

Some Risk Factors for Hypertension of Khmer People Aged From 25 to 64 Years in Tra Vinh Province, Viet Nam

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Abstract

A cross-sectional study was conducted on 1,200 Khmer people aged 25-64 years living in Tra Vinh province to proportion of hypertension some related factors. 30 communes (clusters) were selected by probability proportional to size (PPS) method, evaluating their risk factors of coronary artery disease (CAD) in the next 10 years using Framingham scale in face-to-face interviews. Results showed that proportion of hypertension was 33.5%, inside, having 37.3% people don't know that they are getting hypertension disease. About some risk factors: 83.6% of participants had diet with less fat, 26.2% had adequate fruit and vegetable consumption, 10.6% had less-salt diet, 85.2% were non-alcohol abuse, 62.5% were non-smokers and 79.3% had moderate physical activity. About coronary artery disease: 79.7% of respondents have low risk, 16.3% with moderate risk and 4.0% with high risk of CAD in the next 10 years according to Framingham scale. The risk increases proportionally to the age and higher among men than women.

Keywords: Hypertension; Coronary artery disease; KHMER people

Introduction

Hypertension and coronary artery disease (CAD) is a common heart disease in developed countries and tends to increase sharply in developing countries. In the world, one out of three deaths is caused by heart diseases [1]. In Vietnam, the mortality rate of CAD is 45 per 100,000 populations [2]. The identified risk factors of hypertension and CAD include age, sex, and family history of the disease, blood lipid disorder, and diet with salty foods, smoking, alcohol abuse, inadequate nutrition, and insufficient physical activity. Tra Vinh is a province, where Khmer people are more populated with limited socio-economic conditions and low utilization of health services. It is necessary to determined proportion of hypertension and evaluates some risk factors and risk of CAD among Khmer people in order to recommend the effective interventions for the improvement of health in this community. The study was conducted to determined proportion of hypertension and evaluates the risk of CAD in the next 10 years among Khmer people aged 25-64 years in Tra Vinh in 2015.

Methods

Participants and duration

Participants: Khmer people aged 25-64 years who are permanent residents or temporary residents in at least 1 year, excluding pregnant women, people with foot malformation or osteopathic scoliosis.

Duration: The study was conducted from July to October 2015.

Research design

A descriptive cross-sectional study

Sample Size:

$$n = Z_{(1-\alpha/2)}^2 \times \left(\frac{p \times (1-p)}{\epsilon^2} \right) \times DE$$

n: minimum sample size

p= 0.22.

According report of WHO about the proportion of hypertension in Vietnam, 2014 [3].

α : statistical significant level at 95% level of confidence ($\alpha=0.05$).

$\epsilon=0.04$: acceptable error.

Design effect DE=2.

Minimum sample size is n=1,188 people.

In fact, we recruited 1,200 people.

Sample selection: 30 clusters by probability proportional to size method.

The cumulative population of Khmer people living in 104 communes of Tra Vinh was 187,096 people aged 25-64 years. In this study, we selected 30 clusters of 40 people in each commune. All Khmer people aged 25-64 years in each communes were listed and classified into 4 age group: 25-34, 35-44, 45-54, 55-64. We randomly selected 5 men and 5 women in each age group.

Data collection: Interview using structured questionnaire adapted from the tool of World Health Organization. Blood pressures were measured by Microlife BP 3BM1-3.

Total cholesterol, serum triglycerides, HDL-cholesterol were measured by enzymatic end point method using automatic biochemical machine AU680.

Indicators: Diet with salty foods: the consumption of salty foods of 3 days or more per week or of 5 gram or more of salt per day for each person in a household. Diet with plenty of fat: the intake of more

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than 25% lipid/day and more than 7% saturated fat or more than 300 gram/person/month or consume animal's fat, lipid in more than 4 days/week. Fruit and vegetable consumption: the intake of 5 units or more of fruit or vegetable per day. Each unit is equivalent to 80 g. Alcohol abuse: drink 5 standard units or more of alcoholic beverage (for men) and 4 standard units or more (for women) on any day in a week (01 standard unit is equivalent to 10 g ethanol or 330 mL beer, 30 mL strong alcoholic drinks, 120 mL wine). Smoking: current smoking or have been stopped smoking in less than 6 months of any type of cigarette like tobacco, cigar or pipes.

Physical activity: Vigorous physical activity of at least 75 minutes per week or moderate physical activity of at least 150 minutes per week or combination of both vigorous and moderate physical activity of 600 MET-minute per week. Overall good practice: consume less fat, no alcohol abuse, and engage regular physical activity.

The level of CAD risk in the next 10 years using Framingham scale which is based on 5 variables: age, HDL-C level, total cholesterol, smoking, systolic blood pressure. Low risk: <10%. Moderate risk: 10 - 20%. High risk: >20%.

Data analysis

The data were entered by Epidata software, and analysed by Stata 12 software. χ^2 test was used with p value<0.05.

Ethical consideration

The benefits and personal information of the participants are protected according to the regulation of Institutional Review Board of the National Institute of Hygiene and Epidemiology and Tra Vinh Department of Health before implementation.

Results

Demographical characteristics of Khmer people in Tra Vinh province

The study included 1200 participants, among those 57.8% had the education level lower than primary school and 77.7% were farmers, 42.3% had the household income between 2,150,000 to less than 4,300,000 VND.

Situation of hypertension of Khmer people in Tra Vinh province

Result showed 402 people with hypertension disease, proportion was 33.5%; inside, the proportion of hypertension was discovered to be 21.0%, proportion of newly diagnosed with hypertension was 12.5% (Table 1).

After control impaction of variables together, some factors associated really to proportion of hypertension were sex, age group, diet with less fat, diet with salty foods, fruit and vegetable consumption, alcohol abuse, obesity (Table 2).

Practice of hypertension prevention Khmer people

The correct overall practice towards hypertension prevention and control accounts for 54.7% of respondents. The proportion were 10.6%

	Hypertension	Freq.	%
No hypertension		798	66.5
Hypertension	Having been diagnosed	252	21
	Newly diagnosed	150	12.5

Table 1: Proportion of hypertension of Khmer people in Tra Vinh province.

for less-salt diet, 83.6% for no/less-fat diet, 26.2% for adequate fruit and vegetable consumption, 85.2% for no alcohol abuse, 62.5% for no smoking, and 79.3% for physical activity (Table 3).

The of people with correct overall hypertension prevention and control practices is 50.5% among men that is lower than among women with 58.8%, p<0.05. The figures are 47.6% and 56.5% among people with and without history of hypertension, respectively, p<0.05 (Table 4).

Risk of coronary artery disease and demographical characteristics

The risk of CAD in the next 10 years is 79.7% with low risk, 16.3% with moderate risk and 4.0% with high risk. Males are more likely to get CAD with 7.9% than females with 0% (Table 5).

Discussion

Situation of hypertension among Khmer people at Tra Vinh province

Result of this study showed that proportion of pretension among Khmer people at Tra Vinh province was 33.5%, inside; having 37.3% people don't know that they are getting hypertension disease. This result higher when compared with report of Viet Nam Ministry of Health, the proportion hypertension among Khmer people from 25 years or older was 25.1% (2012-2015). Hypertension is rapidly increasing in Tra Vinh province and the increase in Khmer people is higher than in other communities.

Factors	Cruve-OR (95%CI)	Combined-OR (95%CI)	p-value
Sex	1.4 (1.1-1.8)	1.7 (1.2-2.4)	<0.05
Age groups			
25-34	1	1	1
35-44	2 (1.3-3.0)	2.1 (1.3-3.3)	<0.05
45-54	3.6 (2.5-5.2)	5.1 (3.3-8.0)	<0.05
55-64	4.9 (3.4-7.0)	9.0 (5.8-14.0)	<0.05
Diet with less fat	1.9 (1.4-2.6)	1.7 (1.2-2.4)	<0.05
Fruit and vegetable consumption	2.3 (1.2-4.5)	2.2 (1.1-4.6)	<0.05
Diet with salty foods	2.1 (1.3-3.3)	1.4 (1.1-2.1)	<0.05
Alcohol abuse	1.5 (1.1-2.1)	1.6 (1.1-2.4)	<0.05
Smoking	1.4 (1.1-1.8)	0.8 (0.6-1.2)	>0.05
Dyslipidemia	2.0 (1.6-2.6)	1.3 (0.9-1.7)	>0.05
Obesity	2.6 (1.9-3.5)	2.3 (1.7-3.3)	<0.05
Glucose disorder	2.3 (1.5-3.6)	1.4 (0.9-2.1)	>0.05

Table 2: Some risk factors of hypertension among Khmer people through multivariate analysis.

Practice	Correct		Incorrect	
	Freq.	%	Freq.	%
Diet with less fat	1003	83.6	197	16.4
Fruit and vegetable consumption	314	26.2	886	73.8
Diet with salty foods	127	10.6	1073	89.4
Alcohol abuse	1022	85.2	178	14.8
Smoking	750	62.5	450	37.5
Moderate or vigorous physical activity in more than 150 minutes per week	952	79.3	248	20.7
Regular health check	758	63.2	442	36.8
Receipt of information related to hypertension	585	48.8	615	51.3

Table 3: Practice of hypertension prevention among Khmer people (n=1.200).

Associated factors		Correct overall practice		Total	p-value	OR (95% CI)
		Freq.	%			
Sex	Female	353	58.8	600	<0.05 (*)	1
	Male	303	50.5			0.71(0.56-0.90)
Age group	25-34	168	56	300	>0.05	1
	35-44	153	51	300		0.82(0.59-1.13)
	45-54	172	57.3	300		1.06(0.76-1.46)
	55-64	163	54.3	300		0.93(0.68-1.29)
Occupation	Farmers	522	56	932	>0.05	1
	Blue- or white- collar workers	22	53.7	41		0.91(0.48-1.70)
	Others*	112	49.3	227		0.76(0.57-1.02)
Education level	Lower than primary school	387	55.8	694	>0.05	1
	Primary school	169	53.8	314		0.92(0.71-1.21)
	Secondary school	75	56	134		1.01(0.69-1.46)
	High school	16	38.1	42		0.48(0.26-0.93)
	Higher than high school	9	56.2	16		1.02(0.37-2.77)
Household income (million dong)	<2.15	226	53.4	423	>0.05	1
	2.15-<4.30	266	52.4	508		0.96(0.74-1.24)
	4.3 -< 6.45	97	62.2	156		1.43(0.98-2.09)
	6.45 -<8.60	32	64	50		1.55(0.84-2.85)
	≥ 8.60	35	55.6	63		1.09(0.64-1.85)
History of hypertension	No	536	56.5	948	<0.05 (*)	1
	Yes	120	47.6	252		0.70 (0.52-0.93)
Obesity	No	551	55.3	997	>0.05	1
	Yes	105	51.7	203		0.87(0.63-1.19)

Table 4: Some associated factors of practices towards hypertension prevention.

Factors		Risk of CAD						Total	p
		Low		Moderate		High			
Overall		957	79.7	196	16.3	47	4	1200	
Sex	Female	583	97.1	17	2.8	0	0	600	<0.01
	Male	374	62.3	179	29.8	47	7.9	600	
Age group	25-34	299	99.7	1	0.3	0	0	300	<0.01
	35-44	279	93	18	6	3	1	300	
	45-54	220	73.3	67	22.3	13	4.4	300	
	55-64	159	53	110	36.7	31	10.3	300	
Education level	Able to read and write	548	78.9	121	17.4	25	3.7	694	0.61
	Primary school	248	78.9	51	16.2	15	4.9	314	
	Secondary school	110	82.1	19	14.2	5	3.7	134	
	High school	35	83.3	5	11.9	2	4.8	42	
	Higher than high school	16	100	0	0	0	0	16	
Occupation	Blue- or white- collar workers	35	85.4	3	7.3	3	7.3	41	0.27
	Farmers	735	78.9	160	17.2	37	3.9	932	
	Others*	187	82.4	33	14.5	7	3.1	227	
Household income (million dong)	<2.15	317	79.7	69	17.3	12	3	423	0.44
	2.15-<4.30	407	80.1	78	15.4	23	4.5	508	
	4.30-<6.45	123	78.9	28	17.9	5	3.2	156	
	6.45-<8.60	42	84	8	16	0	0	50	
	≥ 8.60	51	80.9	7	11.1	5	8	63	

*Other occupations include: sellers, housewives, students, retired people and unemployed (able/unable to work).

Table 5: Risk of CAD according demographical characteristics.

Among 35 INTERSALT Populations with Allele Frequency Data, with an increase of one degree of latitude north or south, population-average systolic blood pressure increased by 0.3 mmHg. When GNB3 (G protein $\beta 3$ subunit) 825T was included in the analysis, we were able to explain 64% of worldwide variation in blood pressure. With each 1% increase in GNB3 825T allele frequency, blood pressure increased 0.19 mmHg [4]. The genetic basis of blood pressure variation is largely

unknown but is likely to involve genes. The research in Kenya-Africa, have a total of 1528 adults were surveyed with a mean age of 46.7 years, the age-standardized prevalence of hypertension was 29.4 % (95% CI 27.0-31.7) [5]. The same, the survey in sub-Saharan Africa shown that the age-standardized prevalence of hypertension ranged from 19.3% to 38.0%, with the mean age ranged from 36.8 years to 45.3 years [6]. Thus,

the prevalence of hypertension in some ethnic minority communities is higher than in other communities.

Result this study showed that through multivariate, some factors associated really to proportion of hypertension were sex, age group, diet with less fat, diet with salty foods, fruit and vegetable consumption, alcohol abuse, obesity. Therefore, in interventions for the prevention of hypertension, attention should be paid to these factors.

Some risk factors of hypertension among Khmer people at Tra Vinh province

The correct overall practice of hypertension prevention and control among Khmer people accounts for 54.7% of respondents that is associated with sex, history of hypertension. More women than men have correct practices with 58.8% and 50.5%, respectively. The proportion of hypertension of male higher than female is 1.3 times $p < 0.01$. Young women tend to have lower blood pressure, and less risk of hypertension, compared to young men. As people age, both blood pressure and the risk of hypertension increase in both sexes; this occurs most strikingly in women after menopause [7].

The majority of hypertension case was in age group of 55-64 years with 57.0%, the poorer health of those people in this age leads to the difficulties in physical activity so that the lower of correct practice was seen among those who had been diagnosed with hypertension (47.6%) than people without or had not been diagnosed with hypertension (56.5%).

About 16.4% of Khmer people in this study had the diet with plenty of animal's fat. In contrast, the majority of Khmer people are farmers with lower socio-economic sources so that they have less opportunity to expose to fast foods. Thus, Khmer people have diet with less fat than Kinh people and other ethnicities living in other cities.

The intake significantly depends on the household's economic. Although Tra Vinh is an agricultural province, the daily diet contains many natural vegetables. However, 77.5% of people participated in this survey have the income lower than 4.300.000 VND that hinders the access to vegetables and fruits to supplement daily diet. In the OHASAMA study, during 4-year follow-up period, After adjustment for all putative confounding factors, the highest quartile of fruit intake was associated with a significantly lower risk of future home hypertension (OR 0.40, 95% CI 0.22-0.74, $p = 0.004$). In conclusion, this study, based on home blood pressure measurement, suggests that higher intake of fruit is associated with a lower risk of future home hypertension [8].

The commonly consumed foods in this region are fish and other seafood using to produce fish-sauce. The diet with salty foods is an important factor of hypertension. It suggests the needs of other intervention measures to improve the knowledge and practice in terms of reducing salt consumption among Khmer people, and thus contribute to hypertension prevention and control.

The alcohol consumption among Khmer people in this study is as twice as in other studies on Kinh people. The drinking habit is determined by social norms, economic conditions and especially local customs and festivals. In a study to appear in *Alcoholism: Clinical and Experimental Research*, Charles Holahan, who is professor of psychology at The University of Texas at Austin. The researchers followed 1,824 older adults, also found those who drank moderately were more likely to live longer across a 20-year follow-up than those who drank heavily or who didn't drink at all. The findings showed

increases in mortality risk of 42.0% for heavy drinkers and 49.0% for abstainers in comparison to moderate drinkers [9]. This study of among Khmer people shown that proportion of alcohol abuse is 14.8%, alcohol abuse in the Khmer youngsters are highest and lasted many years can cause hypertension when older.

In this study, 32.0% of participants are smokers, of which 61.3% in males and 2.7% in females ($PR = 23$; $p < 0.05$). Furthermore, the smoking initiation among Khmer people is Tra Vinh is very early. Among the smokers, 84.6% have experienced smoking more than 10 years with the mean age of 22.2 ± 11.3 years. 36.2% smoke less than 10 cigarettes per day, 39.4% smoke from 10 to less than 20 cigarettes per day and 24.4% smoke 20 or more cigarettes per day.

The people who meet the recommended physical activity are 79.3%, which is mostly due to the works of farmers that require more physical activity (77.7% of respondents are farmers). 20.7% of Khmer people have physical inactivity. The distinction may be explained that the above ethnic people live in mountainous areas that they have to climb the mountains while carrying heavy tools to do farm works. This is why their physical activity is more intense than Khmer people living in delta areas. In study in Kenya, when fit in a multivariable logistic regression model, moderate physical activity [AOR = 1.9; (95%CI, 1.2-3.0)], remained significantly associated with hypertension [5]. A meta-analysis of prospective cohort studies in China, including 136,846 persons who were initially free of hypertension, and 15,607 persons developed hypertension during follow-up. The pooled relative risk of main results from these studies suggests that both high and moderate levels of recreational physical activity were associated with decreased risk of hypertension (high vs. low: RR, 0.81; 95%CI, 0.76-0.85 and moderate versus low: RR=0.89; 95%CI 0.85-0.94) [10].

The risk of CAD in the next 10 years of Khmer people

According to Framingham scale, the risk of CAD in the next 10 years of Khmer people is 79.7% with low risk, 16.3% with moderate risk and 4.0% with high risk. CAD is a common disease among elderly people and resulted from many factors like high blood pressure, and particularly, blood lipid disorder. At the same time, the older people are not easy to convince to change in lifestyle and habits like smoking that occur with physical inactivity and low health care accountability. Thus, the elderly people have higher risk than younger adults.

To sum up, among Khmer people participated in this study, there are 956 people at low risk, 196 people at moderate risk and 48 people with high risk of CAD. The inference in 187,096 Khmer people aged 25-64 years living in Tra Vinh province in 2015 is that there will have been 7.484 Khmer people at high risk of CAD by 2025.

Age is an important factor of atherosclerosis. CAD develops silently and slowly in many years from young age. After a long time, the arteries are aging, hardening and loss of elasticity. The risk of CAD in the next 10 years by Framingham scale among study participants increases proportionally to age with statistical significance ($p < 0.01$). The high risk of CAD in 10 coming years is highest among people aged 55-64 years with 10.3%. A cross-sectional study conducted on 13,769 adult people aged 20-79 years in the United States in 2004 also indicates that the older a person is, the higher risk of CAD in 10 years does the person get with $p < 0.05$ [11]. It means that age is a risk factor of CAD that cannot be modified by medical intervention but it is valuable in CAD prediction among Khmer people in Tra Vinh.

Males are more likely to develop CAD than females with 7.9% and 0%, respectively. Besides, the moderate risk accounts for 29.8% among

males and 2.8% among females. The results are in line with a cohort study of Framingham that follows up 5251 white people in 10 years. The CAD was found in 8.0% of males and 2.8% of females [12]. In one hand, the arteries are ageing more quickly among males than females. On the other hand, the estrogen hormone helps protect the women against CAD. It is demonstrated that the risk of CAD is reduced by 35-50% with estrogen supplementation. This is explained that estrogen is conducive to the increase of HDL-C, decrease of LDL-C and lipoprotein (a) and accelerates the LDL-C oxidation.

This study cannot indicate the association between CAD risk in the next 10 years and education level, occupation and income. The factors considered in CAD risk evaluation are less likely to be influenced by level, occupation and income. It is necessary to conduct cohort studies to identify the association between those factors and CAD in the next 10 years.

Conclusions

Proportion of hypertension was 33.5%, inside; having 37.3% people don't know that they are getting hypertension disease. About some risk factors have related to the diet with less fat, adequate fruit and vegetable consumption, less-salt diet, alcohol abuse, smokers and physical activity. About coronary artery disease have the moderate risk (16.3%) and high risk (4.0%) of CAD in the next 10 years according to Framingham scale. The risk increases proportionally to the age and higher among men than women.

Disclosure

The authors declare no conflicts of interest.

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