The role of physical and cognitive functioning as predictors in crash involvement among older drivers: an assessment of the traffic injury to enhance sustainable prevention

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Summary

The number of older persons is growing in the major areas of the world. According to the recent Thai eleventh national economic and social development plan, there are more elderly while the proportions of the young and working age adults have decreased. Thailand will become an aging society by 2015. The literatures had been shown that older are at a higher risk of being involved in a motor vehicle accident and are more susceptible to injuries and fatalities. This study investigated the role of physical and cognitive function to identify factors associated with crash involvement in older adults. A community survey was carried out in older persons age 50 years and older of sampling villages in four provinces of Thailand. Face-to-face interview and anthropometric measurement were used to gathering data. A total of 550 completed questionnaires were used analysis. Ten percent of respondents reported had been experiences road traffic injury in last 12 months. The analysis revealed that level of cognitive function, smoking and being treated with arthritis were associated with road traffic injury incidence.

Background

The numbers of persons aged 50 years and over and 60 years and older is growing in the major areas of the world and in the vast majority of countries. By the year 2025, the global population of persons aged 50 years and over will have exceed the numbers of persons younger than 15 years. According to the Thai eleventh national economic and social development plan (2012-2016), there are more elderly while the proportions of the young and working age adults have decreased (1). Older persons will increase from 11.9 % of total population at present to 14.8 % by the end of the plan and Thailand will become an aging society by 2025. Approximately 1.24 million people die every year on the world road, and another 20-50 million sustain non-fatal injuries as a result of road traffic crashes(2). Older adults were reported as prone to traffic crashes due to driving capacity. Research has shown that older adults have high motor vehicle-related injury and fatality rate, likely in part due to increase frailty(3). Health research in less developed countries has historically been more heavily focused on younger age populations, so as global populations' age, there is an increasing need for valid and comparable data on the health and well-being of older adults especially in developing countries including Thailand.

Several studies have been reported various factor as predictors of crash involvement in older adult drivers; physical factors have been played a crucial role of injury(4-9). Cognitive status was found as predictor of crash risk(4, 10-13). Cognitive function is influenced by many factors such as genes, home environment in childhood, education

and occupation. It decline is first detectable in the fifth decade of life, with age-related declined from this point onwards(14, 15). However, little has been know on the effect of those factors on crash involvement in Thai older adults. Therefore, this will be the first study to insert the body of knowledge on the role of physical, cognitive, health and well-being to determine risk of traffic injury in a developing country. The study results could be used as input in the context of planning and preparing social protection mechanisms to meet the demands of this growing population group which need to initiate sustainable prevention.

Method

Multi-stage sampling was employed to draw the Thai elderly in selected village during October to December 2015. Ethical clearance was obtained from Committee for Research Ethics (Social Science), Mahidol University. Four sampled provinces represent four different regions were identified. The chief of the provincial health office each province was contacted to obtain the permission prior to data collection. Providers at health center in sampling area were approached to obtain a list of subjects according to the criteria. Research assistants independently recruit subjects from the household of selected village. After obtained consent, subjects who were 50 years and older living in target areas were interviewed and measure their anthropometric by trained research assistants. The questionnaire consisted of five parts; demographic characteristics, health status and well-being, chronic condition, cognitive function, and traffic injury 12 months prior to data collection. Cognitive function score was added 1 if subject's education less than 12 years. A total score is 30. The score was classified in to three level; normal cognitive $\geq$26, mild = 19-25, and moderate to severe < 18.

The risk factors for crash involvement were identified. Chi square tests were used to determine the role of physical and cognitive factors to crash involvement which will be an important element of designing preventive strategies for enabling sustain safety driving. A *P value <0.05* was considered statistically significant.

Results

A total of 580 subjects were approached with the response rate 94.8%, a completed 550 cases were used for analysis. Descriptive of respondents' and traffic injury characteristics were presented in table 1 and 2. The mean age of the respondents was 62 years (SD 7.9), range 50-89 years. Majority of them were female (62.5%) and married (69.6%). Nearly half (45.9%) are farmer, and perceived their health as moderate level. Over one-third had normal BMI, and hypertension was found to be a common non communicable disease. Over half (51.2%) were classified as moderate and severe cognitive impairment. (Table 1)

A total of 55 cases was experienced traffic injury in last 12 months, majority were the motorcyclist. Most of injury are unexpected accident, with nearly two-third were being treated in health facilities. Few cases reported could not be able to use hand(s), arm(s) or walk properly after the injury incidence. (Table 2)

Chi square tests indicated that factors associated with traffic injury in elderly were level of cognitive function, being a smoker, and had been diagnosed with arthritis (p value= 0.013, 0.010, 0.023 respectively). (Table 3)

Table 1 Descriptive of respondents' characteristics

Sex	Male	206	37.5
	Female	344	62.5
Age	50-59	225	40.9
	60-69	217	39.5
	70 +	108	19.6
	Mean 62.1 SD. 7.9 Min 50 Max 89		
Marital status	Married	383	69.6
Education	Less than 6 years	90	16.4
	Primary school	368	66.9
	Higher than primary	92	16.7
Occupation	Farmer	244	45.9
	Employee	172	32.3
	Other	67	12.6
	Do not work	49	9.2
Well being	Poor	45	8.2
	Moderate	248	45.1
	Good	257	46.7
BMI	Underweight	23	4.6
	Normal	197	39.4
	Overweight	99	19.8
	Obese	180	36.0
Disease	Hypertension	209	41.8
	Diabetes	109	21.8
	Low back pain	129	25.8
	Arthritis	108	21.6
	Cataract	49	9.8
Risk behavior	Smoking	61	12.2
	Drinking alcohol	171	34.2
Cognitive function	Moderate to severe	270	51.2
	Mild	217	41.2
	Normal	40	7.6

Table 2 Characteristics of traffic injury in last 12 months

Road user type	Rider/driver	50	90.9
	Passenger	3	5.5
	Pedestrian	2	3.6
Type of vehicle	Bicycle	10	18.2
	Motorcycle	41	74.5
	Car	4	7.3
Causation	Unintentional	50	90.9
	Cause by other	5	9.1
Being treated	Yes	35	63.6
Disability	Yes	4	7.3

Table 3 Physical and cognitive function associated with traffic injury in elderly

	Road traffic injury (%)			
	Yes	No	X^2	P value
Cognitive function				
Moderate to severe	13.5	86.5	8.754	0.013
Mild cognitive impairment	5.2	94.8		
Normal cognitive function	14.8	85.2		
Risk behavior				
Smoker	8.8	91.2	6.718	0.010
Non smoker	18.0	82.0		
Been diagnosed with arthritis				
Yes	16.7	83.3	5.169	0.023
No	8.4	91.6		

Conclusion: A community household survey was conducted to identify the role of physical and cognitive function to crash involvement in Thai older drivers. The analysis identify that older adults with high cognitive impairment, smoking and had been diagnose with arthritis were at risk of traffic injury. Our results describe specific characteristics of the injured persons which could be focused to enhance capacity to drive safety.

Future areas to take note of: It might also be used to guide the development of driving environments that can enable older adults despite change in cognitive and physical function. Further research should consider other driving conditions in different physical and cognitive function.

Means of official announcement of research results: Cognitive and physical functioning associated with the incidence of traffic injury in old drivers. Screening tests might be applied to identified risk in older during the driving test.

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