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The Association of Hypertension with Major Risks Factors among University Putra Malaysia Retirees

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The aim of this study was to determine the prevalence of hypertension and its associated risk factors among University Putra Malaysia (UPM) retirees in Klang Valley, Malaysia. This study was conducted among UPM retirees aged 50 years and above. Seventy-three respondents (males n = 62, females n = 11) were selected randomly and interviewed using a pre-designed questionnaire to collect information on the above variables. Blood pressure and anthropometric parameters measurement were done using standardized technique. Prevalence of hypertension was 32.88% in males and 36.36% in females, with the highest proportion among those aged 70 years and above (75%). Isolated systolic hypertension was detected in 50% hypertensive subjects. The mean systolic blood pressure was 133.73±16.35 mmHg with a significant difference observed in age group and various ethnics (p<0.05). The mean diastolic blood pressure was 81.99±9.46 mmHg. Among hypertensive subjects, 70.83% were aware of their hypertension and 82.35% (14) were currently under treatment. Among ever diagnosed hypertensive, 73.33% were currently under treatment and a mere 40.91% achieved blood pressure control. Factors found to be significantly associated with hypertension were literacy ($\chi^2 = 16.51$, df = 2, p<0.05) and previous job ($\chi^2 = 8.82$, df = 1, p<0.05). The prevalence of hypertension in this study was high. It is highly recommend that proper screening of blood pressure should be emphasized among the retirees to increase their awareness on the importance of blood pressure control and to improve lifestyle modification of hypertension.

Key words: Hypertension, systolic blood pressure, risk factors, elderly

INTRODUCTION

Hypertension is predominantly a disorder of populations in which the fundamental problem is the tendency for blood pressure to rise with age (Perry and Beevan, 1992). Ten to fifteen percent of the world's population suffers from hypertension and majority of them are elderly (Yeoleker and Shete, 2002). The lifetime risk of hypertension for individuals 55 years old is approximately 90% (Vasan *et al.*, 2002). Prospective data on the associations between diet and nutrient components with risk of hypertension remain limited (Wang *et al.*, 2008).

Based on the Malaysian National Health and Morbidity survey of 1996, a survey of 21,391 individuals over the age of 30 showed a high prevalence of high blood pressure (Lim *et al.*, 2000). According to the same survey, the prevalence of hypertension in adults aged 30 years and above was 24%. Numerous hypertensive cases are not detected due to a simple lack of routine check-up (WHO MONICA Project, 1989). However, it is a significant and independent risk factor for coronary heart disease morbidity and mortality, regardless of age, gender, ethnicity and history of coronary heart disease. Cardiovascular diseases are major health problems not only in the developed countries but also in developing countries such as Malaysia. In the United States (US) over the last two decades, the National High Blood Pressure Education Program of the US has been remarkably successful in increasing detection, treatment and control of hypertension in the US population (Joint National Committee on Detection, 1993).

Influence of obesity as determinant of cardiovascular risk factors has not been well studied. Obesity is a major and independent cardiovascular and hypertension risk factor (Gupta *et al.*, 2007; Aguilar *et al.*, 2007).

Cardiovascular disease has emerged as the principle cause of mortality and hypertension is a prevalent cardiovascular risk factor in our population (Kandiah *et al.*, 1980). Though hypertension among the elderly has become a public concern, hypertensives often remain undetected in the community until they present with cardiovascular complications (Lim, 1991). Late detection will not only burden the individual but also the government due to high cost of treatments.

The health of individuals be they elderly or otherwise, need to be approached in a broad, comprehensive and holistic perspective, that includes not only the biological but also environmental, lifestyle and health care aspects, all of which have a bearing on where an individual fits into an illness-wellness continuum. Hypertension is predominantly the commonest disorder of

the population and there is a tendency for blood pressure to rise with age (John and Arokiasamy, 2000).

Specific suggestion and recommendation can also be generated from the study to educate UPM staff to prevent hypertension as early as possible. The main objective of this study was to determine the prevalence of hypertension and its associated risk factors among UPM retirees in Klang Valley, Malaysia.

MATERIALS AND METHODS

This cross-sectional study consisted of two categories. The first category was a descriptive research involving measurement of blood pressure, followed by a brief face to face interview. The second category was a qualitative data to obtain information related to gender, marital and smoking behavior. Study was carried out at Faculty of Medicine and Sciences, University Putra Malaysia (UPM). A total of 210 persons were eligible and invited to participate into the study based on the prevalence of hypertension within acceptable confidence limits. Each member was given an invitation letter and consent to participate in the study. The participants were interviewed in the first half an hour using a pre-tested and structured questionnaire administered by an interviewer to collect information on socio-demographic variables, history of self-reported diagnosis hypertension, dietary habits, history of smoking, stress level and level of awareness. At the end of the interview, heights, weights and blood pressure were measured according the National High Blood Pressure (1993). Fasting blood samples were taken to measure the serum lipid and blood glucose according to the standard enzymatic techniques. Body Mass Index (BMI) was calculated. BMI values ≥ 27.5 was defined as obesity (Clinical Practice Guidelines on Management of Obesity, 2003) which was considered as a risk factor. Measurement of fasting serum lipid levels and blood glucose was carried out. Subjects having ≥ 5.2 mmol L⁻¹ of total cholesterol level (National Cholesterol Education Program, 2002) and ≥ 6.7 mmol L⁻¹ fasting glucose (Clinical Practice Guidelines, 2002) at baseline laboratory examination were defined as having dyslipidemia and diabetes respectively, which was also considered as a risk factor. Subjects with medical history of diabetes and currently on anti-diabetic medication were also classified as diabetic. Blood pressure was measured based on recommendation by Malaysian Guideline for Good Clinical Practice (2002). Blood pressure was measured after 30 min rest in the right arm supported on a table at heart level with the patient seated. They were also abstained from smoking or ingested caffeine within that time. Three readings were taken and their mean was

recorded as the actual pressure. Hypertension for this study was a systolic pressure of greater than 140 mmHg and or diastolic pressure of above 90 mmHg regardless of age. Isolated systolic hypertension as SBP >140 mmHg and DBP <90 mmHg was also noted ((Joint National Commission, 1997). Reported level of physical activity was divided into three categories: no activity, low activity and high activity, according to the criteria used by Sharabi *et al.* (2004). Smoking status was defined as current smoker, former smoker, or never smoked. Subjects answering positively to questions about whether a doctor had ever told them that they had heart failure, a previous heart attack, diabetes, or stroke were classified as having an additional risk factor. Self-reported family history was also considered as an additional risk factor. Participants were asked to state their previous and current employment as professional or general worker. Educational level was divided into three categories: primary, secondary or tertiary. Fruits and vegetables intake was divided into three categories: <3 servings per day, < 3 servings per day or do not include fruits and vegetables in meal. Salt intake was defined as high: <6 g of sodium chloride a day and low: < 6 g of sodium chloride a day (Whelton *et al.*, 1998).

Data analysis: All statistical analyses were performed with using SPSS 10.0 (Statistical Package for Social Science). Descriptive statistics including means and SDs for the outcome variables of interest were computed. The probability levels of significance reported are based on the 2-tailed t-test. Correlations test were used to determine the association between hypertension and the different variables.

RESULTS

Socio-demographic profiles and characteristics of respondents: The proportion of male participants (84.93%) was greater than that of females (15.07%). The mean age was 60.0±5.41 with a minimum age of 47 years and the maximum of 79 years (Table 1). The Malays formed the majority 94.52%, followed by Chinese 4.11% and Indians 1.37%. Table 2 shows the socio-demographic of the respondents 9.59% of the elderly participants were living without spouse of whom 6.85% were widows and 2.74% were widowers. The rest 90.41% were living as couple. The study found 43.55% of males received tertiary education compared to only 27.27% of females. Most of the females studied reported their education was until primary level (54.55%). 41.09% of the respondents were previously worked as professionals in UPM and 58.91% were as general workers. Only 9.58% were current smokers and all of them were males. Majority (95.89%) included vegetables and fruits in their daily meals and 73.97% of

Table 1: Socio-demographic profile of the respondents

Factors	n	Percentage (%)
Total subjects	= 73	
Mean age	= 60.03±5.41	
Mean age for male	= 60.47±5.06	
Mean age for female	= 57.55±6.80	
Age group		
40-49 years	2	2.74
50-59 years	38	2.05
60-69 years	29	39.73
70 years and above	4	5.48
Gender		
Male	62	84.93
Female	11	15.07
Ethnicity		
Malays	69	94.52
Indians	1	1.37
Chinese	3	4.11

Data were expressed as mean±SD

Table 2: Characteristics of the respondents

Characteristics	Male (n = 62)	Female (n = 11)	Total (n = 73)
Marital status			
Married	60 (96.77)	6 (54.55)	66 (90.41)
Widow	-	5 (45.45)	5 (6.85)
Widower	2 (3.23)	-	2 (2.74)
Literacy			
Primary	22 (35.48)	6 (54.55)	28 (38.36)
Secondary	13 (20.97)	2 (18.18)	15 (20.55)
Tertiary	27 (43.55)	3 (27.27)	30 (41.09)
Previous job in UPM			
Professional	27 (43.54)	3 (27.27)	30 (41.09)
General worker	35 (56.45)	8 (72.73)	43 (58.91)
Smoking			
Current	7 (11.29)	-	7 (9.58)
Never	24 (38.71)	11 (100.00)	35 (47.95)
Stopped	31 (50.00)	-	31 (42.47)
Food habit			
Vegetarian	59 (95.16)	11 (100.00)	70 (95.89)
Non-vegetarian	3 (4.84)	-	3 (4.11)
Extra salt			
Hi-intake	15 (24.19)	4 (36.36)	19 (26.03)
Low-intake	47 (75.81)	7 (63.64)	54 (73.97)
Health			
Diabetes	18 (29.03)	2 (18.18)	20 (27.40)
Stroke	5 (8.06)	-	5 (6.85)
Heart disease	6 (9.68)	-	6 (8.22)
Kidney disease	2 (3.23)	-	2 (2.74)
Family history			
Hypertension	27 (43.55)	2 (18.18)	29 (39.73)
Diabetes	21 (33.87)	5 (45.45)	26 (35.62)
Stroke	5 (8.06)	1 (9.09)	6 (8.22)
Heart disease	6 (9.68)	1 (9.09)	7 (9.59)
Physical activity			
Active/Moderate	41 (66.13)	7 (63.64)	48 (65.75)
Low	21 (33.87)	4 (36.36)	25 (34.25)
BMI			
Underweight <18.5	2 (3.23)	-	2 (2.74)
Normal 18.5-22.9	12 (19.35)	3 (27.27)	15 (20.55)
Overweight = 23.0	26 (41.94)	4 (36.36)	30 (41.09)
Obese = 27.5	22 (35.48)	4 (36.36)	26 (35.62)

Values within parenthesis indicate percentage (%)

respondents practiced low salt intake in their food habit. 65.75% (48) of the respondents were engaging active to moderate activity and which showed higher percentage in both males (66.13%) and females (63.64%). Health

Table 3: Prevalence of hypertension status by age-sex-ethnic

Factors	Total	n	Prevalence (%)	p-value
Overall current hypertension		24	32.88	
Self-reported diagnosed hypertension		30	41.10	
Newly detected high blood pressure		7	9.60	
Mean age = 62.42±6.13				
Mean age for male = 63.25±5.41				
Mean age for female = 58.25±8.66				
Overall	73	24	32.88	
Age group				
40-49 years	2	1	50.00	0.09
50-59 years	38	6	15.79	
60-69 years	29	14	48.27	
70 years and above	4	3	75.00	
Gender				
Male	62	20	32.26	0.789
Female	11	4	36.36	
Ethnicity				
Malays	69	21	30.43	0.151
Indians	1	1	100.00	
Chinese	3	2	66.67	

*p-value is significance if (p<0.05), Data were expressed as mean±SD

problems were recorded in 45.21% of the participants and diabetes was shown to be the highest health problem (27.4%). 39.73% had a positive family history of hypertension which was classified as having an additional risk factor. Overall mean BMI was 25.98±3.79. The mean BMI for male was 25.95±3.8 and 26.14±3.86 for female.

Prevalence of hypertension: The overall prevalence of hypertension in the study sample was 32.88% (24) of the 73 respondents, 30 self-claimed to have hypertension (Table 3), giving a prevalence of 41.10%. However after the assessment, 9.59% (7) were detected to have high blood pressure. The mean age for hypertensive was 62.42±6.13. There was no significant difference in the prevalence of hypertension with increasing age (p>0.05). High prevalence (75%) were observed in the age group 70 years and above (Table 3). No significant sex difference (p = 0.789) was observed in the prevalence of hypertension. The Indians had the highest rate of prevalence (100%), followed by Chinese (66.67%) and Malays (30.43%). However, there was no significant difference among the different ethnic groups (p = 0.151).

Distribution of hypertensives according to their cardiovascular risk factors: Table 4 shows that primary education was the most frequently observed (70.83%) among the hypertensives and showed the highest prevalence of hypertension (60.71%). Only 16.67% (4) tertiary educated hypertensives were observed, giving the lowest prevalence of 13.33%. Among the hypertensives, 83.33% (20) were previously worked as general workers while only 16.67 (4) were professional workers. Fifty percent (12) of the total hypertensives had stopped smoking and only 12.5% (3) were current smokers. In general, current smokers showed the highest prevalence

Table 4: Characteristics of hypertensives and prevalence of hypertension by Characteristics

Characteristics	Total retirees (N = 73)	Male (n = 20)	Female (n = 4)	Total HTNsv (n = 24)	Prevalence (%)
Literacy					
Primary	28	14 (70.0)	3 (75.0)	17 (70.83)	60.71
Secondary	15	3 (15.0)	-	3 (12.50)	20.00
Tertiary	30	3 (15.0)	1 (25.0)	4 (16.67)	13.33
Previous job in UPM					
Professional	30	3 (15.0)	1 (25.0)	4 (16.67)	13.33
General worker	43	17 (85.0)	3 (75.0)	20 (83.33)	46.51
Smoking					
Current	7	3 (15.0)	-	3 (12.50)	42.86
Never	35	5 (25.0)	4 (100)	9 (37.50)	25.71
Stopped	31	12 (60.0)	-	12 (50.00)	38.71
Food habit					
Vegetarian	70	19 (95.0)	4 (100)	23 (96.0)	32.86
Non-vegetarian	3	1 (5.0)	-	1 (4.0)	33.33
Extra salt					
Hi-intake	19	4 (20.0)	2 (50.0)	6 (25.0)	31.58
Low-intake	54	16 (80.0)	2 (50.0)	18 (75.0)	33.33
Health					
Diabetes	20	11 (55.0)	1 (25.0)	12 (50.0)	60.00
Stroke	5	1 (5.0)	-	1 (4.00)	20.00
Heart disease	6	4 (20.0)	-	4 (16.67)	66.67
Family history					
Hypertension	29	9 (45.0)	1 (25.0)	10 (41.67)	34.48
Diabetes	26	7 (35.0)	2 (50.0)	9 (37.5)	34.62
Stroke	6	1 (5.0)	-	1 (4.00)	16.67
Heart disease	7	3 (15.0)	-	3 (12.5)	42.86
Physical activity					
Active/Moderate	48	13 (65.0)	3 (75.0)	16 (66.67)	33.33
Low	25	7 (35.0)	1 (25.0)	8 (33.33)	32.00
BMI					
Underweight <18.5	2	-	-	-	-
Normal 18.5-22.9	15	2 (10.0)	1 (25.0)	3 (12.50)	20.00
Overweight ≥ 23.0	30	10 (50.0)	1 (25.0)	11 (45.83)	36.67
Obese ≥ 27.5	26	8 (40.0)	2 (50.0)	10 (41.67)	38.46

Values within parenthesis indicate percentage (%), HTNsv = hypertensive

of hypertension (42.86%). Majority of the respondents (96%) included vegetables and fruits in their daily meals and 75% had low salt intake in their food habit. The prevalence of hypertension was higher in both diabetics (60%) and heart disease patients (66.67%). Diabetes was the most frequently suffered health problem among the hypertensives (50.0%), followed by heart disease (16.67%) and stroke (4%) which was classified as having an additional risk factor. 41.67% (10) hypertensives had a positive family history of hypertension and 37.5% (9) had a positive family history of diabetes. The prevalence of hypertension among respondents with both positive family history of hypertension and diabetes were found to be similar (34.48%). Most of the hypertensives (66.67%) admitted that they practiced active to moderate activity and only 33.33% engaged light activity. Overall mean BMI for hypertensives was 26.35±3.08. Mean BMI for male was 26.25±2.81 and 26.83±4.73 for females. 45.83% (11) of the hypertensive were overweight, 41.67% (10) of them were obese and only 12.5% (3) had normal BMI. Obese hypertensive showed the highest prevalence of hypertension (38.48%), followed by overweight

Table 5: Distribution of blood pressure level by gender

Groups	Male (n = 62)	Female (n = 11)	Total (n = 73)
Normotensives			
Optimal (< 120 and < 80)	10 (16.13)	4 (36.36)	14 (19.18)
Normal (< 130 and < 85)	17 (27.42)	2 (18.18)	19 (26.03)
High-normal (130-139 and / or 85-89)	15 (24.19)	1 (9.09)	16 (21.92)
Hypertensives			
Stage 1 (140-159 and/or 90-99)	16 (25.81)	2 (18.18)	18 (24.66)
Stage 2 (160-179 and/or 100-109)	4 (6.45)	1 (9.09)	5 (6.85)
Stage 3 (180 and/or 110)	-	1 (9.09)	1 (1.37)
Isolated systolic hypertension (ISH) (≥140 and < 90)	10 (16.13)	2 (18.18)	12 (16.44)

Values within parenthesis indicate percentage (%)

Table 6: Mean systolic blood pressure by age group, gender and ethnic

Characteristics	Overall (n = 73)	p-value (ANOVA)	Mean SBP (Hypertensives)	Mean SBP (Normotensives)
	133.73±16.35		152.29±11.29	124.63±9.11
Age group				
40-49 years	129.50±14.85		140.00±0.0	119.00±0.00
50-59 years	128.39±13.15		148.83±9.83	124.57±9.74
60-69 years	138.52±17.47		153.29±11.34	124.73±8.33
70 years>	151.75±18.19	0.007*	158.67±14.47	131.00±0.00
Gender				
Male	133.65±15.10		151.15±9.24	125.31±8.88
Female	134.18±23.10	0.921	158.00±19.6	120.57±10.13
Ethnicity				
Malays	132.41±15.18		150.67±9.29	124.42±9.08
Indians	169.00±0.0		169.00±0.0	-
Chinese	152.33±24.21	0.009*	161.00±26.87	135.00±0.0

SBP: Systolic blood pressure, *p-value is significance if (p<0.05), Data were expressed as mean±SD

hypertensive (36.67%) and normal weight hypertensives (20%). Fifty percent of the females hypertensive were obese as compared to only 40% in males.

Distribution of blood pressure level by gender: Only 19.18% individuals in the study sample had optimal blood pressure (Table 5). Females had a higher percentage (36.36%) of optimal blood pressure than males (16.13%). Out of hypertensive subjects (n = 24), 75% had mild hypertension (Stage 1) while 20.83% had moderate hypertension (Stage 2) and 4.17% of the hypertensives suffered from severe hypertension (Stage 3). Among hypertensive subjects 50% (12) has isolated systolic hypertension (ISH).

Mean blood pressure: The overall mean systolic was 133.73±16.35 and overall mean diastolic was 81.99±9.46. The mean SBP of the respondents with hypertension was 152.29±11.29 and mean SBP for normotensives was 124.63±9.11. There was a significant overall mean DBP difference between normotensives and hypertensives (p = 0.001) (Table 6, 7). There was a general tendency for mean Systolic Blood Pressure (SBP) to rise progressively and significantly (p = 0.007) with increasing age beyond the age 50-59 but Diastolic Blood Pressure (DBP) tended

Table 7: Mean diastolic blood pressure by age group, gender and ethnic p-value

Characteristics	Mean DBP		Mean SBP (Hypertensives)	Mean SBP (Normotensives)
	Overall (n = 73)	p-value (ANOVA)		
	81.99±9.46		87.79±10.27	79.14±7.66
Age group				
40-49 years	87.50±17.68		100.00±0.0	75.00±0.0
50-59 years	81.53±9.39		86.17±98.64	80.66±9.4
60-69 years	81.90±8.64		86.00±7.55	78.07±7.98
70 years>	84.25±15.13	0.808	84.00±18.52	85.00±0.0
Gender				
Male	82.24±9.14		87.95±9.38	79.52±7.76
Female	80.55±11.47	0.587	87.00±15.79	76.86±7.13
Ethnicity				
Malays	82.14±9.21		85.43±6.49	80.71±9.90
Indians	100.00±0.00		100.00±0.0	-
Chinese	72.33±5.86	0.032*	69.00±1.41	79.00±0.0

DBP: Diastolic blood pressure, *p-value is significance if (p<0.05), Data were expressed as mean±SD

Table 8: Association of continuous variables with hypertension (correlations)

Factors	Systolic blood pressure	Diastolic blood pressure
Age	0.244	-0.471*
BMI	0.083	0.634**
Fasting blood glucose	-0.026	-0.144
Total cholesterol	0.045	0.055
Triglyceride	0.129	0.136
HDL	0.172	0.286
LDL	-0.199	-0.090

*Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the 0.01 level (2-tailed)

to decline (Table 8). The overall mean SBP was highest (151.75±18.19) in the age group 70 years and above which also seen in both normotensives (131.00±0.0) and hypertensives (158.67±14.47) in the same age group. There was a significant mean SBP difference between normotensives and hypertensives in the age group 50-59 years (p = 0.00) and 60-69 years (p = 0.00) but there was no significant mean DBP difference in both age group.

There was not much overall SBP difference between the two genders (p = 0.921). Overall mean DBP was slightly lower (80.55±11.47) in females. There was a significant difference in mean SBP (p = 0.009) and mean DBP (p = 0.032) in various ethnics. The Indians had the highest average SBP (169.00±0.0) and DBP (100.00±0.0), followed by Chinese and Malays. Malays had the lowest average SBP (132.41±15.18) for both genders while Chinese had the lowest average DBP (72.33±5.86). All significance differences were at 95% confidence level.

Association between hypertension and the risk factors:

Correlations test was used to determine the association between hypertension and the different continuous variables (age, BMI, fasting blood glucose, total cholesterol, triglyceride (TG), High Density Lipoprotein (HDL) and Low Density Lipoprotein (LDL). Chi-square test was used to determine the association between

Table 9: Association between hypertension and different variables (chi-square)

Factors	Value (χ^2)	df	Significant (2-sided)
Gender	0.071	1	0.789
Ethnicity	3.78	2	0.151
Marital status	2.066	1	0.151
Literacy	16.152	2	0.000*
Previous job	8.815	1	0.003*
Smoking	1.608	2	0.448
Food habit	0.000	1	0.986
Extra salt	0.020	1	0.889
Health problem	3.004	2	0.223
Family history	1.057	3	0.787
Physical activity	0.013	1	0.908

*p-value is significance if ($p < 0.05$)

hypertension and the different descriptive variables. The association of age, BMI and various descriptive variables with hypertension was determined among the 24 hypertensive subjects. The association between blood pressure and fasting blood glucose, TG, HDL and LDL however was determined among 32 subjects who were agreed to draw their blood.

There was no significant association between systolic blood pressure and age, BMI, fasting blood glucose, total cholesterol, TG, HDL and LDL in this study (Table 8). There was a significant negative relationship between diastolic blood pressure and age. Positively significant association was observed between diastolic blood pressure and BMI. Hypertension was significantly related to literacy ($\chi^2 = 16.51$, $df = 2$, $p < 0.05$) and previous job ($\chi^2 = 8.82$, $df = 1$, $p < 0.05$) in UPM (Table 9). There was no significant association between hypertension and the other variables.

DISCUSSION

The definition and concern of hypertension in this study was based on a single measurement with individuals who currently have their SBP ≥ 140 mmHg and or DBP > 90 mmHg. Clearly, the researcher was looking at an extremely grave situation. The prevalence rates found here are among the highest reported in the literature. Population blood distribution can help the high prevalence of hypertension will result in heavy burden of illnesses related cardiovascular morbidities.

In this study the newly diagnosed high blood pressure was lower (9.6%) compared to the findings in National Health and Morbidity Survey, 1997 (15.9%). Isolated systolic hypertension (ISH) was detected in 50% among the elderly hypertensives in the study sample, 41.67% in males and 8.33% in females. The distribution of hypertension in those aged 65-88 years in the Framingham Study suggests approximately 60% will have isolated systolic hypertension (ISH) (Wilking *et al.*, 1998).

The prevalence of hypertension in this study was 32.88%. This figure was slightly higher compared to the report of the 2nd Malaysian National Health and Morbidity Survey Conference (1997) where the prevalence of hypertension was 24.1%. Majority of those surveyed were hypertensive subjects who had mild hypertension (Stage 1).

Females have shown a slightly higher prevalence than males. This finding was comparable to the National Health and Morbidity Survey report (1997). Distribution of hypertension across age groups also showed a steady increase with age, particularly after the 50s age group. Increase in blood pressure level with ageing and its adverse impact has been reported in many studies conducted in different parts of the globe (Trenkwalder *et al.*, 1994).

Hypertension was most prevalent in respondents aged 70 years and above (75%) but it should be interpreted with caution as the number of cases examined in this age group was low. The lowest prevalence of hypertension was seen in the age groups of 50-59 years (15.79%). Currently, hypertension is the major killer in males aged 45 years and above and females aged 65 years and above (Hennekens, 1998). There was no significant association observed between hypertension and both age and gender. Findings in this study suggested that SBP, but not DBP, was a strong, positive, independent indicator of mortality risk in the elderly as 50% of total hypertensive subjects had Isolated Systolic Hypertension (ISH) and should be stressed much more than DBP in the diagnosis and treatment of hypertension in this age group. It is particularly important to diagnose and treat ISH as early as possible due to the high incidence of stroke, heart attack and heart failure associated with this type of hypertension. The increase in mean systolic pressure with age was significantly marked than the increase in diastolic both males and females. Mean Systolic Blood Pressure (SBP) was higher among females compared to males in all ages but the mean Diastolic Blood Pressure (DBP) was higher among males. There was a significant difference in mean SBP and mean DBP in various ethnics. Literacy and previous job in UPM were found to be significantly associated with hypertension. No significant association was observed in other variables. Detection and control among retirees was less than satisfactory as shown in this survey. Generally, there was a decreased in mean SBP in DBP in this study sample. The prevalence of hypertension in this study may have been overestimated or could also be a true picture of the hypertension burden among retirees. Averaging across the measurements obtained on the two or more occasions provides a more precise estimate of an individual's blood

pressure than that obtained by use of either set of readings alone. Because of the extent to which the selection of the sample and the measurement protocol influence prevalence estimation, caution should be emphasized in comparing the findings presented in the study. Hypertensive patients frequently demonstrate their highest recorded levels in a clinical setting, with subsets of patients who demonstrate hypertensive blood pressures only in the physician's office (Pickering, 1999). In pursuit of the minimum exercise prescription to improve cardiovascular risk, research should focus on brisk walking programs of greater total duration than 60 min per week. Hypertensive subjects with multiple risk factors may be encouraged to exercise and lead a healthy lifestyle. This will lead to attenuation of the relation between physical activity and risk factors clustering. Lifestyle interventions targeting multiple risk factors including blood pressure may be the most effective prevention strategy.

CONCLUSION

Prevention program must stress the important of healthy lifestyle, good nutrition, weight reduction in the obese and increased physical activity. Concerted public health effort is required to increase awareness, detection and to improve lifestyle modification of hypertension among retirees. Coping with adversity in later life, in particular health-related problems is priority for older persons, their families and caretakers alike. Education may be important, not because it conveys information about early life but because it is a guide to position in society in adult life. This, in turn, is related to the determinants of differentials in health. This study is primarily useful in the generation of hypothesis, but not in hypothesis testing. The findings of this study can be used as a baseline for future studies done in greater depth. It is highly recommend that proper screening of blood pressure should be emphasized among the elderly in UPM.

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