ORIGINAL ARTICLE

Knowledge, Awareness and Practices on the Risk Factors of Cardiovascular Diseases Among Community in Gombak, Kuala Lumpur

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ABSTRACT

Introduction: Cardiovascular disease (CVD) is a group of disease which are related to the heart and its circulations. The main modifiable risk factors of the CVD disease are hypertension, hyperglycemia and obesity. This study aims to evaluate the knowledge, awareness and practice on cardiovascular disease risk factors among Gombak community in Kuala Lumpur. **Methods:** This was a cross-sectional study using self-administered questionnaire and anthropometric measurement among 388 subjects in Gombak District, Kuala Lumpur. Descriptive data analysis and multivariate binary logistic regression were carried to identify demographic and factors associated. **Results:** The prevalence of the risk factors was high among study subjects, including obesity (24.2%), hypertension (42.3%) and hyperglycemia (26.8%). More than half (64.4%) of the study subjects having at least one of the risk factor. The multivariate binary logistic model factor illustrated that compare to Malays, Chinese were 37% less likely to have obesity (CPR=0.67; 95% Cl: 0.26-1.69). Gombak district community are more likely to have the knowledge on the CVD risk factor but lack of awareness and poor in practicing the prevention action. The Indian ethnic group was less likely to be aware (APR: 0.33, Cl: 0.05-2.31) and others bumiputera ethnic group were less likely to prevent (APR: 0.58, CI: 0.20-1.65) the risk of CVD. The Chinese ethnic less likely to have the knowledge (APR: 0.88, Cl: 0.35-2.22). **Conclusion:** Gombak community was more likely to have the knowledge but less likely to be aware and lack of practice of prevention of the risk factors of CVD.

Keywords: Prevalence, Knowledge, Awareness, Practices, Cardiovascular disease

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INTRODUCTION

In Asia, Cardiovascular disease (CVD) burden has been dramatically increase over past decades. In 2016, the proportional mortality in Malaysia shows about 74% of the death occur was cause by NCD cases with 35% of the cases contributed by the CVD (1). Annually in Europe, cardiovascular disease (CVD) has caused 3.9 million death which equivalent to 45% of total death. In 2015, there were below 11.3 million initial cases of CVD and over 85 million European were living with the CVD (2). Excluding Japan, Singapore, South Korea and Thailand, most of the Asian countries shows yearly age adjusted mortality of CVD compare to western countries with 82-215 in every 100,000 for Asian countries and 26-46 in every 100,000 for western countries (3).

Malaysia is one of the developing countries that experiencing the outbreak of the CVD as the mortality caused. Prevalence of cardiovascular risk factors locally shows that the Malaysian adult (≥18 years) has high caliber of cardiovascular risk factor with 63.6% of men and 64.5% of women are either extravagantly corpulent or exorbitantly corpulent (4). It was reported that 43% of men smoke with 59% of them between 21-30 years old (4).

Prevalence of the hypercholesterolemia of men and women are 43.5% and 52.2% respectively and the percentage of the hypertension for men and women are 30.8% and 29.7% respectively, while 16.7% of men and 18.3% of women have diabetes mellitus in Malaysia (4). Over the years, the hypertension cases has been increasing and compared to urban area, the controlled hypertension in the rural area are remain quite low (15.9%), and only one third of the hypertension patient were controlled (5). Nonetheless, much more preponderant rate of vigilance witnessed

in a capital country like the USA (57.7 % in men and 57.1 % in women ≥ 30 years) (6) and among the rural Thailand community (42.3%) achieved blood pressure control (7). Despite the amend cognizance, treatment rate observed was lower in Malaysia compared to in Thailand with 38.2% and 42.6% respectively (5, 7). However the treatment proportion were reported to be lower in neighboring country Indonesia (25%) (8).

Studies show that inculcation level was predominant prognostic factors regarding the erudition on cardiovascular risk factors (9, 10). Cardiovascular diseases incline to occur more in the elderly population. It is treated hostilely in the elderly population, to avert CVD epidemic in Malaysia. The overall prevalence of hypercholesterolemia in Malaysia was high (55.4%) compared to awareness rate for hypercholesterolemia (39.5%) (11). Moreover, among the Malaysian elderly, 79.3% that was given dietary advice, 60.4% of them were inductively authorized to lose weight and 77.1% were advised to exercise (11). Based on the study related to knowledge, awareness and practice towards the diabetes mellitus, it found that the acceptance of the community towards the traditional medicine is better compared to clinical treatment. This portrayed, the important of the knowledge and awareness spreading in the way such through mass media campaigns, public lectures or verbalize, and door-to-door campaigns on an frequently massive scale to redress the wrong belief (9). Previous study on urban community in Klang, Selangor showed the differences in knowledge on diabetes mellitus between different age groups and ethnicity, thus suggests the structured educational program to improve the understanding of community on the disease (10). Thus, this study aims to evaluate the knowledge, awareness and practice on CVD risk factors among Gombak community in Kuala Lumpur.

MATERIALS AND METHODS

Study design
This was a cross-sectional study using self-administered questionnaire. The data were collected from 388 general public residing in the state of Kuala Lumpur, Malaysia. The study was conducted at the Gombak district, Kuala Lumpur. The inclusion criteria were male and female > 18 years old and Gombak community who agreed to participate in the study. This study used standardized urban population of Malaysia (average of 20 million individuals and equivalent to 72% of the population of Malaysia). Centered on the recent national survey, we used frequency of the highest CVD risk factors in Malaysia (hypercholesterolemia) which is 52.9%. Using the sample size formula which is $[(Z1-\alpha/2)(2p(1-p))]/d2$ the minimum sample size is equal to 383 (12). Ethical approval was granted from institutional ethical review committee of Management and Science University (MSU-RMC-02/FR01/08/L2/125). All sample participants

had given their written informed consent.

Data collection
Anthropometric quantifications included height, weight and waist and hip circumference. SECA 213 Stadiometer for Mobile Height Measurement used to measured height and rounded to nearest 0.1cm and SECA 803 Digital Floor Scale were used to weight the participant and rounded to the nearest 0.1kg. The waist and hip circumference were measured using measuring tape in cm. BMI below 18.5kg/m2 were defined as the underweight, BMI range 18.5-22.9 kg/m2 is categorized as normal, BMI 23-27.4 kg/m2 is overweight and above 27.5 kg/m2 is obesity (4).

Using the Omron blood pressure monitor HEM 7120, blood pressure were measured on the right arm and supported at the heart level. Hypertension were reflected with the presented average reading of systolic BP >140 mmHg and average diastolic BP > 90mmHg. Non-fasting random blood sugar were measured using Accu-chek Perfoma Blood glucose meter and lancing device. To be categorize as diabetic, >11.0mmol/L Arbitrary Blood Sugar (RBS) reading and under treatment of diabetes. RBS level between 5.6 mmol/L to 11.0 mmol/L resolute the high risk of diabetes (4).

Survey questionnaire
The study was conduct using the self-administered questionnaire with closed ended questions. The questions were validated, appraised and used in assessing knowledge, awareness and practice of CVD risk factors (13). The questionnaire consists of four parts, whereby the first part was categorized as the socio-demographic information, followed by second part of 15 questions on knowledge, third part of 15 questions on awareness and fourth part of 15 questions on practices on the risk factors of the CVD.

Statistical analysis
Descriptive statistic was used to analyses the demographic data. One-way ANOVA and Tukey HSD post-hoc tests were used to determine the significance of difference among the demographic groups, such as gender, ethnicity, age group, education level, household income and occupational. Using the 95% confidence interval (CI), the overall prevalence of knowledge, awareness and practice were described. Crude and adjusted prevalence ratio in this study were estimated using the modified Poisson regression. The independent risk factors related to CVD such as gender, age group, ethnicity, BMI and highest education were identified and controlled for each other using the modified Poisson regression model. Adjusted prevalence ratio (APR) and their 95% were used to compare with the crude prevalence ratios (CPR) (5). All statistical tests a two-sided p-value of <0.05 was considered statistically significant.

RESULTS

Socio-demographic characteristic of participants

A total of 388 eligible adults have participated in this study. Table I shows the socio-demographic characteristic of the participant by gender, age, occupation, ethnicity, highest education level, marital status and household income. The mean age of the participants was 37.43 (SD +14.5). Majority of the participant in the age range 18 to 29 years old (38.4%), Malays (69.1%), married 58.5%, have tertiary highest education background (52.1%), paid employee (42%) and household income RM 940-RM3650 (47.42%). Most of the participant had the history of diabetes (15.98%).

Prevalence on the individual risk factors of CVD

Overall prevalence of the obesity, hypertension, hyperglycemia, high body fat percentage and at least one of these as the risk factors that contribute to the formation of the CVD were shown in Table II. Out of the 388 of the eligible participants, total obesity (24.2%), hypertension (42.3%), hyperglycemia (26.8%), high body fat percentage (69.6%), at least one (64.4%).

Respondents above 60 years old have the most prevalence of hypertension (73.53%) and hyperglycemia (47.06%). Majority of them have at least one (85.29%) of the CVD risk factors. Most of the respondents age 40 to 49 were observed to have obesity (30.26%). There is significant different between the age group in the obesity (p=0.0001), hypertension (p=0.0001), high body fat percentage (p=0.0001), hyperglycemia (p=0.001) and at least one (p=0.0001).

Obesity, hypertension, hyperglycemia and at least one of the risk factors were more prevalent in married people with 27.00%, 49.34%, 31.28% and 72.69% respectively. Most of the widowed high body fat percentage (84.62%). There is significant different show in all the risk factor of CVD between the marital statuses, obesity (p=0.0001), hypertension (p=0.021), high body fat percentage (p=0.0001), hyperglycemia (p=0.041) and at least one (p=0.0001).

In term of the education level, respondents with primary education level have the highest prevalent of hypertension (70.59%), high body fat percentage (88.24%) and 76.47% of them have at least one of the risk factors. While, secondary education respondent has the highest prevalent of the obesity (31.76%). Apparently, there is no significant different see in hyperglycemia between the education level (p>0.05).

Poor respondent which categorize by the household income <RM940, were mostly obesity (28.57%) and hypertension (48.57%). On the other hand, respondent with household with low income which RM940-RM3650 have high body fat percentage (70.65%) and at least one (72.22%) of the risk factors were held by the

Table I: Socio-demographic characteristic of the participants

Variable	Sub-Categories	Frequency (n)	Percentage (%)
Total		388	100
Gender	Male	130	33.5
	Female	258	66.5
Age Group	18 - 29	149	38.4
	30 - 39	79	20.4
	40 - 49	76	19.6
	50 - 59	50	12.9
	≥ 60	34	8.8
Ethnicity	Malay	268	69.1
	Chinese	46	11.9
	Indian	43	11.1
	Other bumiputera	31	8.0
Marital Status	Single	148	38.1
	Married	227	58.5
	Widowed	13	3.4
Highest Education Level	No formal education	21	5.4
	Primary	17	4.4
	Secondary	148	38.1
	Tertiary	202	52.1
Household Income	<Rm940	35	9.0
	Rm940-Rm3650	184	47.42
	<Rm5000	97	25.0
	>Rm5000	72	18.6
Occupation	Paid Employee	163	42.0
	Self-Employee	47	12.1
	Retiree	40	10.3
	Others	138	35.6
History of illness	Heart Disease	71	1.8
	Diabetes	62	15.98
	Cancer	0	0
	Mental Illness	1	0.26
	Heart Failure	0	0
	Stroke	3	0.77
	Heart Attack	0	0
	Respiratory Illness	19	4.9
	Heart Disease	71	1.8

respondent with household income >RM5000. There is no significant difference in the CVD risk factor among the different household income with (p>0.05).

Most of the paid employee were obese (28.22%) and retired respondent were mostly hypertensive (57.50%), hyperglycemia (42.50%) and have at least one of the risk factors (75%). A total of 87.23% of the self-employed respondent were observed to have hyperglycemia. There is significant different in obesity among the different occupational (p=0.009) and high body fat percentage (p=0.0001).

There were no significant different (p>0.05) of obesity

Table II: Overall prevalence of individual cardiovascular disease risk factors

		Total	Obesity	Hypertension	High Body Fat Percentage	Hyper-glycemia	At Least One Risk Factor
			94 (24.2%)	164 (42.3%)	270 (69.6%)	104 (26.8%)	250 (64.4%)
Gender	Male	130	30 (23.08%)	72 (55.38%)	91 (70.00%)	27 (20.77%)	90 (69.23%)
	Female	258	64 (24.81%)	92 (35.66%)	179 (69.38%)	77 (29.84%)	160 (62.02%)
	p-value		>0.05 (F=3)	<0.0001 (F=2)	>0.05 (F=1)	>0.05 (F=2)	>0.05 (F=1)
Age Group	18-29	149	30 (20.13%)	41 (27.52%)	72 (48.32%)	27 (18.12%)	74 (49.66%)
	30-39	79	22 (27.85%)	30 (37.97%)	55 (69.62%)	14 (17.72%)	51 (64.56%)
	40-49	76	23 (30.26%)	37 (48.68%)	65 (85.53%)	28 (36.84%)	54 (71.05%)
	50-59	50	11 (22.00%)	31 (62.00%)	47 (94.00%)	19 (38.00%)	42 (84.00%)
	> 60	34	8 (23.53%)	25 (73.53%)	31 (91.18%)	16 (47.06%)	29 (85.29%)
	p-value		<0.0001 (F=12)	<0.0001 (F=8)	<0.0001 (F=4)	0.001 (F=8)	<0.0001 (F=4)
Ethnic	Malay	268	71 (26.49%)	115 (42.91%)	193 (72.01%)	68 (25.37%)	173 (64.55%)
	Chinese	46	7 (15.22%)	18 (39.13%)	29 (63.04%)	13 (28.26%)	25 (54.35%)
	Indian	43	10 (23.26%)	15 (34.88%)	27 (62.79%)	16 (37.21%)	31 (72.09%)
	Other bumiputera	31	6 (19.35%)	16 (51.61%)	21 (67.74%)	7 (22.58%)	21 (67.74%)
	p-value		0.009 (F=9)	>0.05 (F=6)	>0.05 (F=3)	>0.05 (F=6)	>0.05 (F=3)
Marital	Single	148	29 (19.59%)	47 (31.76%)	72 (48.65%)	30 (20.27%)	77 (52.03%)
	Married	227	62 (27.31%)	112 (49.34%)	187 (82.38%)	71 (31.28%)	165 (72.69%)
	Widowed	13	3 (23.08%)	5 (38.46%)	11 (84.62%)	3 (23.08%)	8 (61.54%)
	p-value		<0.0001 (F=9)	0.021 (F=4)	<0.0001 (F=2)	0.041 (F=4)	<0.0001 (F=2)
Highest Education Level	No formal education	21	2 (9.52%)	10 (47.62%)	11 (52.38%)	8 (38.10%)	16 (76.19%)
	Primary	17	4 (23.53%)	12 (70.59%)	15 (88.24%)	6 (35.29%)	13 (76.47%)
	Secondary	148	47 (31.76%)	81 (54.73%)	123 (83.11%)	43 (29.05%)	113 (76.35%)
	Tertiary	202	41 (20.30%)	61 (30.20%)	121 (59.90%)	47 (23.27%)	108 (53.47%)
	p-value		<0.0001 (F=9)	<0.0001 (F=6)	<0.0001 (F=3)	>0.05 (F=6)	<0.0001 (F=3)
Household Income	<Rm940	35	10 (28.57%)	17 (48.57%)	23 (65.71%)	6 (17.14%)	21 (60.00%)
	Rm940-Rm3650	184	44 (23.91%)	75 (40.76%)	130 (70.65%)	54 (29.35%)	115 (62.50%)
	<Rm5000	97	21 (21.65%)	42 (43.30%)	69 (71.13%)	23 (23.71%)	62 (63.92%)
	>Rm5000	72	19 (26.39%)	30 (41.67%)	48 (66.67%)	21 (29.17%)	52 (72.22%)
	p-value		>0.05 (F=12)	>0.05 (F=8)	>0.05 (F=4)	>0.05 (F=6)	>0.05 (F=4)
Occupational	Paid Employee	163	46 (28.22%)	58 (35.58%)	121 (74.23%)	43 (26.38%)	105 (64.42%)
	Self-Employee	47	9 (19.15%)	26 (55.33%)	41 (87.23%)	10 (21.28%)	33 (70.21%)
	Retiree	40	6 (15.00%)	23 (57.50%)	30 (75.00%)	17 (42.50%)	30 (75.00%)
	Others	138	33 (23.91%)	57 (41.30%)	78 (56.52%)	34 (24.64%)	82 (59.42%)
	p-value		0.009 (F=0.009)	>0.05 (F=6)	<0.0001 (F=3)	>0.05 (F=6)	>0.05 (F=3)

(23.08% vs. 24.81%) and hyperglycemia (20.77% vs. 29.84%) between male compared to female, although female possessed higher prevalence. Furthermore, there is also no significant different between the gender in hyperglycemia, body fat percentage and at least one of the risk factors. However, a significantly higher prevalence of hypertension (55.38% vs. 35.66%, p=0.0001) were observed in males respondents. Prevalence on the CVD risk factor among the different gender were illustrated in Table II. It shows that women have the higher prevalence of obese (24.81%) and hyperglycemia (29.84%). However, male have high prevalence of hypertension (55.38%), high body fat percentage (70.00%) and at least one (69.23%).

Ethnic difference in prevalence of CVD risk factors

Majority of the Malaysian believe to have at least one of the CVD risk factor. Figure 1 shows that Indian (72.09%) have the highest prevalence to have at least one of the CVD risk factor followed by others bumiputera (67.74%), Malay (64.55%) and Chinese (54.35%).
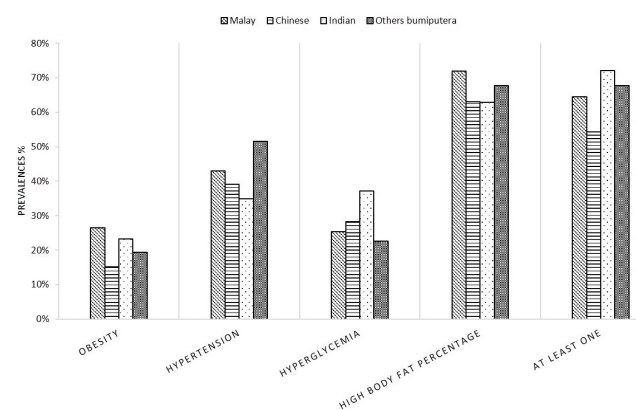

Figure 1: Ethnic difference in the prevalence of CVD risk factors

Malay have the highest rate of being obese (26.49%) and to have the highest body fat percentage (72.01%). In hypertension, other bumiputera group seem to have the highest prevalence of hypertension (51.61%), Indian with hyperglycemia (37.21%).

The mean of knowledge, awareness and practice

Figure 2 shows the mean of knowledge, awareness and practice in different age group. Using one way ANOVA and Tukey HSD post hoc test, there is significant different (p=0.047) of knowledge between Chinese ethnic and Indian. However, there is no significance (p>0.05) difference of awareness and practice among the different ethnic.
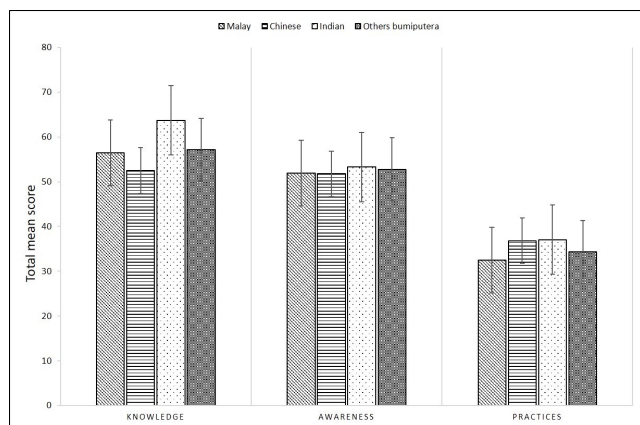

Figure 2: Mean of knowledge, awareness and practices in different age group

Factors associated of CVD risk factor

Crude and adjusted result of multivariate binary logistic regression identified the significant determinant of the existence of CVD risk factors. Table III shows factor associated with obesity, hypertension, hyperglycemia, at least one of the CVD risk factors, knowledge, awareness and practice. In the regression model that controlled for gender, age, ethnicity, marital, highest education level, household income and occupation, the independent factor that associated with them are male, age group 18 to 29, Malay, single, none formal education, <RM940 and paid employee. Female are more likely to be obese (APR: 1.11; CI: 0.65-11.89) compare to male. In term of the age group, people at the age above 60 tend to be more likely to be obese (APR: 1.54; CI: 0.48-4.92), hypertension (APR: 6.49; CI: 0.21-19.99), hyperglycemia (APR: 4.56; CI: 1.54-13.46), high in body fat (APR: 8.00; CI: 1.79-35.78) and to have at least one of the CVD risk factors (APR: 4.82; CI: 1.36-17.04). Compare to Malay, Chinese tend to be more hyperglycemic (APR: 0.78; CI: 0.29-2.11), Indian are more likely to be obese (APR: 1.22; CI: 0.35-4.30), high body fat percentage (APR: 2.45; CI: 0.75-8.02) and to have at least one of the risk factor (APR: 1.80; CI: 0.63-5.14).Other bumiputera group were more likely to have hypertension (APR: 2.85; CI: 0.98-8.21). On the other hand, comparing to the single people, married people are more likely to be obese (APR: 1.32; CI: 0.27-6.42), high body fat percentage (APR: 6.37; CI: 0.73-55.24)

and at least one (APR: 0.49; CI: 0.12-2.01).

Factor associated with knowledge, awareness and practice on risk factor of CVD

Crude and adjusted result of multivariate binary logistic regression identified the significant determinant of the knowledge, awareness and practice on the CVD risk factor among the study population. Table IV shows logistic regression analysis of the factors associated with the knowledge, awareness and practice on the CVD risk factors. It shows that older people (>60 years old) have the lower knowledge (APR: 0.72; CI: 0.19-2.74) and awareness (APR: 0.51; CI: 0.04-6.86) on the CVD risk factors compared to other age groups. Interestingly the older group showed to have higher practice (APR: 1.15; CI: 0.31-4.27) on prevention of CVD risk factors compared to younger age group.

It is also projected that people at the age of 40-49 years old are more aware about the CVD risk factor (APR: 5.07; CI: 0.62-41.160), followed with group at the age of 50-59 years old (APR: 3.19; CI: 0.42-24.36). Both group of people also have higher knowledge on the risk factors of CVD, but have lower practices on prevention of CVD risk factors (APR: 0.59; CI: 0.17-2.06).

Female respondents seem to have higher knowledge (APR:1.41; CI: 0.82-2.16) on the risk factors compared to male, but lower practices (APR:0.64; CI: 0.38-1.07) on prevention of CVD risk factors. In terms of ethnicity, the Chinese ethnic showed to have lower knowledge (APR: 0.88; CI: 0.35-2.22) on the risk factors of CVD compared to Malay and Indian ethics, but have higher practices (APR: 1.53; CI:0.64-3.66) on prevention of CVD compared to other ethic groups.

Participant from the secondary education level have the higher level of practice on the CVD risk factors (APR: 3.19; CI: 0.62-16.44) compare to other education level, although the group have lower knowledge (APR: 0.67; CI: 0.16-2.78) and awareness on the risk factors of CVD. Respondents with higher income group (>RM5000) showed to have higher knowledge (APR: 1,32; CI: 0.61-2.89) on the risk factors of CVD, but lower on the awareness (APR:0.22: CI: 0.05-0.99) and practices (APR: 0.70; CI:0.33-1.51) on the prevention of CVD risk factors compared to other lower income groups (Table IV).

DISCUSSION

This study was generally in route with the literature event a few divergences discovered. The prevalence of the CVD risk factor mostly inclined with age. This study found that, participant age >60 have the highest prevalence for most of the risk factor studied and it believed that 26.7% of the Malaysian >30 were at high CV risk (14).

Table III: Factors associated with risk factors of cardiovascular disease

	Obesity		Hypertension		Hyperglycemia		High Body Fat Percentage		At Least One Risk Factor	
	CPR[1] (CI)[2]	APR [3](CI)	CPR (CI)	APR (CI)	CPR (CI)	APR (CI)	CPR (CI)	APR (CI)	CPR (CI)	APR (CI)
Gender										
Male	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Female	1.10 (0.67-1.81)	1.11 (0.65-1.89)	0.45 (0.30-0.69)	0.37 (0.22-0.60)	1.62 (0.98-2.68)	1.56 (0.91-2.68)	0.97 (0.61-1.54)	1.06 (0.60-1.86)	0.73 (0.46-1.14)	0.73 (0.44-1.21)
Age Group										
18-29	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
30-39	1.22 (0.50-3.0)	1.14 (0.35-3.72)	1.70 (0.66-4.41)	1.61 (0.55-4.70)	1.45 (0.60-3.51)	1.36 (0.51-3.62)	0.66 (0.13-3.48)	0.64 (0.11-3.80)	1.11 (0.33-3.72)	1.12 (0.30-4.16)
40-49	0.80 (0.31-2.03)	1.04 (0.33-3.30)	2.93 (1.21-7.09)	2.57 (0.89-7.45)	1.52 (0.67-3.46)	1.41 (0.53-3.77)	1.75 (0.46-6.72)	2.34 (0.49-11.07)	2.36 (0.81-6.89)	2.79 (0.80-9.75)
50-59	0.71 (0.280-1.80)	1.08 (0.35-3.33)	4.54 (1.87-11.02)	4.43 (1.43-13.17)	4.13 (1.70-10.02)	4.22 (1.45-12.23)	4.51 (1.26-16.19)	5.73 (1.27-25.91)	3.18 (1.11-9.15)	3.50 (0.99-12.38)
> 60	1.09 (0.39-3.01)	**1.54 (0.48-4.92)**	7.32 (3.15-16.99)	**6.49 (0.21-19.99)**	4.02 (1.82-8.87)	**4.56 (1.54-13.46)**	11.05 (3.24-37.73)	**8.00 (1.79-35.78)**	5.88 (2.16-16.01)	**4.82 (1.36-17.04)**
Ethnic										
Malay	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Chinese	0.67 (0.26-1.70)	0.66 (0.25-1.78)	1.42 (0.67-2.99)	1.46 (0.64-3.35)	0.86 (0.35-2.08)	**0.78 (0.29-2.11)**	0.82 (0.37-1.82)	1.25 (0.48-3.30)	1.15 (0.52-2.55)	1.04 (0.44-2.47)
Indian	1.34 (0.40-4.44)	**1.22 (0.35-4.30)**	1.66 (0.66-4.16)	1.92 (0.67-5.48)	0.74 (0.26-2.13)	0.67 (0.21-2.16)	1.23 (0.47-3.22)	**2.45 (0.75-8.02)**	1.76 (0.68-4.56)	**1.80 (0.63-5.14)**
Other bumiputera	0.79 (0.25-2.47)	0.78 (0.23-2.59)	1.99 (0.78-5.11)	**2.85 (0.99-8.21)**	0.49 (0.17-1.40)	0.43 (0.14-1.38)	1.24 (0.47-3.30)	2.07 (0.61-7.02)	0.81 (0.93-2.22)	0.82 (0.27-2.45)
Marital										
Single	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Married	1.23(0.32-4.76)	**1.32 (0.27-6.42)**	1.34 (0.42-4.33)	0.48 (0.12-1.96)	1.18 (0.31-4.56)	0.40 (0.08-1.89)	5.81 (1.24-27.10)	**6.37 (0.73-55.24)**	1.48 (0.46-4.72)	**0.49 (0.12-2.01)**
Widowed	0.80 (0.21-3.0)	0.93 (0.21-4.03)	0.64 (0.20-2.02)	0.49 (0.13-1.85)	0.66 (0.18-2.47)	0.45 (0.10-1.93)	1.18 (0.25-5.51)	2.98 (0.34-25.73)	0.60 (0.19-1.91)	0.41 (1.05-1.57)
Highest Education Level										
No formal education	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Primary	2.42 (0.54-10.81)	1.96 (0.39-9.96)	0.48 (0.19-1.18)	0.54 (0.18-1.60)	0.49 (0.19-1.26)	0.40 (0.130-1.27)	1.36 (0.55-3.35)	2.21 (0.65-7.56)	0.36 (0.13-1.11)	0.28 (0.08-0.95)
Secondary	0.83 (0.26-2.67)	0.61 (0.17-2.25)	0.18 (0.06-0.53)	0.32 (0.10-1.08)	0.56 (0.20-1.58)	1.38 (0.42-4.56)	0.20 (0.04-0.89)	0.39 (0.06-2.36)	0.35 (0.11-1.12)	0.65 (0.18-2.37)
Tertiary	0.55 (0.34-0.89)	0.53 (0.30-0.93)	0.36 (0.23-0.56)	0.45 (0.27-0.78)	0.74 (0.46-1.20)	1.18 (0.65-2.14)	0.30 (0.18-0.51)	0.64 (0.35-1.19)	0.36 (0.22-0.57)	0.47 (0.27-0.82)
Household Income										
<Rm940	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Rm940-Rm3650	0.90 (0.36-2.21)	0.81 (0.29-2.26)	0.76 (0.34-1.70)	0.63 (0.24-1.65)	1.99 (0.72-5.49)	1.62 (0.51-5.15)	1.04 (0.45-2.45)	0.22 (0.07-0.69)	1.73 (0.74-4.06)	1.37 (0.50-3.70)
<Rm5000	1.14 (0.61-2.130)	1.20 (0.61-2.39)	1.04 (0.60-1.81)	1.25 (0.65-2.39)	0.99 (0.55-1.81)	0.81 (0.41-1.60)	0.83 (0.46-1.49)	0.56 (0.27-1.17)	1.56 (0.86-2.83)	1.72 (0.88-3.34)
>Rm5000	1.30 (0.64-2.65)	1.35 (0.63-2.90)	0.94 (0.51-1.73)	0.94 (0.46-1.92)	1.33 (0.66-2.64)	1.09 (0.50-2.37)	0.81 (0.42-1.57)	0.46 (0.20-1.05)	1.47 (0.76-2.84)	1.39 (0.678-2.91)
Occupational										
Paid Employee	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Self-Employee	0.80 (0.48-1.34)	0.91 (0.50-1.64)	1.27 (0.80-2.03)	1.48 (0.84-2.61)	0.91 (0.54-1.54)	0.86 (0.48-1.55)	0.45 (0.28-0.73)	0.35 (0.19-0.66)	0.81 (0.51-1.29)	0.90 (0.52-1.56)
Retiree	1.33 (0.58-3.03)	1.48 (0.61-3.60)	0.57 (0.29-1.11)	0.81 (0.38-1.74)	1.21 (0.54-2.69)	1.48 (0.61-3.58)	0.19 (0.08-0.48)	0.20 (0.07-0.57)	0.62 (0.31-1.27)	0.90 (0.40-2.02)
Others	1.78 (0.69-4.61)	2.50 (0.81-7.76)	0.52 (0.26-1.06)	1.30 (0.51-3.30)	0.44 (0.21-0.92)	0.80 (0.33-1.95)	0.43 (0.20-0.96)	0.98 (0.30-3.19)	0.49 (0.22-1.08)	1.40 (0.52-3.81)

1 CPR:Crude Prevalence Ratio
2 CI: Confidence Interval at 95%
3 APR: Adjusted Prevalence Ratio

Obesity as the risk factor of CVD

Obesity has been associated with multiple range of chronic disease including CVD and lead to mortality (15). All obesity cause mortality were claimed to be steep in Europe, North America except south Asia (16). Malaysian men have the highest prevalence of obesity (38.2%) after Myanmar (38.6%) and Malaysian women have the highest prevalence of obesity (27%) among the Asian country (17). In this study, the overall prevalence of the obesity 24.2%. However, it is found that women are more obese (24.81%) compare to male (23.08%). Data from NHMS V 2015 show the aligned result whereby Kuala Lumpur women obesity rate are 33.6% which is higher than men 27.8%. Across the globe, gender inequalities of obesity are quite similar. In USA, Kuwait and South Africa seen the huge diverse in

Table IV: Logistic regression results of factor associated with knowledge, awareness and practices of cardiovascular disease

	Knowledge		Awareness		Practice	
	CPR	APR	CPR	APR	CPR	APR
Gender						
Male	Reference	Reference	Reference	Reference	Reference	Reference
Female	1.33 (0.82-2.16)	1.41 (0.83-2.40)	0.87 (0.37-2.07)	1.00 (0.38-2.62)	0.68 (0.43-1.09)	0.64 (0.38-1.07)
Age Group						
18-29	Reference	Reference	Reference	Reference	Reference	Reference
30-39	2.13 (0.77-5.88)	1.04 (0.29-3.77)	1.15 (0.24-5.51)	1.94 (0.24-15.88)	0.29 (0.14-1.06)	0.73 (0.21-2.59)
40-49	1.84 (0.62-5.41)	1.41 (0.40-4.96)	1.56 (0.31-7.91)	5.07 (0.62-41.16)	0.48 (0.16-1.39)	0.59 (0.17-2.06)
50-59	2.07 (0.71-6.09)	1.68 (0.49-5.77)	1.37 (0.26-7.17)	3.19 (0.42-24.36)	0.48 (0.16-1.42)	0.58 (0.17-1.98)
> 60	0.94 (0.27-3.26)	0.72 (0.19-2.74)	0.33 (0.03-3.75)	0.51 (0.04-6.86)	0.91 (0.27-3.05)	1.15 (0.31-4.27)
Ethnic						
Malay	Reference	Reference	Reference	Reference	Reference	Reference
Chinese	0.76 (0.32-1.79)	0.88 (0.35-2.22)	0.37 (0.11-1.21)	0.36 (0.10-1.36)	1.72 (0.77-3.87)	1.53 (0.64-3.66)
Indian	1.39 (0.51-3.83)	1.85 (0.61-5.56)	0.31 (0.05-1.79)	0.33 (0.05-2.31)	0.89 (0.34-2.35)	0.66 (0.23-1.89)
Other bumiputera	1.11 (0.39-3.16)	1.51 (0.50-4.60)	1.10 (0.28-4.26)	1.22 (0.26-5.78)	0.80 (0.30-2.13)	0.58 (0.20-1.65)
Marital						
Single	Reference	Reference	Reference	Reference	Reference	Reference
Married	0.66 (0.20-2.12)	0.64 (0.15-2.73)	0.44 (0.09-2.25)	0.24 (0.03-2.10)	0.93 (0.27-3.16)	1.03 (0.24-4.51)
Widowed	0.37 (0.12-1.20)	0.34 (0.09-1.36)	0.33 (0.07-1.67)	0.15 (0.02-1.10)	1.66 (0.49-5.62)	1.80 (0.44-7.46)
Highest Education Level						
No formal education	Reference	Reference	Reference	Reference	Reference	Reference
Primary	1.13 (0.42-3.05)	0.74 (0.20-2.45)	1.53 (0.32-7.30)	0.73 (0.11-4.79)	0.98 (0.36-2.66)	1.54 (0.47-4.99)
Secondary	0.60 (0.17-2.18)	0.67 (0.16-2.78)	0.01 (0-0.01)	0 (0-0.01)	2.95 (0.65-13.31)	3.19 (0.62-16.44)
Tertiary	0.69 (0.41-1.14)	0.74 (0.40-1.37)	1.17 (0.51-2.68)	1.19 (0.42-3.36)	1.27 (0.78-2.07)	1.17 (0.65-2.09)
Household Income						
<Rm940	Reference	Reference	Reference	Reference	Reference	Reference
Rm940-Rm3650	1.24 (0.56-2.76)	1.23 (0.51-2.94)	0.65 (0.18-2.34)	0.63 (0.15-2.63)	0.80 (0.37-1.75)	0.85 (0.36-2.01)
<Rm5000	0.98 (0.49-1.98)	1.06 (0.50-2.26)	0.82 (0.30-2.26)	0.82 (0.26-2.58)	0.92 (0.47-1.81)	0.81 (0.39-1.69)
>Rm5000	1.35 (0.66-2.75)	1.32 (0.61-2.89)	0.30 (0.07-1.19)	0.22 (0.05-0.99)	0.73 (0.36-1.45)	0.70 (0.33-1.51)
Occupational						
Paid Employee	Reference	Reference	Reference	Reference	Reference	Reference
Self-Employee	0.83 (0.49-1.42)	0.72 (0.40-1.31)	0.76 (0.31-1.83)	0.51 (0.18-1.41)	1.09 (0.65-1.83)	1.28 (0.71-2.29)
Retiree	1.25 (0.60-2.60)	1.12 (0.50-2.52)	0.25 (0.03-2.00)	0.18 (0.02-1.74)	0.86 (0.42-1.79)	0.96 (0.43-2.17)
Others	0.52 (0.20-1.34)	0.67 (0.22-2.01)	1.28 (0.39-4.27)	3.11 (0.66-14.67)	1.47 (0.62-3.47)	1.09 (0.38-3.08)

percentage of women exceeding men (18). Interestingly, by comparing between gender in this study, female was found to likely have obesity (APR: 1.11; CI: 0.67-1.89).

Hypertension as the risk factor of CVD
Equating Malaysia to other South East Asian countries, the prevalence of hypertension in Malaysia (30.3%) (19) were lower compare Vietnam (44.7%) (20) and Indonesia (33.4%) (17). Reported in NHMS V 2015 the prevalence of hypertension in Kuala Lumpur are (33.8%) (19), and this study found that overall prevalence of the hypertension was 42.3%, with the prevalence of male was higher (55.38%) compared to female (35.66%). The prevalence of hypertension was significantly increase compared to the cases reported in the 1980's around 10-14% (21,22) Several studies shows some persistent result where male unyieldingly have high level of hypertension to compare with women. Based on the regression results obtained, female was less likely to have hypertension (APR: 0.37; CI: 0.22-0.60). Biological sex difference could be a part conceivable justification behind this incidence besides perilous behavior (23). Based on the findings, the risk of hypertension seems to be likely increase by the age whereby, it found that people age above 60 are more likely to be hypertensive. Besides that, the prevalence was increase with age whereby this study found that the highest prevalence was observed in age >60 years old (73.5%). Similar finding was seen in the study involving few states in Malaysia (24). In NHMS V 2015, incline pattern was observed along the age and the highest prevalence were in ¬>70 years old (75.4%).

Hyperglycemic as the risk factor of CVD
The prevalence of hyperglycemic cases are increasing

globally especially in Asia and it is estimated to be about 366 million people affected with hyperglycemic worldwide (25). According to NHMS V 2015, overall 17.5% of Malaysia are hyperglycemic and in Kuala Lumpur itself, the prevalence of are about 17.4%. Based from the finding of this study, total hyperglycemic cases are 26.8% and the highest prevalence are among the married individual. This is due to the age group of married participants were mostly above 30 years old. The pattern of hyperglycemic number in this study are increase with age and the highest prevalence in the age above 60 (47.1%). Same finding were seen in the US whereby almost one third of the adult age above 65 are hyperglycemic (26). People age >60 are more likely to have hyperglycemic risk factor (APR: 4.556; CI: 1.543-13.461). Ethnically, Indian (37.21%) ethnic have the highest prevalence of hyperglycemia compare to Malay (25.37%), Chinese (28.26%) and other bumiputera ethnics (22.58%). In this study, NHMS V 2015 reported that Indian ethnic have the highest prevalence of hyperglycemia in Malaysia (22.1%) followed by Malay (14.6%), Chinese (12.0%), and other bumiputera (10.7%). In another study conducted in Subang Jaya, it has reported there was significance difference among the different races which aligned to the both report stated (27).

Knowledge, awareness and practice on CVD risk factors
Knowledge are believe to be the key of awareness and practice which then will help in reducing the number CVD death. Malay are more likely to have more knowledge than other ethics. Publication language used by the media to spread the awareness and information might be the reasons of the little knowledge have by other ethnic (28). Other bumiputera group were less likely to practice the prevention of CVD risk factors. This results were consistence with earlier study which involving comparison between urban and rural population in Malaysia (5). Besides that, Female were more likely to be aware on the risk factors of CVD. Similar finding were obtained from another study (5, 29). In term of practice to prevent CVD female group was less likely to practice compared to male. Previous study reported only 13% women in Kelantan practice exercise as required (30).

Based on another study done in a private university students, 10% of the students suffer from hypertension (31). Two-third of the obesity among the private university students believe to have poor level of knowledge of obesity (32). Serious education programmed are recommended in order to prevent further development of the cases (32, 33). In a previous study to evaluate the dietary habit and nutritional knowledge, it is reported that there was no significance association between the socio-demographic and eating habit however, it found that even though the students have enough knowledge on the nutritional but they still have the poor dietary habit (33). This fairly proven that younger generation have the poor practice on the CVD risk factors compare

to other older generation. In this study respondent age >60 years old have the higher practice on prevention of CVD compared to younger age group. Previous study found that nutrition knowledge increase together with age and elderly found to be practicing more on the prevention (34).

Our participant from the secondary education level have the higher level of practice on the CVD risk factors compare to other education level, although the group shown to have lower knowledge and awareness on the risk factors of CVD. In contrast to previous study have reported positive association between education level and level of knowledge and awareness among local community in Penang (35) and Kuala Lumpur (36).

Respondents with higher income group (>RM5000) showed to have higher knowledge on the risk factors of CVD, but lower on the awareness and practices on the prevention of CVD risk factors compared to other lower income groups. Study by Su et al (2015) have predict that one out of five low-income urban dwellers in Kuala Lumpur has high chance of having CVD within ten years (37). The study also suggest that the health care expenditure, other illness related costs and loss of productivity due to CVD would worsen the current situation of low-income urban population (37).

CONCLUSION

This study highlighted the worrying situation of CVD risk factors and the group of population that are at high risk. Men with the age >30 are most likely to be at higher risk for having CVD since men are less to be aware and practice the prevention of the CVD. Generally, Gombak district community are more likely to have the knowledge on the CVD risk factors but lack of awareness and practicing the preventive action on CVD risk factors. There is a need to increase the knowledge, awareness and practices on the risk factors of CVD among urban community.

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