Predictors of Driving Practices among Older Drivers: Two Ethnic Groups Comparison in Peninsular Malaysia

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Abstract

Background: *The speed of aging has led to a considerable attention on traffic safety among older drivers.*

Objective: *This study aims to determine the driving practices and identify predictor variables that significantly contribute to safe driving practices among older drivers in different ethnic groups at Peninsular Malaysia.*

Method: *The cross-sectional design and face-to-face interview protocol was used to collect 400 respondents aged 50 years and over. Findings: Generally, older Malaysian drivers are practicing safe driving practices (M = 34.79, SD = 3.48). Results of multiple linear regression analysis indicated that 22.8% variance of driving practices was explained by six variables that also significant at correlation level (F = 9.508, p ≤ 0.05). This study also found that different ethnicity group having different determinants of safe driving practices.*

Conclusion: *The provided information about the determinants of safe driving practices and ethnic differences among older drivers can contributes knowledge in gerontology field. The collected information is also important to provide insights for road planning system and training programs to improve road safety among older drivers.*

Keywords: Older drivers, driving practices, Malaysia

1. Introduction: The Ageing Population

Population ageing is becoming global issues as it expands from developed countries to developing countries. In the mean time population ageing has raise up concern of authorities and public from various area and perspectives in endeavor to maintain and improve the quality of old age. Demographer around the world stated that most of the countries are experiencing three factors effect of lower in fertility and mortality rates, also higher life expectancy have led to the increasing number of older persons. The effects of increasing migration rate only impact some of the countries together with the combination of the three effects. Similarly, population ageing is also experiencing by Malaysia due to the declining of fertility and mortality rates (Pala, 1998). Malaysia has two million older persons age 60 years and above that is equivalent to seven percent from its total population in year 2007.

It was projected that the number of older persons will double up to 14 percent in year 2018 (Rohani, 2008). Soon, Malaysia will be qualified as an aged country when the percentage of older persons achieves 15% in total population (DOSM, 2006). Thus, focus on older persons should be enhanced from different perspectives on all aspects by authorities to empower their old age. Malaysia is a multicultural country and consist three major ethnic groups that are Malay, Chinese and Indian. A closer look in ethnic differences based on Malaysia census year 2000, Chinese were among the highest proportion of older persons which recorded 8.8% compared to Malay (5.7%) and Indian (5.7%). The contributing factors included high life expectancy, low mortality rates and low fertility rates, however, different ethnic group were facing different changing rate. In year 2000, fertility rate of Malay, Indian and Chinese were 25.6, 21.4 and 20.3 respectively (Pala, 2005).

Thus, there is a need to know the aging phenomenon especially based on ethnic to improve their later life in old age. One of the advantages is the authorities have information that could brought to better resource management or fund allocation.The increasing number of older drivers was leading by the increasing number of older persons (Fridulv Sagberg, 1999). For instance, the percentage of license holder in total population also increases. However, with the increasing age, older persons were facing slope down changes in biological abilities that could impair daily activities such as driving. Literature showed that crash rate per million mileage based on age group is "U-shaped". Where, younger drivers and older drivers recorded higher crash rate per mileage basis (Fridulv Sagberg, 1999; Cerrelli, 1998; Holland, 2002; Meuleners, Harding, Lee, & Legge, 2006). In terms of accident risks analysis, older drivers do not have higher risk of accident compared to younger drivers, but older drivers have higher probability of fatality and hospitalizations when they involved in accidents. This is because of older drivers were accompanied by the age-related deficiencies which made them being more fragile compared to younger drivers (Hakamies-Blomqvist, Sir□ n, & Davidse,2004). Finison & Dubrow (2002) also found that older female drivers were 1.6 times more likely to be hospitalized or die during crashes compared to older male drivers.

In Malaysia, there are limited road safety studies related older persons especially on older drivers. Until now, there only behavioral studies have been conducted to understand older Malaysian drivers. Sharifah Norazizan, Tengku Aizan & Chan (2007) found that driving confidence was associated with driving competence and gender. Studies on driving practices among older drivers was conducted in order to improve safe driving (Yeoh, Sharifah Norazizan and Chan, 2009). The study found that safe driving practices were explained by factors included older in age, good psychomotor ability, high driving knowledge, high driving confidence, good driving attitude and no accident involvement in the past two years. Looking at environmental effects on driving, Sharifah Norazizan and Yeoh (2009) indicated that there was a positive association between driving confidence and environment effect among older drivers. It remains, the gap between driving practices among different ethnic group.

Previous studies indicated driving were among the most preferred travel modes among older persons (Coughlin, 2001). Through driving, older persons became more mobile, independent and gain self autonomy (Ragland, Satariano & MacLeod, 2004) that eventually contribute to their quality-of-life (Metz, 2000). Therefore, it is important to know the determinants of safe driving practices as this seemingly is the core to improve driving safety among older drivers. There is a need to identify safe driving determinants among Older Malaysian drivers and most importantly to explore the relationships the influencing factors toward driving practices. In addition, older persons in Malaysia are not a homogenous group (United Nations Fund, 2006). To date, there is no study on driving practices among different ethnic groups. Thus, there is the need to identify safe driving practices among different ethnic group in Malaysia.

2. Literature Review

Driving is of the importance and most preferable transportation mode among older persons in maintaining independence, to gaining sense of mobility and for social purposes (Coughlin, 2001; Ragland, Satariano, & MacLeod, 2004). Recently, many studies attempted to explore to relationship and influences of biological abilities deficits among older persons towards daily activities performance such as driving. These age-related abilities associated with safe driving and crash risk can then be categorized into three groups, namely cognitive, sensory and physical factors as well as a few medical conditions (Anstey, Wood, Lord, & Walker, 2005). Previous studies found that deficits in vision, cognitive, perceptual, and physical abilities are associated with an increased accident risk (Brayne et al., 2000; Owsley, 2002; Owsley, 1998). In accident risks analysis, older drivers have 1.7 times higher fatality risk when involved in an accident compared to middle-age drivers (Finison & Dubrow, 2002).

While the older female drivers were 1.6 times more likely to be hospitalized or die during crashes compared to older male drivers (Finison & Dubrow, 2002; Williams & Shabanova, 2003). In fact, older drivers do not have higher risk of accident compared to younger drivers, but older drivers have higher probability of fatality and hospitalizations when they are involved in accidents (Hakamies-Blomqvist et al., 2004). This is because of older drivers were accompanied by age-related deficiencies which made them more fragile compared to younger drivers (Chu, 1995; Hakamies-Blomqvist et al., 2004). Previous studies found that older drivers adjusted their driving practice that was the older drivers make short travel and fewer trips and had increased crash risk per mile driven (Chu, 1995). Hence, older drivers have less accumulated annual driving distances. Thus, older drivers are at higher risk of crash per mile driven and casualty rate per mile driven compared to those with greater annual driving distances (Williams & Carsten, 1989). Therefore, annual crash risk is negatively associated with annual driving distance (Janke, 1991; Langford, Methorst, & Hakamies-Blomqvist, 2006; Williams & Carsten, 1989).

However, analysis of accident risk per mile driven which also called "low mileage bias" will increase the accident risk of older drivers if compared to drivers with higher driving distance in other age groups (Hakamies-Blomqvist, Raitanen, & O'Neill, 2002).Previous study also have found that driving knowledge and driving attitude was positively contributes to safe driving practices among older drivers (Yeoh, Sharifah Norazizan & Chan, 2009). Further, those older drivers were practicing safe driving practices were less likely to involve an accident in the past two years. Thus, a positive change in driving attitude would lead to an improvement in safe driving towards accident reduction. However, there is no further analysis in the study on the influence of ethnicity on driving practices. Another study was conducted among University students and found that there is a significant difference between ethnic and driving attitude (Bergdahl, 2007). Stalvey & Owsley (2000) found that most of the older drivers were disagreed that every individual had the right to drive and the individual should concern on accident prevention upon driving. Individual with different level of driving confidence and older drivers with biological deficits tends to adjust their driving practices. Parallel parking and driving at night especially in the rain are the most common difficult driving situations and older drivers chose to avoid (Baldock, Mathias, McLean, & Berndt, 2006).

On the other hand, handling parallel parking and drive at night in the rain were perceived as not confident by older drivers (Baldock et al., 2006). A study was conducted by Sharifah Norazizan, Chan, & Yeoh (2009) showed that making right hand turns at intersections without traffic light, merging into traffic and followed by driving during the night were among the not confident driving situation by older drivers. Safe drivers were likely to be older female drivers who are more confident in driving and they reported to be in excellent or very good health (Oxley et al., 2005). Further, Oxley et al. (2005) also found that older female drivers with lower level of confidence were related to higher risk of accident involvement and have difficulty in all driving situations. On the other hand, Stalvey & Owsley (2000) found that older drivers that avoid those driving situations included left hand turns, at interstates, in the rain and high traffic that they not confident would lower the chance of accident involvement. Since, there is limited studies in investigating the influences of ethnicity toward safe driving among older drivers, thus, it is the time to study the relationship between ethnicity with driving practices among older drivers. Further, the differences between ethnicity and driving knowledge, driving attitude and driving confidence is important to explore in order to contribute to safety research and gerontology knowledge.

3. Methods

Data was obtained from a study carried out by Institute of Gerontology, Universiti Putra Malaysia (UPM) in year 2007 to 2008. The project is entitled "Perception of Needs and Barriers of Older Road Users in Malaysia: Investigating and Assessing the Risk Factors, Mobility and Behavioral Patterns" that is funded by Fundamental Research Grant, UPM.

3.1 Sampling

Cross-sectional design was employed in this study to collect 400 respondents aged 50 and over. Quota sampling stratified the respondents equally by gender and age group (50 to 59 years; 60 and over). A screening process is required to recruit the respondents. The criteria to qualify as respondents includes Malaysia citizen, driving license holder for private travelling purposes, no disabilities of any body parts and still practicing driving at the minimum frequency of once a week. Two states with the highest absolute numbers of older persons aged 60 years and over, Perak and Selangor were chosen. For each state, one district was chosen. The selected district has the highest absolute number of older persons aged 50 years and over. Within each district, fifteen Enumeration Blocks (EBs) were identified; these Enumeration Blocks have the highest absolute number of older persons aged 50 years and over.

3.2 Data Collection

A group of trained enumerators were assigned to collect data using questionnaire entitled Traffic Survey via face-to-face protocol. Traffic Survey questionnaire is covering socio demographic variables, driving history, driving knowledge, driving attitude, driving practices, driving confidence and psychomotor ability. Driving situations figures were laminated in A4 size paper to assist the enumerators to collect response of the driving confidence level. Instruments below were used to gather data for this study.

3.2.1 Driving practices

Driving practices, the dependent variable of this study was adapted fifteen items from "A guide for older drivers" by Roads and Traffic Authority (2006). Driving practices was measured by three-point ordinal scale that vary from never, sometimes to always with scoring of one to three points respectively. Negative items include items 3, 4, 5, 7, 8, 9, 13, 14 and 15 were recode reversely before the summation of driving practices score.

The driving practices score is vary from 15 to 45 points. The higher the driving practices score indicates the older drivers are practicing the more safe driving practices.

3.2.2 Driving Knowledge

Driving knowledge was measured by ten dichotomous items that adapted from the written test of Road Transport Department, Malaysia. The written test is compulsory when the individual obtaining his/her driving license. One point is given for the item which is answered correctly by the respondents and no points is given to those unable to provide the correct answer. The driving knowledge score was obtained by total up all the ten items. The lowest possible driving knowledge score is zero, while the highest is ten points. The higher score reflects the individual equip with better driving knowledge.

3.2.3 Driver Attitude

Driving attitude was measured by eight items with four-point ordinal scales (Stalvey & Owsley, 2000).The responses include strongly disagree, disagree, agree and strongly agree, were then transformed into one to four points respectively. Prior to tabulate the driving attitude score, negative items include item 3, 4, 6, 7 and 8 were recode. Driving attitude score is ranging from eight points to 32 points. The higher the score revealed the more positive attitude towards driving of the individual.

3.2.4 Driving Confidence

In this study, driving confidence was measured by seven selected driving situations using three-point ordinal scale to collect responses from respondents (Oxley et al., 2005). The driving situations include driving (1) in the rain, (2) at night, (3) busy traffic, (4) through roundabout, (5) changing lanes, (6) merging into traffic and, (7) making right-turns at intersections without traffic lights. The responses include not confident, somewhat confident and very confident in driving with scoring of one point to three points respectively. The highest possible score is 21 points and the lowest is seven. Similarly, the higher driving confidence score indicates the higher confidence level in driving among older drivers.

3.2.5 Psychomotor Ability

Psychomotor ability was assessed by two items with four-point ordinal scale that vary from strongly disagree (one point) to strongly agree (four points). These two items are able to know whether respondents can perform eye-hand coordination or neck rotation to response to different stimuli. The psychomotor ability score is ranging from two to eight points. The greater psychomotor ability score indicates the better psychomotor ability.

3.2.6 Data Analysis

The collected data were analyzed with using "Statistical Package for Social Science" program (SPSS) version 13.0.

4. Results

Characteristics of the respondents have shown in Table 1. The sample is equally distributed in gender that is 50% of the female drivers and 50% of male drivers. Similarly, there are 50% of respondents fell in age group of 50 to 59 years, and 50% of the respondents are aged 60 years and over. Mean age of the respondent is 59.56 years old (SD = 6.68). Older Chinese drivers (M = 61.08, SD = 6.70) have higher mean age than older Malay drivers (M = 57.97, SD = 6.186). Since, this study employed quota sampling that stratified with gender and age group. Looking at the ethnicity, about 46% of the respondents are Malay as well as Chinese. More than half of the respondents (54%) are currently working. Generally, the respondents reported that they have good health (53.3%) regardless of ethnicity. The respondents also reported that they have high psychomotor ability (M = 7.30, SD =1.07). For ethnic differences, older Malay drivers were among the group with the highest psychomotor ability. In terms of weekly driven distance, the respondents usually drive less than 50 kilometers (56.8%).

4.1 Driving Practices

Table 2 shows the result of driving practices among the older drivers. Generally, the older drivers are practicing safe driving practices. Majority of the older drivers (91.0%) are practicing to wear seat belt when driving. About 89% of the older drivers do give signal and checking cars behind and beside during they changing lanes. Those are some of the practices that prevent accident and injury. Less than half of the older drivers (44.5%) always stay up to date to road rules. There are more than half of the older drivers did not on any medication (60.3%), however, only 41.5% of the older drivers were check the effects of medicine with their doctor or pharmacist.Driving task is increasingly hard to perform when the individual grows older. Only 11.0% of the respondents did not slower down in front of dangerous situations. This reflects that these older drivers are fit to driver in terms of sensing, deciding and acting.

More than half of the older drivers reported themselves sometimes or always feel trouble at intersections (70.5%) and busy traffic (68.5%).In terms of driving and emotion, majority of the respondents did not feel sleepy in day time (60.5%) and concentrated during perform driving (74.3%). In general, the respondents usually are patient with the traffic situations (91.1%). Majority of the respondents were compliant to traffic rules and never fine by police officers (83.5%), a good driving practice in accident prevention. Fatality was cited the most in accident among older drivers. In this sample, majority of the older drivers never involved in accident in the past two years (86.5%). The mean score of driving practices among the older driver is 34.79 points (SD = 3.48). This result revealed that, in general the older drivers are considerable safe driving. The ANOVA test (One-way between-groups analysis of variance) was performed to investigate the driving practices mean score differences within three different ethnicity group. The ANOVA test found that there was a significant difference in the mean driving practices score between the three ethnic group F (2, 397) = 4.06, $p \leq 0.05$. Based on Bonferroni post hoc multiple comparison tests, the pair of older Indian drivers (M = 36.29, SD = 3.22) and older Chinese drivers (M = 34.46, SD = 3.76) were found to be statistically significant.

4.2 Driving Knowledge

When one grows older, the individual tends to face memory loss due to biological changes. Generally, the older drivers remember the meaning of the traffic signanges that enumerators shown them (refer to Table 3). Majority of the older drivers (97.5%) know that good tire balance will help vehicle move smoothly. This followed by the items of "you need to give signal when you want to change lane' (97.3%). This study found that the older drivers obtained high driving knowledge mean score which is 8.49 (SD = 1.32) points out of 10 points. More than half of the older drivers (56.5%) answered eight items correctly. However, ANOVA test found that there was no significant difference in the mean driving knowledge score between the three ethnic group F (2, 397) = 0.51, $p \geq$ 0.05. The driving knowledge score obtained by older Indian and others drivers (M = 8.71, SD = 1.22) is higher than older Malay drivers (M = 8.49, SD = 1.30) and older Chinese drivers (M = 8.46, SD = 1.35).

4.3 Driving Attitude

Table 4 summarizes the results of driving attitudes items that agree and strongly agree by the respondents. Majority of the older drivers agrees that vehicle is best qualified to judge their physical fitness in performing driving (92.8%) and every individual has right to drive (93.5%). However, the older drivers not usually plan their route before driving (23%). Generally, the older drivers have positive driving attitude. The mean driving attitude score of the older drivers is 21.10 (SD = 2.59). There is a positive association between driving attitude and driving practices (r = 0.25; $p \leq 0.05$) among the older drivers. This reflects that the higher driving attitude score, the individual is practicing more safe practices in driving. However, ANOVA test found that there was no significant difference in the mean driving attitude score between the three ethnic group F (2, 397) = 0.50, $p \geq 0.05$. The driving attitude score obtained by older Indian and others drivers (M = 22.50, SD = 2.88) is higher than older Malay drivers (M = 22.10, SD = 2.43) and older Chinese drivers (M = 22.02, SD = 2.69). Further analysis shows that, there is a significant differences in driving attitude mean score among drivers with and without accident involvement in past two years [t (2, 397) = 2.279, $p \leq 0.05$]. The mean driving attitude score of driver without history of accident involvement (M = 22.21, SD = 2.617) is higher than those drivers that had accident involvement (M = 21.35 SD = 2.292). This indicates that driver without accident involvement were practicing more positive attitude compared to those involved accident in the past two years. In light of driving attitude result, the low accident involvement is being explained.

4.4 Driving Confidence

Table 5 shows the results of driving confidence in the selected driving situations among the older drivers. Majority of the older drivers reported that they very confident when driving through roundabout (74.3%), changing lanes (63.0%) and followed by driving in busy traffic (54.0%). However, the older drivers are not confident in making right-hand turns at intersection without traffic lights (20.8%), driving at night (18.8%) and driving in the rain (13.5%). The mean driving confidence score of the older drivers is 16.70 points (SD = 3.49). In general, the older drivers are confident in selected driving situations. There are 54.8% of the respondents scored higher than the mean driving confidence score. Relating confidence with ethnicity, one-way ANOVA has proven that there is a significant difference between driving confidence and ethnicity [F (2, 397) = 4.39, $p \leq 0.05$]. Based on Bonferroni post hoc multiple comparison tests, the pair of older Malays drivers (M = 16.15, SD = 3.47) and older Chinese drivers (M = 17.11, SD = 3.36) were found to be statistically significant.

4.5 Determinants of Driving Practices among Older Malaysian Drivers

The analysis of Multiple Liner Regression using enter method was used to identify the determinants for safe driving practices.

A total of twelve selected variables were included in analysis namely: Age, gender, marital status, educational attainment, self-rated health status, working status, psychomotor ability, weekly driven distances, accident involvement in the past two years, driving knowledge, driving attitude and driving confident. The significant model emerged [F (12, 387) = 9.508, $p \leq 0.05$]. A total of 22.8% of variance in driving practices is explained by the six variables. Table 6 summarizes the results of enter method multiple linear regression Analysis. Among the six significant predictors, psychomotor (β = 0.25) was found to contribute more significantly towards one's driving practices, followed by driving attitude (β = 0.20), age (β = 0.18) and accident involvement in past two years (β = 0.16), driving confident (β = 0.15) and driving knowledge (β = 0.13). The obtained standardized beta coefficient value indicates that one standard deviation increase in psychomotor score brings about 0.25 standard deviation increase in safe driving practices (dependent variable). It reflects that those drivers have good psychomotor ability, positive attitude, older, no accident involvement, high level of driving confident and driving knowledge were practicing safe driving.

4.6 Determinants of Driving Practices among Older Malay Drivers

Similarly, the regression analysis was used to identify the determinants of driving practices among older Chinese drivers (n=183). The significant model emerged [F (12, 170) = 6.457, $p \leq 0.05$]. Table 7 summarizes the results of enter method multiple linear regression Analyses. A total of 31.3% of variance in driving practices is explained by the seven variables namely: Age, self-rated health status, self-rated psychomotor ability, weekly driving mileage, history of accident involvement in past two years, driving attitude and driving confident. Among the seven significant predictors, psychomotor ability was found to contribute more significantly towards older Malay's driving practices were age (β = 0.32), followed by driving attitude (β = 0.30) and self-rated psychomotor ability (β = 0.27). The obtained standardized beta coefficient value indicates that one standard deviation increase in psychomotor score brings about 0.32 standard deviation increase in driving practices. Thus, older Malay drivers' safe driving practices were influence by age, better self-rated health status, high level of self-rated psychomotor ability, higher weekly accumulated mileage and good driving attitude.

4.7 Determinants of Driving Practices among Older Chinese Drivers

In order to identify the determinants of driving practices among older Chinese drivers (n= 183), the twelve selected variables were used to run the analysis of multiple liner regression using enter method. The significant model emerged [F (12, 170) = 4.590, $p \leq 0.05$]. Table 8 summarizes the results of enter method multiple linear regression Analyses. A total of 24.5% of variance in driving practices is explained by the two significant variables. That are self-rated psychomotor ability (β = 0.27) and driving attitude (β = 0.21) that determining safe driving practices among older Chinese drivers. The obtained standardized beta coefficient value indicates that one standard deviation increase in psychomotor score brings about 0.27 standard deviation increase in safe driving practices (dependent variable). To conclude, Chinese drivers with higher level in psychomotor ability and good driving attitude were practicing safe driving.

5. Discussions and Conclusions

This study found that there were statistically different in predictors of safe driving practices across ethnicity group. Due to people in different ethnic group were practicing different lifestyle, life experience and socioeconomic status. However, there are two variables included self-rated psychomotor ability and driving attitude appear to be the constant predictors of driving practices across Older Malay and Older Chinese drivers and overall. The gathered information would help the authorities in terms of training programmes design to tackle the needs and level of older drivers across different ethnic group. In fact, the authorities need to advocate driving knowledge class for older Malaysian driver that leads to driving attitude change and understand the role of psychomotor in safe driving which eventually secure safe driving. Furthermore, knowing and understanding the strength and weakness of older drivers could help the authorities to tackle the appropriate strategy in promoting and maintaining safe driving practices among older Malaysian drivers.

Acknowledgement

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Table 1: Demographic characteristics of the older Malaysian drivers

Characteristics		Malay		Chinese		Indian & Others		Total	
		N	%	N	%	N	%	N	%
Gender	Female	96	52.5	93	50.8	11	32.4	200	100
	Male	87	47.5	90	49.2	23	67.6	200	100
Marital status	Never Married	2	1.1	12	6.6	2	5.9	16	4.0
	Married	158	86.3	147	80.3	31	91.2	336	84.0
	Divorce/Separated	8	4.4	6	3.3	0	0	14	3.5
	Widowed	15	8.2	18	9.8	1	2.9	34	8.5
Educational	No schooling	2	1.1	9	4.9	0	0	11	2.8
	Primary	45	24.6	27	14.8	5	14.7	77	19.3
	Secondary	101	55.2	114	62.3	20	58.8	235	58.8
	Tertiary	35	19.1	33	18.0	9	26.5	77	19.3
Self-rated health	Very Good	75	41.0	55	30.1	14	41.2	144	36.0
	Good	89	48.6	107	58.5	17	50.0	213	53.3
	Poor	18	9.8	21	11.5	3	8.8	42	10.5
	Very Poor	1	0.5	0	0	0	0	1	0.3
Working status	Non working	91	49.7	107	58.5	19	55.9	183	45.8
	Working	92	50.3	76	41.5	15	44.1	217	54.3
Weekly driven distances	< 50 km	113	61.8	94	51.4	20	58.8	227	56.8
	51-100 km	44	24.0	42	22.9	8	23.5	94	23.5
	100-150 km	6	3.3	15	8.2	1	2.9	22	5.5
	> 150 km	20	10.9	32	17.5	5	14.7	57	14.3
History of accident involvement in past two years	0	161	88.0	159	86.9	26	76.5	346	86.5
	1 or 2	21	11.5	24	13.1	6	17.6	51	12.8
	≥ 3	1	0.5	0	0	2	5.9	3	0.8
Total		183	45.8	183	45.8	34	8.6	400	100

Table 2: Driving Practices of the older drivers

No.	Driving Practices	Never		Sometimes		Always	
		n	%	n	%	n	%
1	Do you signal and check for cars behind and beside you when you change lanes?	3	0.8	42	10.5	355	88.8
2	Do you stay up to date on changes to the road rules?	74	18.5	148	37.0	178	44.5
3	Do intersections bother you because there is so much to watch from all directions? *	118	29.5	194	48.5	88	22.0
4	Do you find it difficult to decide when to join traffic on a busy road? *	126	31.5	182	45.5	92	23.0
5	Are you slower than you used to be in reacting to dangerous driving situations? *	44	11.0	155	38.8	201	50.3
6	Do you wear a seat belt?	4	1.0	32	8.0	364	91.0
7	Do traffic situations make you angry or impatient? *	179	44.8	185	46.3	36	9.0
8	Do your thoughts wander when you are driving? *	297	74.3	97	24.3	6	1.5
9	Do you find that you are sleepy at times during the day? *	242	60.5	147	36.8	11	2.8
10	Do you get regular eye checks to keep your vision at its sharpest?	147	36.8	119	29.8	134	33.5

11	Do you check with your doctor or pharmacists about the effects of your medications on driving ability?	39	24.5	54	34.0	66	41.5
12	Do you stay up to date with current information on health practices and habits?	83	20.8	141	35.3	176	44.0
13	Are your children, other family members or friends concerned about your driving ability? *	278	69.5	76	19.0	46	11.5
	Frequency	**0**		**1 or 2**		**≥ 3**	
14	How many traffic tickets, warnings, or "discussions" with police officers have you had in the past two years? *	334	83.5	61	15.3	5	1.3
15	How many accidents have you had during the past two years? *	346	86.5	51	12.8	3	0.8

Cronbach's Alpha = 0. 55; Var = 13.65; *SD* = 3.70; Number of items = 15

* Negative statement

Table 3: Driving Knowledge Items Answered Correctly by the respondents

Statements		Total	
		n	**%**
	Entrance is prohibited	237	59.3
	One way street	322	80.5
	Slippery road	343	85.8
	Parking area	354	88.5
You are allowed to overtake vehicle at double line		373	93.3
Driver need to use low gear when going down a hill		362	90.5
Emergency signal is used when driving in high speed		323	80.8
Good tire balance will help vehicle move smoothly		390	97.5
You need to give signal when you want to change lane		304	76.0
When smoke emitted in the front part of your car and temperature indicator is on, turn off the engine and add water immediately		389	97.3

Cronbach's Alpha = 0.36; Var = 1.73; *SD* = 1.32; Number of items = 10

Table 4: Driving Attitudes among older drivers: results that respondents answered agree and strongly agree

No.	Statements	Total	
		n	**%**
1	The drivers of automobiles are best qualified to judge their own physical fitness to drive cars	371	92.8
2	No person should be denied the right to drive an automobile	374	93.5
3	Drivers who take chances eventually become the expert drivers *	122	30.5
4	The occurrence of accidents is a matter of chance and should be regarded as unavoidable *	154	38.5
5	Possession of a driver's license is evidence of the ability of the individual to drive safely	227	56.8
6	The sturdy construction of automobiles assures my safety at any speed *	204	51.0
7	I should not have to plan when and where I drive *	92	23.0
8	It does not matter when or where you drive, your chances of having an accident are the same *	293	73.3

Cronbach's Alpha = 0. 53; Var = 6.71; *SD*= 2.59; Number of items = 8

* Negative statement

Table 5: Driving Confidence among older drivers

Driving situations	Not Confident		Somewhat Confident		Very Confident	
	n	%	n	%	n	%
Driving in the rain	54	13.5	173	43.3	173	43.3
Driving at night	75	18.8	165	41.3	160	40.0
Driving in busy traffic	40	10.0	144	36.0	216	54.0
Driving through roundabouts	9	2.3	94	23.5	297	74.3
Changing lanes while driving	16	4.0	132	33.0	252	63.0
Merging into traffic	75	18.8	157	39.3	168	42.0
Making right-hand turns at intersection without traffic lights	83	20.8	152	38.0	165	41.3

Cronbach's Alpha = 0. 86; Var= 12.20; *SD* = 3.49; Number of items = 7

Table 6: Summary of Multiple Linear Regression Analyses for Driving Practices

Variables	Unstandardized Coefficients		Beta (Standardized Coefficient)	T
	B	SE (Standard Error)		
(Constant)	11.40	2.83		4.04**
Gender	0.31	0.34	0.05	0.92
Age	0.10	0.03	0.18	3.76**
Marital status	0.37	0.45	0.04	0.84
Educational Attainment	0.76	0.96	0.03	0.76
Self-rated Health Status	-0.52	0.53	-0.05	-0.99
Employment status	0.03	0.34	0.00	0.08
Self-rated Psychomotor Ability	0.81	0.16	0.25	5.09**
Weekly Driving mileage	0.22	0.40	0.03	0.56
History of Accident Involvement	-1.58	0.47	-0.16	-3.40**
Driving Knowledge	0.35	0.12	0.13	2.89**
Driving Attitude	0.26	0.06	0.20	4.23**
Driving Confidence	0.15	0.05	0.18	2.91**

$F_{(12, 387)}$= 9.51, $p \leq 0.05$, R = 0.48, R square = 0.23, Adjusted R square = 0.24

 * Correlation is significant at the 0.05 level of significance
** Correlation is significant at the 0.01 level of significance

Table 7: Summary of Multiple Linear Regression Analyses for Driving Practices: Malay

Variables	Unstandardized Coefficients		Beta (Standardized Coefficient)	T
	B	SE (Standard Error)		
(Constant)	3.81	4.90		0.78
Gender	0.40	0.49	0.06	0.82
Age	0.16	0.04	0.32	4.29**
Marital status	0.10	0.66	0.01	0.16
Educational Attainment	3.63	2.12	0.12	1.71
Self-rated Health Status	-1.80	0.75	-0.17	-2.40*
Employment status	-0.70	0.45	-0.11	-1.57
Self-rated Psychomotor Ability	0.82	0.21	0.27	3.85**
Weekly Driving mileage	1.98	0.62	0.23	3.21**
History of Accident Involvement	-1.73	0.64	-0.18	-2.69**
Driving Knowledge	0.24	0.16	0.10	1.46
Driving Attitude	0.39	0.10	0.30	4.06**
Driving Confidence	0.17	0.07	0.19	2.52*

$F_{(12, 170)} = 6.46$, $p \leq 0.05$, R = 0.56, R square = 0.31, Adjusted R square = 0.27

* Correlation is significant at the 0.05 level of significance
** Correlation is significant at the 0.01 level of significance

Table 8: Summary of Multiple Linear Regression Analyses for Driving Practices: Chinese

Variables	Unstandardized Coefficients		Beta (Standardized Coefficient)	T
	B	SE (Standard Error)		
(Constant)	11.43	4.14		2.76**
Gender	0.60	0.52	0.08	1.15
Age	0.07	0.04	0.12	1.66
Marital status	0.06	0.65	0.01	0.09
Educational Attainment	0.58	1.18	0.03	0.49
Self-rated Health Status	0.69	0.82	0.06	0.85
Employment status	0.37	0.55	0.05	0.66
Self-rated Psychomotor Ability	0.91	0.26	0.27	3.50**
Weekly Driving mileage	-0.48	0.59	-0.06	-0.82
History of Accident Involvement	-1.20	0.78	-0.11	-1.55
Driving Knowledge	0.36	0.19	0.13	1.90
Driving Attitude	0.29	0.10	0.21	3.04**
Driving Confidence	0.10	0.09	0.09	1.09

$F_{(12, 170)} = 4.59$, $p \leq 0.05$, R = 050, R square = 0.25, Adjusted R square = 0.19

* Correlation is significant at the 0.05 level of significance
** Correlation is significant at the 0.01 level of significance