as to also accommodate non-dependants which in Indonesian context were quite common to be a member of a household. 82% of the respondents have got university education (Figure 4). This might reflect the population of Jakarta's car user. 70% of their residences were owned by the respondents and 54% of owned cars were produced in 2000 or newer. This is guite sensible, considering that 92% of the respondents monthly expenses were more than 3 million rupiah (Figure 5), i.e. approximately US\$ 335 (at 2004 exchange rate) which is more than 4 times Jakarta's minimum wage. The relatively high level of monthly expenses might reflect the proportion of businessmen/women (22%) and private company employees (48%) on the sample (Figure 6) although most of the respondents (65%) were working in a relatively small companies/institutions with 10-50 employees. Considering their ages, most of them (70%) had a length of employment less than 10 years. 60% of the respondents felt that they had been paid well. 80% of the respondents were mostly working indoor.



Figure 1. Distribution of Age Groups



Figure 2. Distribution of Number of Dependants



Figure 3. Distribution of Car Type





Figure 4. Distribution of Education Attainment







Figure 6. Distribution of Job

None of the respondents was disabled and drug users. All of them considered themselves healthy in general. Only 8% of them needed to stay at hospital for medical treatment this year. 42% of the respondents were smokers. 56% of the smokers, smoke less than a pack of cigarettes daily and the rest of them some smoke 1-2 packs daily.

70% of cars have got automatic safety belt and the rest of the cars have got manual safety belts. Only 4% of the cars were installed with children car seats, although most of the respondents came from young family with small children. 52% of the respondents needed to drive 2 to 4 hours a day (Figure 7), because 50% of the respondents should travel between 30 to 70 km a day (Figure 8). 68% of the respondents were usually driving, whilst 22% and 10% of the respondents were usually seat at the front seat and back seat respectively.



Figure 7. Distribution of Daily Trip Length (Hours)



Figure 8. Distribution of Daily Trip Length (km)

78% of the respondents always wear the safety belt, whilst 14% and 8% of the respondents often and rarely wear safety belt respectively (Figure 9). 64% and 27% of the respondents who did not wear the safety belt all the time during their trip, considered the road location and time of the day (Figure 10). This indicates that these people will only wear safety belt if enforcement might be carried out. Only in 18% of the cars, an alarm will be triggered if the driver does not wear the safety belt. 60% of the drivers of these cars stated that this alarm affect their use of safety belt.









Reason for Non-Regular Seat Belt Use

Figure 10. Distribution of Reason for Non-Regular Seat Belt Use

All of the respondents stated that they have heard about the safety belt law. 40% of them receive the information from their family, 36% from their friends, 18% from the radio and 6% from the television. Only 2% of the respondents felt that the law is a burden, whilst 68% of the respondents felt that the law did not affect their conveniences and 30% of the respondents did not mind at all to wear the safety belt. 54% of the respondents felt that the firmness of the enforcement was low. 90% of the respondents believed that the use of safety belt might reduce the severity of an accident. 88% of the respondents felt that no new law need to be introduced to increase the level of safety belt use. 94% of the respondents felt that the enforcement of primary law is the most effective way to increase safety belt use level.

5.2 Relationship Analysis

Only statistically significant relationships (at $\alpha \le 0.05$) will be reported in this paper. From Spearman correlation analysis, only very few statistically significant relationships were found. Some of them were internally between variables within the first group (e.g. between age and length employment, between monthly expenditures and production year of owned car, etc),

which are not important to be reported in this paper. The only important relationship found was the older the age of the respondent the more their acceptance to the law ($r_s = 0.282$, $\alpha = 0.047$). Another statistically significant finding was rather spurious, i.e. between car production year and perceived usefulness of safety belt use. From Contingency Coefficient Analysis, also only very few statistically significant relationships were found. For this kind of analysis, one should analyse the cross tabulation between each pair of variables, to interpret the meaning of the relationship. Unfortunately, no meaningful relationships were found. It seems that this is due to the homogeneity of the respondents characteristics (please refer to section 5.1.). Per group analysis (e.g. by age, gender, etc) has been conducted for both Spearman and Contingency Coefficient Analysis. However the result was still about the same with the pooled sample analysis.

6. CONCLUDING REMARKS

The safety belt use rate at Jakarta is about 78%. This is only based on the percentage of car user in the sample who always wear safety belt. However, it seems that this only reflect well-educated and relatively wealthy society of the car drivers and passengers. The use of list of Jakarta's fixed phone customer in sampling stage, might explain this. In the last 5 years, there was almost do development of new fixed phone networks. TELKOM, the only fixed phone provider in Indonesia, busy with providing CDMA based mobile phone which is affordable for relatively low income people. Therefore for further research, wider range of respondents should be included, e.g. public transport driver (taxi, paratransit and bus drivers), company driver, etc. Nevertheless, the result from this study might still be valid for describing the seat belt use rate of private car owner. This is considering that per capita GRDP (Gross Regional Domestic Product) of Jakarta in 2004 was about 7 million rupiah or US\$ 782 (at 2004 exchange rate), whilst only 40% of the respondents monthly expenses were more than 5 million rupiah (Figure 5) or more than US\$ 558 (at 2004 exchange rate). This means that the sample consists of respondents from both below and above per capita GRDP and might be representative enough for describing the population of private car owner in Jakarta.

The success rate of phone interview was low. Therefore for each page of phonebook that was selected, an alternative list of respondents were prepared. The first alternative was the one in the most upper left of the page, the second, the third, the fourth and the fifth alternative were the one in the most lower left of the page, the one in the centre of the page, the one in the most upper right of the page and the one in the most lower right of the page respectively. Only 16% respondents were from the first alternative. Respondents from second, third, fourth and fifth alternatives were 52%, 14%, 12% and 6% respectively. However with proper introduction of the objective of the survey, proper choice of interview time and polite interview manner, the respondents were willing to answer most of the questions. There are off course some alternatives of survey methods, e.g. internet survey, workplace interview, home interview, etc. For Indonesian case internet survey might not be appropriate for the purpose of the study, since internet user rate is still very low and therefore might end up with bias (might only represent very well educated/wealthy groups of the population). Workplace and home interview might disturb the respondents and therefore undesirable.

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