

Prevalence of Hypertension and its Associated Factors Among University Staff



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INTRODUCTION



Cardiovascular disease (CVD)

❖ CVD is **responsible for 30% of all deaths worldwide** [1].

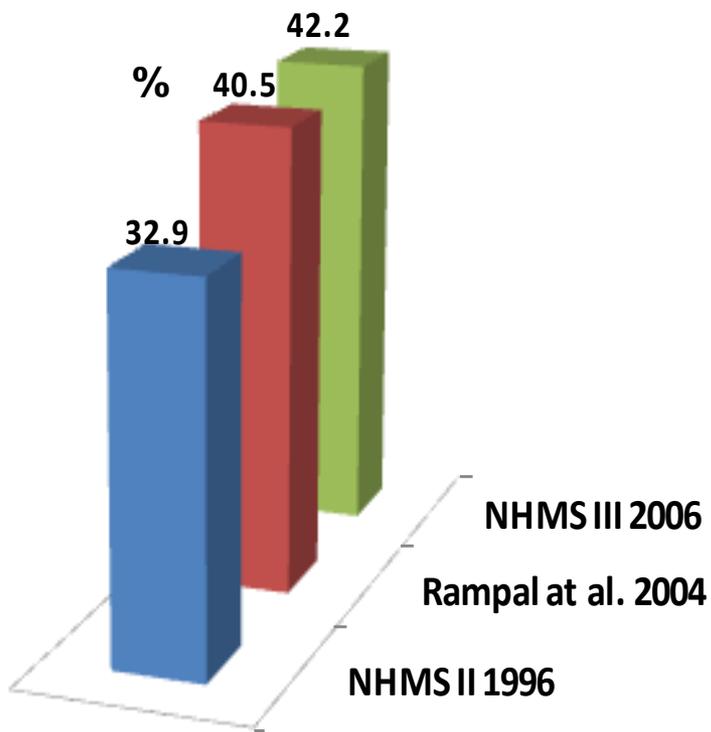
- ✓ Its mortality is likely to continue to increase in developing countries, if no appropriate action is taken [2].
- ✓ The burden of mortality, morbidity and disability attributable to CVD is currently high and continues to grow.

Hypertension World-Wide;

- ❖ It is the **leading treatable risk factor for CVD mortality** [4-6].
- ❖ **Triggering** more than **seven million deaths every year** [5-6]
- ❖ **1.56 billion people** are expected **to have hypertension by 2025** [7],
- ❖ About **10% of global healthcare expenditures** went on **suboptimal** blood pressure in 2001 [10].

In Malaysia

Prevalence of Hypertension among adults aged >30 yrs. in Malaysia



- ❖ CVD has been the leading cause of death for the past 40 years [3].
- ❖ it is estimated that there are **4.8 mil. Malaysian have hypertension** [10].
- ❖ Up to **two thirds** of individuals with hypertension are **not aware** that they have hypertension.

(7th Asian-Pacific Congress Of Hypertension 2009).

❖ The most important risk factors for cardiovascular diseases;

- ❖ **hypertension**,
- ❖ obesity,
- ❖ high blood cholesterol,
- ❖ cigarette smoking,
- ❖ diabetes,
- ❖ physical inactivity and stress.

Study justification

- ❖ **Valid information** on the number of individuals affected by hypertension is the *starting point* for public health policy makers to direct the efforts *to make the population aware of their Hypertension status..... have it treated and controlled!*
- ❖ **Screening for hypertension** is straightforward;
 - ❖ not only it *detects hypertension* but also....
 - ❖ provides an opportunity for *patient education, early diagnosis, and prompt treatment* ^[11].
- ❑ **Lowering BP by 5-10 mmHg can reduce mortality**
 - ❖ from *cerebro-vascular disease* by 35%-40%,
 - ❖ from *ischemic heart disease* by 20% -30%.... and
 - ❖ reduction in *all deaths from cardiovascular events* by 23%.

(Prospective Studies Collaboration. 2002)

STUDY OBJECTIVES



General Objective

To determine the **prevalence of hypertension** and **factors associated** among Malaysian staff in Universiti Putra Malaysia.

Specific Objectives

✓ Determine	Prevalence of hypertension by age, gender and ethnicity among UPM staff aged >30 years in Universiti Putra Malaysia.
✓ Determine	Percentage of hypertensive respondents who are; <ul style="list-style-type: none">• aware of their hypertensive status,• aware of their hypertensive status, being treated and have it under control
✓ Determine Association	Between Prevalence of Hypertension and age, gender, marital status, level of education, family income, family history of hypertension, physical inactivity and Obesity

MATERIALS AND METHODS



Study Location / Study Design

- ❖ This **cross sectional study** was carried out in Universiti Putra Malaysia (UPM) which is;
 - situated 22 km south of Kuala Lumpur and;
 - 12 km from Putrajaya,
- ❖ The university was **established in 1931** and consists of;
 - **16 faculties** and **9 institutes**.
 - With....
 - **3,000 staff.**
 - **20,000 students**

- **Study population:** all Malaysian UPM staff aged 30 years and above
- **Sampling frame:** complete lists of all staff of both genders aged 30 years and above
- **Sampling unit:** each eligible member of the sampling frame
- **Estimated sample size:** 517

Where:

$n =$ Sample size

$P = 0.426$ Expected prevalence according to NHMS III (42.6%)

$Z = 1.96$ Statistic for 95% level of confidence

$\varepsilon=0.1$ Desired precision

$$n = \frac{z_{1-\alpha/2}^2(1-p)}{\varepsilon^2 p} n = \frac{1.96^2(0.574)}{0.1^2(0.426)} = 517$$

(Lemeshow 1990)

- **Sampling technique:** **Simple random selection techniques.**
Table of random numbers was used to select the required samples from “List of staff” obtained from UPM administration department

Data Collection

Ethical Approval (UPM Human Research Committee)

Respondent's Informed Consent

Pre-tested validated questionnaire to obtain data on; age, gender, ethnicity, education, family history of hypertension, smoking status, physical activity, alcohol consumption, awareness of hypertension and antihypertensive treatment.

Measurement

- Blood Pressure
 - Height
 - Weight

Blood pressure (BP) measurement

using a standard mercury sphygmomanometer;

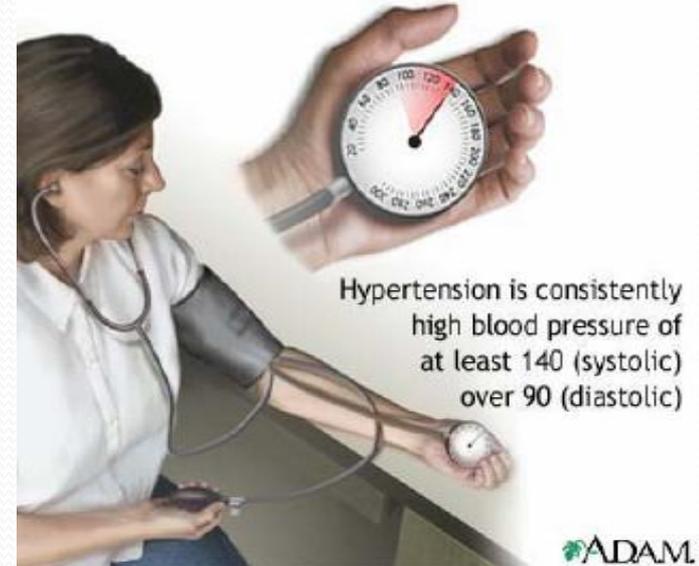
- BP was measured after the respondents had rested for at least 5 minutes
- The respondents were examined in a seated position with the arm placed at the heart level.
- Two blood pressure measurements were taken for each respondent. The average of the two systolic blood pressure [SBP] and diastolic blood pressure [DBP] readings was used in the analysis.

Classification:

- **Normal blood pressure:** SBP <120mmHg, and DBP <80
- **Pre-hypertension:** SBP 120 to 139 mmHg or DBP 80 to 89 mmHg.
- **Hypertensive:** SBP >140 mmHg, and/or DBP > 90 mmHg.... and/or

by self-reports of a medical diagnosis of hypertension and current treatment for hypertension with antihypertensive medication.

- **Hypertension awareness:** was defined as a positive answer to the question ‘**Have you ever been told by a doctor that you have high blood pressure (hypertension)**’.



Body Mass Index (BMI)

- Weight was measured by using a calibrated digital bathroom scale (*TANITA Model HD319*).
- Height was measured by using SECA Body Meter Model 206.
- Body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters (kg/m^2).

Respondents were classified as;

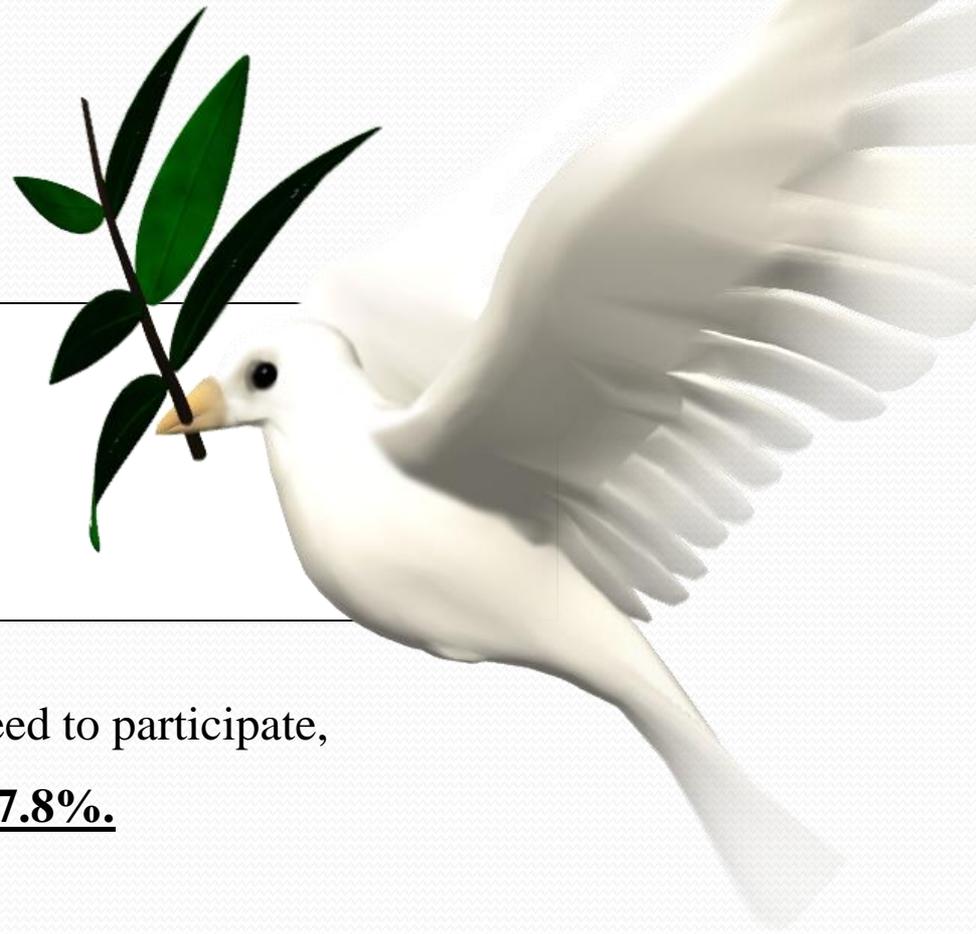
- OBESSE if their BMI was 30 kg/m² or higher, in accordance with W.H.O.'s recommendation ¹².

Data Analysis

- ❑ **Statistical analysis** was carried out by using **SPSS version 18**.
- ❑ **Categorical variables** were presented as **frequencies** and **percentages**.
- ❑ **Pearson's chi-square test (χ^2)** was used to determine the **associations between categorical variables**.
- ❑ **Continuous variables** were presented as **means** with **95% confidence interval (CI)** and **standard deviation (SD)**.
- ❑ **Pearson correlation coefficient** was performed to determine the **correlation between two continuous variables**.
- ❑ **Independent sample t-test** was used to compare the **means of two independent continuous variables**.
- ❑ **Post Hoc-Tukey test** was used to perform multiple comparisons between all the age groups
- ❑ **Multivariate analysis** was performed by using **multiple logistic regressions**.
 - **Result of logistic regression** was expressed as **odds ratio** and **95% CI**.
 - ❖ A two-sided p value less than **0.05** was considered statistically significant.
 - ❖ Level of significance **$\alpha < 0.05$**

RESULTS & DISCUSSION

Out of the **517** selected participants, **454** agreed to participate,
Giving rise to **Response Rate** of **87.8%**.



Distribution of staff according to **Socio-demographic Factors**

1. Mean age of the respondents: **42.86 years (\pm 9.62)**
(95% CI 41.97 - 43.74).
2. out of the 454 respondents: **50.9% were males.**
 - *The males had significantly ($p < 0.001$) higher mean age (45.53 years) as compared to the females (40.09 years).*
3. Majority of respondents: **(86.3%) were Malays**
4. Marital status: **84.8% were married**
5. family history of hypertension: **51.5%**
 - *Females had higher (55.6%) prevalence of positive family history of hypertension than males (47.6%).*

Table 1. Lifestyle-related Factors

Factors	Frequency	Percentage (%)	Mean (\pm SD)
BMI (kg/m²)			24.52 (\pm 4.4)
Underweight	44	9.7	
Normal	215	47.3	
Overweight	141	31.1	
Obese	54	11.9	
Smoking			
Never smoker	368	81.1	
Former smoker	40	8.8	
Current smoker	46	10.1	
Physical Activity			
Inactive	126	27.8	
Insufficiently active	77	16.9	
Sufficiently active	251	55.3	
Alcohol Consumption			
Never drinker	422	93.0	
Former drinker	17	3.7	
Current drinker	15	3.3	

Table 2. Prevalence of hypertension by age and gender.

Gender /Age (years)	Prevalence of Hypertension			Total
	Normal	Pre-hypertension	Hypertension	
<u>MALE</u>				
30-39	37 (46.8%)	32 (40.5%)	10 (12.7%)	79
40-49	9 (13.1%)	33 (47.8%)	27 (39.1%)	69
50-59	3 (4.8%)	9 (14.3%)	51 (80.9%)	63
≥ 60	0 (0.0%)	3 (15.0%)	17 (85.0%)	20
Total	49 (21.2%)	77 (33.3%)	105 (45.5%)	231
<u>FEMALE</u>				
30-39	82 (65.1%)	36 (28.5%)	8 (6.4%)	126
40-49	10 (17.3%)	31 (53.4%)	17 (29.3%)	58
50-59	3 (8.1%)	10 (27.1%)	24 (64.8%)	37
≥ 60	0 (0.0%)	0 (0.0%)	2 (100.0%)	2
Total	95 (42.6%)	77 (34.5%)	51 (22.9%)	223
<u>BOTH GENDER</u>				
30-39	119 (58.0%)	68 (33.2%)	18 (8.8%)	205
40-49	19 (15.0%)	64 (50.3%)	44 (34.7%)	127
50-59	6 (6.0%)	19 (19.0%)	75 (75.0%)	100
≥ 60	0 (0.0%)	3 (13.6%)	19 (86.4%)	22
Total	144 (31.7%)	154 (33.9%)	156 (34.4%)	454

The prevalence is **Higher in male** compared to female for those **aged <60 yrs.**
Higher among female for those **aged >60 yrs.**

Prevalence of hypertension (n = 454)

- Overall mean SBP: 126.2 mmHg (95% CI; 124.99, 127.46).
 - ✓ significantly higher in males (129.68 mmHg) as compared to females (122.65 mmHg). (p=0.001)
 - ✓ significantly increased with age in both males and females. (p=0.001)

Using Post Hoc-Tukey test: (multiple comparisons between all the age groups for males & female) showed that;

- there was a significant difference in the mean SBP levels between;
 - 30-39 and 40-49 age groups (p= 0.002),
 - 30-39 and 50 -59 age groups (p = 0.001),
 - 30-39 and 60 & above (p = 0.003)
 - 40-49 and 50 -59 (p = 0.001).
- However, there was no difference in the mean SBP levels between age groups of 50 -59 and >60 as well as 50-59 and >60 (p > 0.05).

The mean Systolic & diastolic Blood Pressure

The overall mean SBP and DBP for 454 respondents was **126.2** mmHg and **80.17** mmHg respectively. (95% CI 124.99-127.46) / (95% CI 79.32- 81.03)

THE MEAN SBP;

- **Males: 129.68 mmHg**
- **Females: 122.65 mmHg**
- There was significant increase in the mean SBP with age for both males (One way ANOVA T-test ($F= 32.17$, $p=0.001$) and females ($F= 53.08$, $p= 0.001$)).

Using Post Hoc-Tukey test:

there was a significant difference in the mean SBP levels of both male & female between;

($p = 0.001$)

- 30-39 and 40-49 age groups
- 30-39 and 50 -59 age groups
- 30-39 and 60 & above
- 40-49 and 50 -59
- There was no difference in the mean SBP between age groups of 50 -59 and >60 .

($p > 0.05$).

THE MEAN DBP:

- **Male: 82.64 mmHg** (95% CI 81.52-83.75)
- **Female: 77.62 mmHg**
- There was a significant difference in mean DBP between males and females ($t = 5.962$; $df = 452$; $p < 0.001$).
- The increase in the mean DBP with age was significant both in males ($F= 23.75$, $p < 0.001$) and females ($F= 39.01$, $p = 0.001$).
 - there was a significant difference in the mean DBP levels between age groups 30-39 and 40-49 ($p = 0.002$), accept for 50-59 and ≥ 60 years ($p > 0.05$).

Table 3. Awareness, Treatment and Control of Hypertension by Gender

STATUS	MALE	FEMALE	BOTH SEXES
	Frequency (%)	Frequency (%)	Frequency (%)
<u>HYPERTENSIVES</u>			
Aware	66 (62.9)	34 (66.7)	100 (64.1)
Aware and Treated	53 (80.3)	33 (97.1)	86 (86.0)
Treated and Controlled	23 (43.4)	16 (48.5)	39 (45.3)
HYPERTENSIVES (n=156)			
Overall Controlled PB	23 (21.9)	16 (31.4)	39 (25.0)

- 36% of the hypertensive individuals were un-aware that they had hypertension
- Only 25% of the hypertensive individuals have their BP under control
- Female had higher controlled PB proportion (31.4%) compared to male (21.9%)

Bivariate analysis.

- Bivariate analysis showed that;
- prevalence of hypertension was significantly associated with;

	<u>p - value</u>
• age,	<0.001*
• gender,	<0.001*
• marital status,	<0.001*
• level of education,	0.029*
• family income,	<0.001*
• family history of hypertension,	<0.001*
• physical inactivity	0.003*
• Alcohol consumption	0.006*
• Smoking	0.015
• Obesity	<0.001*

- Prevalence of obesity among Malaysian aged >18 yrs. Has increased from 4.4% in 1996 to 14.2% in 2006 [9].

(Nagelkerke R2 = 0.59; Hosmer and Lemeshow Test), $p = 0.09$

Logistic Regression analysis

- ❑ **Obese** individuals (BMI >30) were **eleven times** more likely **to have hypertension** than individuals with a normal BMI (OR 11.37, 95% CI 4.36–29.62).

- ❑ Individuals who **consume alcohol** were **seven times** as likely **to have hypertension** than those never consume alcohol (OR 7.14, 95% CI 1.75 - 29.16).

- ❑ Individuals with a **family history of hypertension** were **five times as likely to have hypertension** than those without a family history of hypertension. (OR 5.25, 95% CI 2.80 - 9.85).
 - The ***overall accuracy*** of this model to predict the subjects having hypertension is **83.2%**;
area under ROC curve = 0.90 (95%CI: 0.87 – 0.93)

Other study findings

- ❖ **Predictors** of having hypertension among UPM staff were found to be **age, gender, family history, BMI and physical activity.**
- ❖ **Every staff with one year increase of age had 1.13 times the odds of having hypertension.**
- ❖ The **higher the age and BMI**, the **more risk** of developing hypertension.
- ❖ **Being a male increased the odds** of having hypertension by **126%** compared to being a female.
- ❖ Being **physically inactive increased the odds** of having hypertension by **75% and 50%** compared to being physically insufficiently and sufficiently active, respectively.
- ❖ Overall pre-hypertensive respondents was high (39.9%)

CONCLUSIONS & RECOMENDATION



- ❑ **Prevalence of hypertension and pre-hypertension** is **high** among the University staff.
- ❑ **Highest prevalence** of hypertension was among older individuals, men, less educated, positive family history, high family income, former smokers, alcohol consumption, obese and those with inactive lifestyle, **suggesting that ongoing programs should increase the effort to reach these populations.**
- ❑ **Only 25% have their blood pressure under control.**
- ❑ **Pre-hypertension is not a disease. However it could be used as an alert for earlier intervention.**

- ❑ **There is an urgent need for the implementation of a comprehensive CVD prevention program;**
 - ❑ **Reducing the prevalence of hypertension risk factors** among the staff should be the primary goal of university authority.
 - ❑ **Initiating** intensive and innovative **educational programs that enhance staff's active participation**
 - ❑ **Use of opportunistic screening for hypertension** during routine consultation with health care providers for early detection and treatment of hypertensive individuals.

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THANK YOU



Table 4. Distribution of staff according to Socio-demographic Factors

Factor	Frequency	Percentage (%)	Mean (\pm SD)
Age			42.86 (\pm 9.62)
30-39	205	45.2	
40-49	127	28.0	
50-59	100	22.0	
\geq 60	22	4.8	
Gender			
Male	231	50.9	
Female	223	49.1	
Ethnicity			
Malay	392	86.3	
Chinese	40	8.8	
Indians	22	4.9	

Table 5. Mean systolic blood pressure levels by age and gender

Gender / Age (Years)	Number of respondents	Systolic blood pressure (mmHg)		
		Mean SBP	95% CI	Std. Deviation
<u>MALE</u>				
30-39	79	121.26	119.00-123.52	10.09
40-49	69	130.33	127.72-132.93	10.85
50-59	63	137.15	134.45-139.84	10.69
≥ 60	20	137.15	133.64-140.65	7.49
Total	231	129.68	128.09-131.26	12.22
<u>FEMALE</u>				
30-39	126	115.36	113.62-117.10	9.87
40-49	58	128.37	125.40-131.33	11.26
50-59	37	137.60	133.93-141.28	11.02
≥ 60	2	139.00	37.35-240.64	11.31
Total	223	122.65	120.85-124.45	13.64
<u>BOTH GENDER</u>				
30-39	205	117.64	116.21-119.06	10.34
40-49	127	129.43	127.49-131.37	11.04
50-59	100	137.32	135.18-139.45	10.76
≥ 60	22	137.31	133.96-140.67	7.56
Total	454	126.22	124.99-127.46	13.39