Prevalence, awareness and risk factors of hypertension in Hmawbi Cantonment Area, Yangon Region, Myanmar

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Abstract

Hypertension is one of the leading risk factors for global mortality. A community based cross sectional descriptive study was conducted in Hmawbi Cantonment Area, Yangon Region in November, 2015. This study aimed to identify the prevalence, awareness and risk factors of hypertension concerning smoking, alcohol dinking, eating food pattern, taking regular exercise, stressful condition and body mass index (BMI). The sample consisted of 210 respondents from three Units (Light Infantry Regiments) were randomly selected to participate in the study. A pre-tested structured questionnaire was used as a data collection tool. It was found that 33.3% of respondents had hypertension; 55.7% achieved good awareness on hypertension as well; 16.7% respondents were current smoker; 7.6% had the history of alcohol drinking; 67.1% respondents took regular exercise; 29.5% respondents were in stressful condition; 32.9% respondents were overweight and 19.5% were obese. Hypertension was significantly associated with age (*p*-0.001), family income (*p*<0.001), awareness level (*p*-0.01), current smoking status (*p*<0.001), alcohol drinking (*p*<0.001), regular exercise taking (*p*<0.001), stressful condition (*p*<0.001), and increase BMI (*p*<0.001) of respondents. This setting in Hmawbi evidenced that age, family income, smoking, alcohol drinking, consumption of salty and fast food, stressful condition and increase BMI were identified as risk factors and taking regular exercise was protective. Overall, over 50% of respondents having good awareness show that favorable circumstances exist for further strengthening the hypertension prevention and control program. These findings have implications for future public health intervention and clinical efforts to decrease the prevalence of hypertension among population.

Keywords: Prevalence, Awareness, Risk factors, Hypertension, Myanmar.

Introduction

Hypertension is one of the important public health problems worldwide because its disease burden is getting higher in both developed and developing countries.[1] It is also one of the most important contributors to heart disease and stroke – which together make up the world's number one cause of premature death and disability.[2] Globally, the overall prevalence of hypertension among adults population aged from 18 and over was around 22% in 2014.[3] This contributes nearly 9.4 million deaths from cardiovascular disease each year, it is growing epidemic and is estimated to affect more than one in three adults aged 25 and over, or about one billion people.[2]

The specific underlying cause of hypertension cannot be found in patients who are said to have essential hypertension. Many factors may contribute to its development, including renal dysfunction, peripheral resistance vessel tone, endothelial dysfunction, autonomic tone, insulin resistance and neurohumoral factors. Hypertension is more common in some ethnic groups, particularly African Americans and Japanese, and approximately 40-60% is explained by genetic factors.[4]

Essential hypertension is related to heredity, old age, male sex in young and middle-aged adults, Black Afro-American ethnicity, low socioeconomic status in

Practice Points

- Hypertension is one of the leading risk factors for global morbidity and mortality.

- More than one-third of respondents were hypertensive and among them, 44.3% had pre-hypertension, 38.6% were hypertension stage I and 17.1% were state II.

- In socio-demographic factors, age group (40-60 years) and family income group (250000-500000 kyats) were found to be significantly associated with hypertension.

- Smoking, alcohol drinking, dietary habits, irregular exercise, overweight and stressful condition were also significantly associated with hypertension.

- National Non-communicable Disease Strategic Plan should be implemented through a primary health care approach as an affordable and sustainable way; required provision to reduce the exposure of the whole population to risk factors of hypertension.

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developed economies and high socioeconomic status in transitional economies, obesity, alcohol consumption, physical inactivity, high salt intake, hormonal contraceptives, and stress.[5] Important environmental factors include a high salt intake, heavy consumption of alcohol, obesity, lack of exercise and impaired intrauterine growth. There is little evidence that 'stress' causes hypertension.[6]

The treatment of hypertension has been shown to prevent cardiovascular diseases and to extend and enhance life, hypertension remains inadequately managed everywhere. Different national and international organizations have defined the concept of 'hypertension' and also divided the disease into degrees of severity based on a number of large epidemiological and treatment studies.[7]

The prevalence of hypertension is highest in Africa (46% of adults) while the lowest prevalence is found in the Americas (35% of adults). Overall, high-income countries have a lower prevalence of hypertension (35% of adults) than low and middle income groups (40% of adults).[2] Almost half of the disease burden in low and middle income countries is now caused by non-communicable diseases, especially stroke and ischemic heart disease.[8] The risk of cardiovascular disease doubles for every 10 points increase in diastolic blood pressure or every 20 points increase in systolic blood pressure.[9] About two thirds of stroke and half of ischemic heart disease were attributable to high blood pressure globally. It also increases the risk of conditions such as kidney failure and blindness.[2]

The incidence is also increasing in most countries and lifestyle factors are considered to play a decisive role in this development. Obesity, physical inactivity and increased salt intake, in particular, have varying degrees of significance in different populations. As a single risk factor, physical inactivity is believed to be responsible for 5-13% of hypertension today.[7]

In the South-East Asia Region, approximately 35% of the adult population has hypertension, which accounts for nearly 1.5 million deaths annually; 9.4% of the total deaths are attributable to hypertension.[10] The four major behavioral risk factors of non-communicable diseases (tobacco use, unhealthy diet, lack of physical activity and harmful use of alcohol) that lead to four major metabolic risk factors (overweight/obesity, hypertension, raised blood sugar and raised blood lipids) are highly prevalent in the region and on the rise.[5]

Detecting high blood pressure is the first step in preventing and controlling it. When people know their blood pressure level, they can take steps to control it. People can cut the risks of high blood pressure by: consuming less salt, eating a balanced diet, engaging in regular physical activity, avoiding tobacco use and avoiding harmful use of alcohol.[11]

The purpose of this study is to estimate the prevalence and, determine the awareness and associated risk factors of hypertension among the adult population in Hmawbi Cantonment Area, Yangon Region. This information is important to provide and support strategic decisions such as public health interventions to reduce risk factors and decrease the burden of disease.

Materials and methods

Sampling method and procedure
The study was conducted as a community-based cross-sectional descriptive study and carried out at Hmawbi Cantonment Area, Yangon Region, Myanmar, in November 2015.

The study population was military community and sample size was   determined based on a study conducted in Myanmar.[12] Among 23 regiments, three were selected for the study by simple random sampling. Seventy respondents were selected from each of these three regiments using simple random sampling procedure. List of over 35 years age people for sampling frame was accessible from the   adjutant of each regiment.

Data collection method and tools
Before the main data collection, quantitative data were collected by face to face interview method using pre-tested structured questionnaires. Then the questionnaires were modified according to pretest results. The study population was explained about the purpose of the study and was requested for participation in the study. Then the face to face interviews were conducted at three regiments after receiving informed consent.

The questionnaire comprised 53 questions, divided into 3 parts. First part included socio-demographic factors such as gender, age, educational status, marital status, family income of respondents. Second part included 11 questions for awareness of hypertension and third part included risk factors related questions. Scoring for the awareness questions were 1 and 0 (1 for correct answer and 0 for incorrect and don't know answers).

Blood pressure was measured with the standard mercury sphygmomanometer in good working condition after standardization. The respondents were asked to avoid physical exertion, smoking, coffee drinking etc. and then rest for 5 minutes. After removing clothes from the arm, in sitting position, one inch above the elbow of right upper arm, systolic blood pressure was taken at Korotcoff first sound and diastolic blood pressure at phase five.

Weight measurement was done by portable bathroom weight measuring scale in even and hard surface. The respondents were in light clothes without foot wearing. By height measuring tape showing both Metric and British system of length in standing position, optimal exposure against a vertical surface with the head position so that top of the external auditory meatus was in level with the inferior margin of the bony orbit.

Data management and analysis
Collected data were reviewed for completeness and relevancy, and then data entry was done with SPSS 16.0 (Statistical Package for Social Sciences) software program. The data were checked for completeness, error and inconsistency after data collection. Data were cleaned by checking for errors and outliers. Data summarization was done by presenting tables, and measures of central tendency and measures of dispersion were also calculated. Cross tabulation was done for testing of significance for association between categorical variables, using Chi-square test. The statistical level of significance was $p \leq 0.05$.

Ethical consideration
Ethical clearance was obtained from Ethical Board of Studies, Defense Services Medical School.

Results

The socio-demographic characteristics of study population are shown in Table 1. Most of respondents were females 82.9%; in the age range of 40-60 years 62.4%; Bamar 84.3%; middle school education level 38.6%; dependents 82.8%; and had less than 250000 kyats of family income 64.8%.

Table 2 revealed the distribution of risk factors among respondents. It can be found that 16.7% respondents were current smokers and 71.4% of them had history of daily smoking. In alcohol drinking, 7.6% of respondents were current drinker and 87.5% of these current drinkers gave the history of drinking previous 12 months. Most of the respondents sometime ate fish source, fish prawn salt, fishy juice 55.2%, saturated oil 51.4%, monosodium glutamate 61.9%, fast food 52.9% and transfat 55.2%. It was also observed that 67.1% of the respondents took regular exercise and 78.1% of them took 30 minutes and more per day. Regarding the

Table 1: Distribution of socio-demographic characteristics among respondents (n=210)

Socio-demographic characteristics	Respondents (%)
Gender	
Male	36 (17.1%)
Female	174 (82.9%)
Age (year)	
≤ 40 years	69 (32.9%)
40 – 60 years	131 (62.4%)
> 60 years	10 (4.8%)
Mean ± SD: (44.98 ± 10.89); range: 35-74 years	
Race	
Bamar	177 (84.3%)
Shan	9 (4.3%)
Kayin	10 (4.8%)
Rakhine	12 (5.7%)
Mon	2 (1.0%)
Education	
Illiterate	10 (4.8%)
Read and write	15 (7.1%)
Primary	59 (28.1%)
Middle	81 (38.6%)
High	41 (19.5%)
Graduate	4 (1.9%)
Rank	
Lance Corporal	5 (2.3%)
Corporal	11 (5.2%)
Sergeant	9 (4.3%)
Warrant Officer II	7 (3.3%)
Warrant Officer I	4 (1.9%)
Dependency	
Dependent	174 (82.8%)
Family Income	
<250000 kyats	136 (64.8%)
250000 – 500000 kyats	74 (35.2%)
Mean ±SD: (250000 ± 89000); Range: 120000 - 500000 kyats	

body mass index (BMI) of respondents, 47.6% were within normal range, 32.9% respondents were over-weight and 19.5% were obese. There were 70.5% respondents with no stress and 29.5% respondents with stress.

As shown in Table 3, 44.3% respondents had poor awareness and 55.7% had good awareness. Regarding the prevalence of hypertension, 33.3% respondents were hypertensive. Among them, 44.3% respondents were pre-hypertension, 38.6% were hypertension stage I and 17.1% were hypertension state II.

Table 4 shows the association between the socio-demographic characteristics, awareness, risk factors of respondents and prevalence of hypertension. Concerning socio-economic characteristics, 40-60 years age group and 250000-500000 kyat family income group are found to be statistically significantly associated with hypertension. It can be assumed that female respondents were found to have hypertension more but their association was not statistically significant. Similarly, other races were found to catch hypertension than the Bamar respondents. However, their association was not statistically significant.

It was also observed that respondents who had poor awareness 41.9% were found to get hypertension than the respondents who had good awareness 26.5% and was significantly associated with hypertension. Regarding to the risk factors, hypertension had significant association with current smokers ($p<0.001$), alcohol drinkers ($p<0.001$), various salty and fast food patterns (p-0.01) such as consumption of fish, fish prawn salt, fishy juice, use of saturated oil, ($p<0.01$), use of monosodium glutamate during cooking ($p<0.001$), use of fast food ($p<0.001$), and use of transfat (p-0.001). Moreover, hypertension was significantly associated with irregular exercise ($p<0.001$), stressful condition ($p<0.001$) and over-weight respondents ($p<0.001$).

Discussion

Awareness of hypertension among military persons and their families is vital for success of hypertension prevention and control program. The cross-sectional descriptive study of prevalence, awareness and risk factors of hypertension in military community was carried out to find out major modifiable risk factors of hypertension, and the association between these factors and prevalence of hypertension.

In this study, we found that the prevalence of the respondents was 33.3% and it was lower than the previous studies conducted in Bangladesh and India 65%,[13] among the aboriginal Nicobarese tribe living in Car Nicobar Island, India 50.5%,[14] in Iranian adult population 41.8%.[15] However, the prevalence of other studies conducted in India 29.3%[16], in the northwestern tip of Penang Island, Malaysia 29.8%,[17] in middle Anatolian city 24.2%[18] and in Jalalabad City, Nangarhar Province, Afghanistan 28.4%[19] were lower than that of current study.

Regarding the awareness on hypertension, there were 55.7% respondents with good awareness which is higher than the findings 33.96% respondents with

Table 2: Distribution of risk factors among respondents

Risk factors			Respondents (%)
Smoking	Currently smoking (n=210)	Yes	35 (16.7%)
		No	175 (83.3%)
	Daily smoking (n=35)	Yes	25 (71.4%)
		No	10 (28.6%)
	Previously smoking (n=175)	Yes	12 (6.9%)
		No	163 (93.1%)
Alcohol drinking	Current drinking (n=210)	Yes	16 (7.6%)
		No	194 (92.4%)
	Drinking within previous 12 months (n=16)	Yes	14 (87.5%)
		No	2 (12.5%)
Food pattern	Taking with Fish source, Fish prawn salt, Fishy juice (n=210)	Daily	73 (34.8%)
		Sometime	116 (55.2%)
		Never	21 (10.0%)
	Usage of saturated oil (n=210)	Daily	38 (18.1%)
		Sometime	108 (51.4%)
		Never	64 (30.5%)
	Usage of Monosodium glutamate at cooking (n=210)	Daily	31 (14.8%)
		Sometime	116 (55.2%)
		Never	63 (30.0%)
	Usage of fast food (n=210)	Daily	42 (20.0%)
		Sometime	111 (52.9%)
		Never	57 (27.1%)
	Usage of trans-fat (n=210)	Daily	7 (3.3%)
		Sometime	130 (61.9%)
		Never	73 (34.8%)
Exercise	Taking regular exercise (n=210)	Yes	141 (67.1%)
		No	69 (32.9%)
	Duration of regular exercise in each day (n=141)	<30 min	31 (21.9%)
		≥30 min	110 (78.1%)
Body Mass Index	Normal weight		100 (47.6%)
	Overweight		69 (32.9%)
	Obese		41 (19.5%)
Stress	No stress (< mean score)		148 (70.5%)
	Stressful (≥ mean score)		62 (29.5%)
	Mean score (SD; Range): 1.04 (1.56; 0-8)		

Table 3: Awareness and prevalence of hypertension among respondents

Factors		Respondents (%)
Awareness (n=210)	Poor (< mean score)	93 (44.3%)
	Good (≥ mean score)	117 (55.7%)
	Mean score (SD; Range) – 20.03 (2.98; 12-27)	
Hypertension (n=210)	Yes	70 (33.3%)
	Pre hypertension (n=70)	31 (44.3%)
	Hypertension stage I (n=70)	27 (38.6%)
	Hypertension stage II (n=70)	12 (17.1%)
	No	140 (66.7%)

good awareness of a previous study conducted in Myanmar among the middle aged people in Bago Township,[21] 44.7% of awareness in study of Bangladesh and India[13], and 46.2% of awareness in study of Iranian adult population.[15]

In the association between socio-demographic characteristics and hypertension, hypertension was statistically significant associated with ages groups (*p*-0.001), and level of family income (*p*<0.001) of respondents. In the study of Aung *et al*.[20] study, hypertension was also statistically significant associated

with age groups and family income level. It indicated that prevalence of hypertension increased with increasing age and family income level. Kyaw *et al*.[21] revealed that hypertension was also statistically significant associated with age and family income. However, hypertension was not statistically significant associated with gender and race of respondents in our study. Doğan *et al*.[18] stated that significant risk factors of hypertension were age (*p*<0.0001), gender (*p*<0.0001) and income (*p*<0.0001). The study conducted in Jalalabad City, Nangarhar Province, Afghanistan

Table 4: Association between socio-demographic characteristics, awareness, risk factors of respondents and prevalence of hypertension (n=210)

Variable	Hypertension			*p* value
	Present Respondents (%)	Absent Respondents (%)	Total Respondents	
Gender				
Men	8 (22.2%)	28 (77.8%)	36	0.12
Women	62 (35.6%)	112 (64.4%)	174	
Age (year)				
<40	11 (15.9%)	58 (84.1%)	69	0.001
40-60	55 (42.0%)	76 (58.0%)	131	
>60	4 (40.0%)	6 (60.0%)	10	
Race				
Bamar	57 (32.2%)	120 (67.8%)	177	0.42
Others	13 (39.4%)	20 (60.6%)	33	
Family Income				
< 250000 kyat	33 (24.3%)	103 (75.7%)	136	<0.001
250000-500000 kyat	37 (50.0%)	37 (50.0%)	74	
Awareness				
Poor	39 (41.9%)	54 (58.1%)	93	0.01
Good	31 (26.5%)	86 (73.5%)	117	
Risk factors				
Current Smoking				
Yes	33 (94.3%)	2 (5.7%)	35	<0.001
No	37 (21.1%)	138 (78.9%)	175	
Alcohol Drinking				
Yes	16 (100.0%)	0	16	<0.001
No	54 (27.8%)	140 (72.2%)	194	
Food patterns				
Taking with fish source, fish prawn salt, fishy juice				
Daily	33 (45.2%)	40 (54.8%)	73	0.01
Sometime	34 (29.3%)	82 (70.7%)	116	
Never	3 (14.3%)	18 (85.7%)	21	
Usage of saturated oil				
Daily	18 (47.4%)	20 (52.6%)	38	<0.001
Sometime	43 (39.8%)	65 (60.2%)	108	
Never	9 (14.1%)	55 (85.9%)	64	
Usage of Monosodium glutamate at cooking				
Daily	14 (45.2%)	17 (54.8%)	31	<0.01
Sometime	45 (38.8%)	71 (61.2%)	116	
Never	11 (17.5%)	52 (82.5%)	63	
Usage of fast food				
Daily	29 (69.0%)	13 (31.0%)	42	<0.001
Sometime	34 (30.6%)	77 (69.4%)	111	
Never	7 (12.3%)	50 (87.7%)	57	
Usage of trans-fat				
Daily	5 (71.4%)	2 (28.6%)	7	0.001
Sometime	51 (39.2%)	79 (60.8%)	130	
Never	14 (19.2%)	59 (80.8%)	73	
Regular Exercise				
No	53 (76.8%)	16 (23.2%)	69	<0.001
Yes	17 (12.1%)	124 (87.9%)	141	
Stress				
Stressful	36 (58.1%)	26 (41.9%)	62	<0.001
No Stress	34 (23.0%)	114 (77.0%)	148	
Body Mass Index				
Normal weight	20 (20.0%)	80 (80.0%)	100	<0.001
Overweight	36 (52.2%)	33 (47.8%)	69	
Obese	14 (34.1%)	27 (65.9%)	41	

showed that hypertension was significantly associated with gender and level of income.[19] Hypertension was also significant associated with gender and age in the study of Malekzadeh *et al.*[15] The study conducted among urban adult population in India also showed hypertension was also statistically significant associated with age, sex and education.[16] The associations between hypertension and various age, and education subcategories were statistically significant (*p*<0.05) in the study of Manimunda *et al.*[14] In Malaysia study, age group and education level were also found to be statistically significant with hypertension.[17] It demonstrated that respondents with the highest educational level and young age group had the lowest prevalence of hypertension.

Regarding the awareness of hypertension, respondents with poor awareness (41.9%) had hypertension more than respondents with good awareness (26.5%). There was statistically significant association between awareness and hypertension (*p*-0.01). It demonstrated that poor awareness could increase the prevalence of hypertension among population. Iranian adult population study stated that awareness of being hypertensive was significantly higher in women and it was also more common in older patients, overweight and obese patients, urban residents, illiterates, those with less physical activity and never-smokers.[15] In the study of Zafar *et al.*,[22] there were significantly different of awareness between hypertensive respondents and normotensive respondents. In the study conducted in Bangladesh and India, there were also significantly associated between hypertension and awareness.[13]

In this study, hypertension was significant associated with current smokers, alcohol drinkers, various salty and fast food patterns such as consumption of fish, fish prawn salt, fishy juice, use of saturated oil, use of monosodium glutamate during cooking, use of fast food, and use of transfat. Moreover, hypertension was significantly associated with irregular exercise, stressful condition and overweight respondents. Thus, most of risk factors were associated with hypertension in the present study.

The study conducted in Bago Township revealed that hypertension was also associated with smoking (*p*<0.001), alcohol drinking (*p*<0.001), physical exercise (*p*<0.001) and body mass index (*p*<0.001). Nevertheless, there were no association between hypertension and dietary patterns, and stress.[21] In the study of Aung,[20] hypertension was statistically significant associated with alcohol drinking (*p*<0.001), salt consumption status (*p*<0.001), physical activity (*p*<0.001), stressful condition (*p*<0.001) and body mass index (*p*<0.001). However, there was no statistically significant association between smoking status and hypertension condition.

In a study conducted by Doğan *et al.*[18] in Turkey, it was demonstrated that significant risk factors of hypertension were obesity (*p*<0.0001). Another study from Afghanistan showed that hypertension was significantly associated with obesity, and physical activity.[19] Hypertension was also significant associated with BMI and physical activity at work in the study of Malekzadeh *et. al.*[15] The study conducted among urban adult population in India showed that hypertension was also statistically significant associated with extra salt

intake, current smoker, current alcoholic, high body mass index, and physical inactivity.[16] The associations between hypertension and alcohol consumption status, and overweight/obesity were statistically significant (*p*<0.05) in the study of Manimunda *et al.*[14] In Malaysia study, alcohol consumption and body mass index were found to be statistically significant with hypertension.[17]

In this study, major risk factors were asked to the respondents by cross sectional descriptive method. More detail risk factors will be explored by case control study. One limitation in this study is that blood pressure has been checked two times within a period of 30 minutes according to the researcher as well as respondents, which should have been confirmed on further follow up. Another limitation is that the study was intended for essential hypertension, secondary hypertension could not be excluded. The next one is that most of military persons were away from their regiments for training at the time of data collection.

Conclusion

Myanmar is now facing double burden of diseases — communicable diseases and non-communicable diseases. Hypertension is one of the important health problems and the priority actions are needed to develop with the aim to prevent, control and reduce disease, disability and premature deaths from hypertension. The risk factors of hypertension such as smoking, alcohol drinking, consumption of salty and fast food, sedentary life style, stress condition and increase body mass index will be diminished by improving the awareness and changing the lifestyle of population.

Based on these findings, population should be educated on the risk factors, presenting features and complications of hypertension by implementing National Non-communicable Disease Strategic Plan in order to reduce the risk factors of hypertension. Provision of this plan would further enhance awareness of hypertension and would gradually decrease the prevalence of hypertension among population.

Competing interest

The authors declare that they have no competing interests.

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