Prevalence and Some Important Risk Factors of Hypertension in Ban Paew District, Second Report

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Background: *Hypertension (HT) has been one of the leading global risk factors for health. Therefore, it is important to indicate groups of people with high risk(s) of HT to provide them with lifestyles modification and checking blood pressure (BP) periodically for early detection of HT.*
Objective: *To determine the prevalence of HT and some important risk factors in suspected high-risk group.*
Material and Method: *Randomized villages in Ban Paew District, Samuthsakorn Province, Central Thailand, which were near the sea, were selected for this study. The authors conducted the survey between February and April 2002 and 2003, getting one volunteer from each house who was in the age of 40-69 years (y). Volunteers were advised to fast from 8 pm until next morning for blood drawn, checking the weight, height, and waist. BP was measured by using the automatic BP and history, physical examination, etc were done. BP at 140/90 mm Hg or higher either systole or diastole and persons with currently treatment would be diagnosed as hypertension.*
Results: *One thousand seventy nine volunteers with completed data were included. One hundred fifty three (14.2%) were known HT, 143 (19.5%) out of 735 and 62 (32.5%) out of 191volunteers, with no history of HT did not know that their BP reached hypertensive level. Therefore, 205 (22.1%) from 926 volunteers were hypertensive with 89 (26.6%) from 335 men, 116 (19.6%) from 591 women ($p = 0.0145$) and 32 (3.5%) with isolated systolic hypertension. HT increased significantly in age of 60-69 y, more than 50-59 y and 40-49 y, BMI over 25 ($p = 0.0002$) and drinking alcohol ($p = 0.0384$). However, it did not increase with smoking ($p = 0.2139$) and eating salty foods ($p = 0.6568$). The group which ate sour taste had borderline significance for negative risk of hypertension ($p = 0.0489$).*
Conclusion: *The authors reported the prevalence of 22.1% having hypertension in the age group of 40-69 years and up to 32.5% in the group of not knowing their BP. Hypertension significantly increased with older age group from 40-49 to 60-69 y, male gender, BMI over 25, drinking alcohol. However, it did not with borderline significance for being a negative risk of hypertension in eating sour taste group.*

Keywords: *Hypertension, Prevalence of hypertension, Risk factors of hypertension, Ban Paew District*

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Hypertension has been one of the global risk factors for health across World Health Organization's (WHO) regions[1]. It is one important risk factor of stroke, acute myocardial infarction and heart failure[2,3]. In more than 95% of cases, no single and reversible causes can be detected and the terms essential or primary hypertension have been used[4]. Hypertension is diagnosed by blood pressure (BP) 140/90 mmHg or higher either systole or diastole in any person aged 18 years (y) or above[5]. Singh et al[6] stated that the prevalence of hypertension in Asia, diagnosed by BP more than 140/90 mmHg being in between 15-35% in an urban adult population and in rural areas where the prevalence was two to three times lower than in urban subjects. The prevalence of hypertension in Thailand, which is BP of 160/95 mmHg or over diagnosed hypertension, found 2.12% in age 15-80 y at Chaiyo District, Arngthong Province[7]. From Klong-Toey Slum, Bangkok[8], 17.3% with age of 30 y or more were

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hypertensive. According to JNC 6[9] hypertension was defined as BP being of 140/90 mmHg or more; there were 29.8% to be hypertensive in age 40-69 y from Ban Paew District, Samuthsakorn Province in the year of 2000[10]. It was questioned if the prevalence of hypertension was high in Central Thailand[10]. It is necessary to know the incidence, and or the prevalence of the high-risk(s) group of hypertensive people and the risk factors of hypertension in Thailand for prevention or delaying them from hypertension and early detection if they are hypertensive including proper treatment to decrease complications such as stroke, heart failure, coronary artery disease and total mortality[2,3,11].

Objective

1. To determine the prevalence of hypertension in suspected high-risk group.

2. To find out some important risk factors in a suspected high risk group in a Thai population.

Material and Method

The authors randomized villages in Ban Paew District, Samuthsakorn Province, Central Thailand, which were near the sea. The authors conducted the survey in February and April 2002 and 2003 in the same months, getting one volunteer from each house who was in the age of 40-69 y and all of them were from new villages, not the same as reported in 2000[10]. Volunteers were advised to fast from 8 pm until the next morning for blood drawn, checking the weight, height and waist. BP was measured from both arms after sitting quietly more than 5 minutes, following JNC 7 advice[5] and using the automatic BP measurement at least twice on each arm, using the average of two consecutive lower BP values of the higher arm. BP was re-checked by using sphygmomanometer periodically by only one cardiologist. History and physical examination were done, BP at 140/90 mmHg or higher either systole or diastole and any person currently on antihypertensive treatment would be diagnosed of hypertension (HT)[5,12]. Data were analyzed and presented with frequency and percentage. Pearson Chi-square tests, Asymptotic Type were used. A p-value of less than 0.05 was considered significant.

Definitions

Known HT = volunteers who had BP measured by the physician and or the nurse, and told to be hypertensive, or who was currently on treatment.

No history of HT = volunteers who had BP measured by the physician and or the nurse and told to be normal.

Not knowing their BP = volunteers who were never measured their BP or had been measured but did not remember the result.

Non-smoker = volunteer who never smoked or used to smoke but discontinued for at least six months.

Smoker = volunteer who smoked at least in the past six months, cigarettes or hand-made cigarettes made from tobacco.

Non-drinker = volunteer who never drank any alcohol beverage or discontinued drinking for at least six months.

Drinker = volunteer who drank any alcohol beverage regularly, social drink at least in the past six months.

Eating salty foods (taste) = volunteer who committed himself eating salt, usually put salt, fish sauce, or soy sauce in his plate.

Eating normal foods (taste) = volunteer who ate normal taste and usually did not add salt, fish sauce, or soy sauce in his plate.

Eating sour taste = volunteer who liked to eat sour taste with lime, tamarind, young green fruits, vinegar, and usually having it in his plate.

Eating normal taste = volunteer who ate normal taste and usually did not add sour material in his plate.

Results

One thousand seventy nine volunteers, between 40 and 69 years old completed data for analysis. There were 153 (14.2%) volunteers including 37 men, 116 women who were known HT and 55 (35.9%) persons having BP in control under 140/90 mmHg (Table 1). The group of 735 (68.1%) volunteers who had no history of HT included 238 men and 497 women. In that group, 143 persons (19.5%) were hypertensive and included 55 men and 88 women. The ratio of HT in men and women was M: W = 1.31: 1. In contrast, 191 (17.7%) volunteers, which included 97 men and 94 women who did not know their BP, 62 volunteers (32.5%) were hypertensive and included 34 men and 28 women for a ratio of M: W = 1.18: 1. Adding of both groups, 89 (26.6%) from 335 men and 116 (19.6%) from 591 women were hypertensive ($p = 0.0145$) (Table 2), giving a prevalence of 22.1% (205 from 926 persons). If adding known HT, the prevalence of HT would be 33.2% (358 from 1,079 volunteers).

Volunteers with no history of HT in the age of 60-69 y, were diagnosed to be hypertensive more than the group of 50-59 and 40-49 y with 38 (33.6%) from 113, 54 (19.5%) from 277 and 51 (14.9%) from 345 persons respectively with $p < 0.0001$ (Table 2). In the group that did not know their BP, the older age group had HT more than the younger groups as 19 (52.8%) from 36, 20 (30.3%) from 66 and 23 (25.8%) from 89 in the age groups of 60-69, 50-59 and 40-49 y respectively, $p = 0.0129$ (Fig. 1). According to 2007 ESH [12] for grading of HT, there were 140 (15.1%), 52 (5.6%) and 13 (1.4%) persons to be in Grade 1, 2 and 3 HT respectively. There were 32 (3.5%) from 926 volunteers being Isolated systolic hypertension (ISH) (Table 3).

The risk factors of HT beside older age and male gender, were overweight/obesity (BMI over 25,

Table 1. Prevalence of hypertension and risk factors of hypertension in 926 volunteers

	BP less than 140/90	BP 140/90 or over	Total	Percentage of HT (%)	p-value
Known HT	55	98	153	-	
No Hx of HT	592	143	735	19.5	
Not knowing their BP	129	62	191	32.5	<0.0001
BMI					
25 or less	419	89	508	17.5	
Over 25	302	116	418	27.8	0.0002
Alcohol drinker					
Yes	148	56	204	27.5	
No	573	149	722	20.6	0.0384
Smoking					
Yes	137	47	184	25.5	
No	584	158	742	21.3	0.2139
Eating salty taste					
Yes	311	92	403	22.8	
No	410	113	523	21.6	0.6568
Eating sour taste					
Yes	294	68	362	18.8	
No	427	137	564	24.3	0.0489

BP = blood pressure; HT = hypertension; Hx = history; BMI = body mass index

Table 2. Hypertension increased with the age of 40-69 years in 926 volunteers

	BP less than 140/90	BP 140/90 or over	Total	Percentage of HT (%)	p-value
Men	246	89	335	26.6	
Women	475	116	591	19.6	0.0145
No Hx of HT					
Age 40-49 y	294	51	345	14.9	
Age 50-59 y	223	54	277	19.5	
Age 60-69 y	75	38	113	33.6	<0.0001
Sub-total	592	143	735	19.5	
Not knowing their BP					
Age 40-49 y	66	23	89	25.8	
Age 50-59 y	46	20	66	30.3	
Age 60-69 y	17	19	36	52.8	0.0129
Sub-total	129	62	191	32.5	
Total*	721	205	926	22.1	

BP = blood pressure; HT = hypertension; Hx = history; Total* = no Hx of HT + not knowing their BP

Table 3. Grading of hypertension according to 2007 ESH in 926 volunteers

	Men	Women	Total
BP < 140/90	246	475	721
BP = 140-159/90-99	57 (17.0%)	83 (14.0%)	140 (15.1%)
BP = 160-179/100-109	25 (7.5%)	27 (4.6%)	52 (5.6%)
BP ≥ 180/110	7 (2.1%)	6 (1.0%)	13 (1.4%)
Total hypertension	89	116	205 (22.1%)
ISH (BP ≥ 140/ < 90)	17 (5.1%)	15 (2.5%)	32 (3.5%)

BP = 140-159/90-99 = Grade 1, BP = 160-179/100-109 = Grade 2, BP=180/110 or over = Grade 3

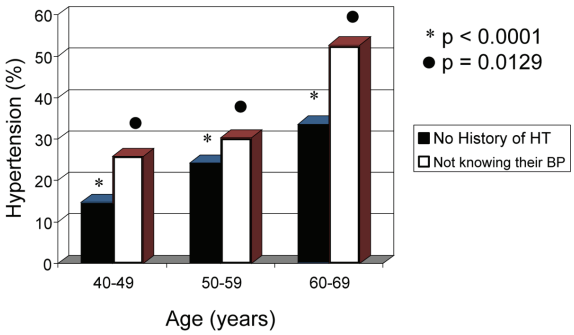

Fig. 1 Shown hypertension increased with higher age in volunteers who had no history of hypertension; not knowing their blood pressure

p = 0.0002), and alcohol drinkers (p = 0.0384) (Table 1). Eating sour taste had p = 0.0489, which was borderline significance for a negative risk of HT. There was no significance in smoking (p = 0.2139) and eating salt (p = 0.6568) for the risk of hypertension.

Discussion

The authors reported the survey taken by 1,079 volunteers in the age of 40-69 y. One hundred fifty three (14.2%) volunteers who were known HT and 55 persons (35.9%) had BP controlled under 140/90 mmHg (Table 1), which was higher than the first report with BP under control only 26.6%[10]. This is because medical personnel gave more health education to the public, good drugs with less drug adverted effects and more awareness with more educated population. Wang and Vasan mentioned that 31% of 1,565 hypertensive participants having BP in controlled[13]. The prevalence of hypertension was 22.1% from the age of 40 to 69 y with suspected high risk group that was lower than the previous report, which was 29.8%[10]. It took time to realize that in the group of no history of HT, the majority in the present report, were classified as normal even if their BPs were high at that time, they should have been classified as known HT (Table 1). However, in the group of not knowing their BP, they had a prevalence of up to 32.5%. There was a report of the prevalence of HT being as high as 46.4% from 15,612 persons of Royal Thai Air Force personnel aged 19-65 y with a mean age of 45.7 ± 8 y and 82.0% were male who had a routine check up between January 2002 and December 2003[14]. That prevalence was much higher than this report. From the report of the Ministry of Public Health in 2005[15], there were up to 65.8% of the Thai population in the age of 15-75 y having BP measurement at least one time in that whole year and 8.3% were told to have high BP. If counting from the age of 35-75 y, there would be 5.3, 12.8, 22.1 and 27.3% for each 10 y apart from 35-44 up to 65-75 y to be hypertensive respectively. The prevalence was nearly the same as in the present report in nearly the same age range groups. Hypertension was found in age 60-69 y more than age 50-59, 40-49 y significantly, (p < 0.0001) in group of no history of HT, and p = 0.0129 in the group of not knowing their BP (Table 2, Fig. 1). The numbers of hypertensive population increased with advanced age of each 10 y the same as the above report[15] and other countries[16-19]. In the group of 191 volunteers, did not know their BP, there were 62 persons (32.5%) being hypertensive which was very high prevalence probably because of their health ignorance. They were not interested in their BP although it was free for BP measurement. It was necessary to increase the public concern about hypertension and its complications. It may be necessary to send medical personnel to visit those people, measuring BP and giving health education at their houses.

Eighty-nine (26.6%) from 335 men and 116 (19.6%) from 591 women were hypertensive. Men had

hypertension more than women (p = 0.0145), similar as in India[20]. Nonetheless, there were other reports[21,22] showing women having more hypertension than men. Victor and Kaplan mentioned that women had lower prevalence of hypertension than men in the age before 50, but after menopause women got more prevalence than men. At age 75 y, US men and women had hypertension equally[23].

From 926 volunteers, 205 persons (22.1%) were hypertensive with 140 (15.1%), 52 (5.6%) and 13 (1.4%) being in Grade 1, 2 and 3 respectively as following 2007 ESH[12] (Table 3). These data supported that more population got their BP checked rather often, when high BP was detected and more than two-third were only in Grade 1 HT. The 32 ISH (3.5%) was low because the age group was under 70 y. It was reported that diastolic BP peak at about age 60 y in men and 70 y in women then falling down gradually thereafter[24].

The risk factors of hypertension besides advanced age, were being men and overweight and/or obesity (BMI over 25, p = 0.0002), which is similar to previous report[10], JNC 7[5]. For alcohol drinkers, 56 persons (27.5%) from 204 drinker volunteers were found to be hypertensive. When compared to non-drinkers, which only 149 (20.6%) from 722 volunteers were hypertensive with p = 0.0384 (Table 1), drinking alcohol was a significant risk factor of hypertension. This is different from lifestyle modification recommendation of JNC 7[5] about drinking two alcohol drinks for men (one drink for small body) and one for women every day. The explanation for this issue was these volunteers might drink more than two drinks each day, which caused hypertension[25]. Additionally, there might be some hidden confounding factors that could not be seen such as some volunteers may have drank alcohol with tamarind and salt, being overweight and older.

When eating sour tasting food, 68 (18.8%) from 362 volunteers were hypertensive, comparing to 137 (24.3%) from 564 volunteers who did not like to eat sour food/taste. This was borderline significant (p = 0.0489) for negative risk of hypertension. The ingredients giving sour taste were lime, tamarind and young green fruits such as mango. They would also give more potassium and help decrease the systolic blood pressure[5,26]. It was worthwhile to confirm this issue. High salt consumption caused hypertension[5,27], however in the present report, hypertension was not related to salt consumption (p = 0.6568). The volunteers lived near the sea, (Samuthsakorn Province was on the seashore) they ate a lot of seafood both fresh and dry, which were rather inexpensive thus, salt could easily contaminate these seafoods. Smoking was not a significant risk of hypertension. Forty-seven (25.5%) from 184 smoker volunteers being hypertensive and 158 (21.3%) from 742 non-smoker volunteers had hypertension (p = 0.2139), which was documented in another report[28]. However smoking cigarettes has been a major risk factor of cardiovascular disease[5,12,29].

Conclusion and Clinical Implication

The authors reported on 1,079 volunteers in age group of 40-69 y from Ban Paew District. The prevalence of hypertension was 22.1%, With the group of not knowing their BP, the prevalence was up to 32.5%. Hypertension was significantly increased with advanced age, from 40-69 y, male gender, overweight and/or obesity, and drinking alcohol. Eating sour taste food was borderline significant for negative risk of hypertension. It is worthwhile to inform the public to check their BP every year at the age of 40 y or above. Persons with suspected high-risks for hypertension, who are over 60 y of age, male gender, overweight/obese and drinking alcohol, need to be advised for lifestyles modification to delay the onset of hypertension, checking their BP more often such as every six months for early detection of hypertension and proper treatment to prevent complications.

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Potential conflicts of interest

Granted by Rajavithi Hospital.

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ความชุกของความดันโลหิตสูงที่อำเภอบ้านแพ้วครั้งที่สองและปัจจัยเสี่ยงสำคัญบางชนิด

วิไล พัววิไล, ดอนพิชิต เหล่ารักพงษ์, เสาวลักษณ์ พรหมพงศา, สุธรรม สุธีระภัทรานนท์, นภา ศิริวิวัฒนากุล, น้ำทิพย์ มัธพงษ์ถาวร, ประเทือง ศรีเลิศ, จงรักษ์ จักรเพชรโยธิน

ภูมิหลัง: *โรคความดันโลหิตสูงยังเป็นปัจจัยเสี่ยงสำคัญต่อสุขภาพสำหรับประชากรทั่วโลก ดังนั้นจำเป็นต้องรู้กลุ่มประชากรที่มีความเสี่ยงสูงต่อโรคนี้เพื่อให้ได้รับคำแนะนำ ในการปรับเปลี่ยนพฤติกรรมในการดำรงชีวิต และตรวจวัดความดันโลหิตเป็นระยะ ๆ เพื่อวินิจฉัยโรคนี้ตั้งแต่ระยะแรก*

จุดประสงค์: *เพื่อค้นหาความชุกของโรคความดันโลหิตสูง และปัจจัยเสี่ยงสำคัญในกลุ่มประชากรที่คาดว่าเป็นกลุ่มเสี่ยงสูง*

วัตถุและวิธีการ: *คณะผู้นิพนธ์ได้ไปสำรวจความดันโลหิตสูงที่อำเภอบ้านแพ้ว จังหวัดสมุทรสาคร ระหว่างเดือนกุมภาพันธ์-เมษายน พ.ศ. 2545-6 เพื่อสุ่มตัวอย่างหมู่บ้าน และขออาสาสมัครบ้านละหนึ่งคนซึ่งมีอายุ ระหว่าง 40-69 ปี โดยให้อดอาหารและน้ำตั้งแต่ 20.00 น. ถึงเช้าก่อนเจาะเลือด ชั่งน้ำหนัก วัดส่วนสูง วัดเอว และอื่น ๆ รวมทั้งซักประวัติและตรวจร่างกาย วัดความดันโลหิตด้วยเครื่องอัตโนมัติ ซึ่งค่าความดันโลหิต 140/90 มม.ปรอทหรือสูงกว่าของค่าความดันโลหิตตัวบน หรือ ค่าความดันโลหิตตัวล่าง และรวมทั้งผู้ซึ่งขณะนี้รับประทานยารักษาโรคนี้จะถูกวินิจฉัยเป็นโรคความดันโลหิตสูง*

ผลการศึกษา: *มีอาสาสมัครทั้งหมด 1,079 คน ซึ่งมีข้อมูลครบ พบว่า 153 (14.2%), 143 (19.5%) จาก 735 และ 62 (32.5%) จาก 191 อาสาสมัครเป็นความดันโลหิตสูง โดยมีกลุ่มถูกวินิจฉัยเป็นความดันโลหิตสูงแล้ว, กลุ่มไม่มีประวัติความดันโลหิตสูง และกลุ่มไม่ทราบว่าตนเองมีความดันโลหิตเท่าใดตามลำดับ ดังนั้นมี 205 (22.1%) จาก 926 อาสาสมัครเป็นความดันโลหิตสูงซึ่ง 89 (26.6 %) จาก 335 ชาย; 116 (19.6 %) จาก 591 หญิง ($p = 0.0145$) และ 32 (3.5%) เป็นความดันโลหิตสูงเฉพาะตัวบน ความดันโลหิตสูงเพิ่มขึ้นอย่างมีนัยสำคัญในคนอายุ 60-69 ปี มากกว่าอายุ 50-59 ปี และ 40-49 ปี รวมทั้งผู้ที่มีดัชนีมวลกายมากกว่า 25 ($p = 0.0002$), ดื่มเหล้า ($p = 0.0384$) แต่ไม่มีนัยสำคัญในคนสูบบุหรี่ ($p = 0.2139$), ชอบรับประทานอาหารรสเค็ม ($p = 0.6568$) และพบว่าผู้ชอบรับประทานอาหารรสเปรี้ยวเป็นความดันโลหิตสูงน้อยกว่าผู้ชอบรับประทานอาหารรสธรรมดาไม่เปรี้ยวคาบเส้นของการมีนัยสำคัญ ($p = 0.0489$)*

สรุป: *คณะผู้นิพนธ์รายงานความชุกของอาสาสมัครที่มีความดันโลหิตสูง 22.1% ในกลุ่มคนอายุ 40-69 ปี และพบมากถึง 32.5% ในกลุ่มที่ไม่ทราบความดันโลหิตของตนเอง ความดันโลหิตสูงเพิ่มขึ้นอย่างมีนัยสำคัญในคนอายุมากขึ้นจาก 40-49 ถึง 60-69 ปี, เพศชาย, ดัชนีมวลกายมากกว่า 25, ดื่มเหล้า ส่วนการชอบรับประทานอาหารรสเปรี้ยวเป็นปัจจัยเสี่ยงลบต่อโรคความดันโลหิตสูงอย่างคาบเส้นของการมีนัยสำคัญ*