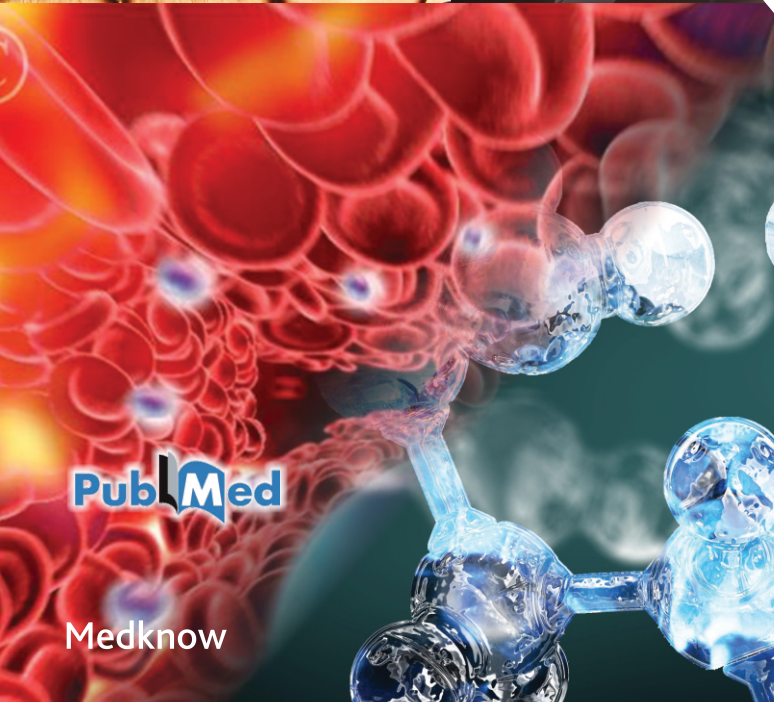
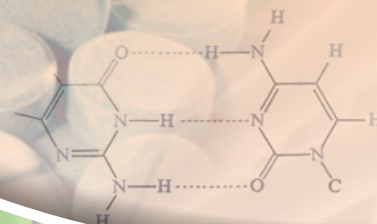
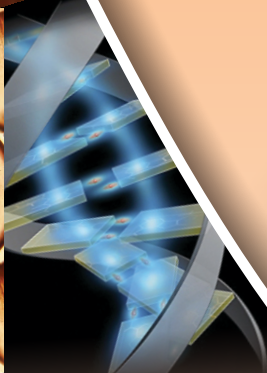
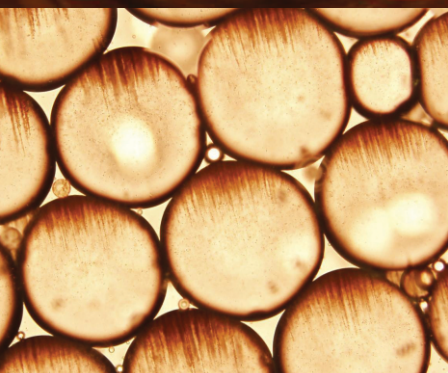
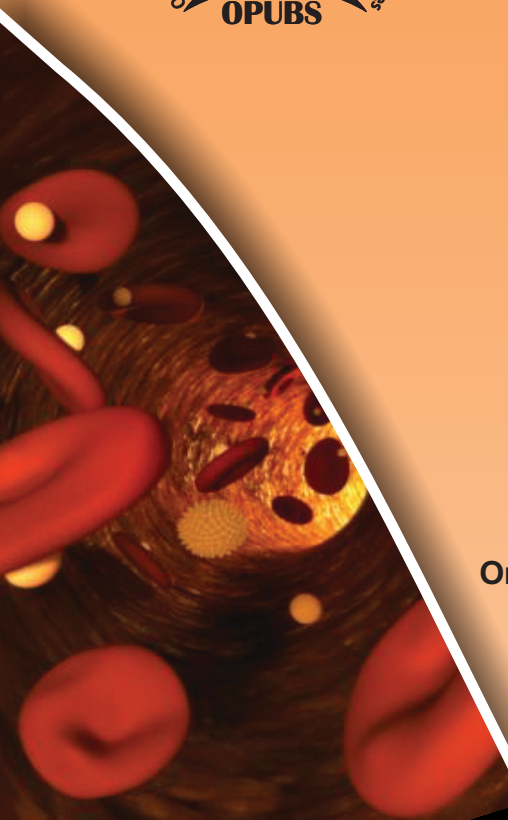


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Knowledge, Attitude, and Practice Regarding the Risk of Cardiovascular Diseases in Patients Attending Outpatient Clinic in Kuantan, Malaysia

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ABSTRACT

Background: Cardiovascular disease (CVD) is a leading cause of death around the world including Malaysia. Ischemic heart disease (IHD) is the single largest cause of death in the developed countries and is one of the main contributors to the disease burden in developing countries. **Materials and Methods:** This was a cross-sectional study conducted to determine knowledge, attitude, and practice (KAP) regarding the risk of CVD in patients attending an outpatient clinic in Kuantan, Malaysia. A total of 100 patients comprising 52 male and 48 female subjects were selected through convenient sampling method. **Results:** Of the total subjects, 86% were Malays. The mean scores (standard deviation) for KAP were 60.75 ± 4.823 , 54.36 ± 8.711 , and 33.43 ± 4.046 , respectively, whereas the maximum scores obtained by the subjects for KAP were 71, 65, and 43, respectively. Regarding questions related to knowledge, 88% subjects knew irregular eating pattern can cause disease and the benefits of vegetable intake. Most subjects recognized that smoking and obesity were CVD risk factors. Regarding questions related to attitude, 96% agreed that exercise can prevent CVD. More than half of the subjects followed healthy lifestyle. There were statistically significant differences observed in knowledge level between sexes ($P = 0.046$) and races ($P = 0.001$). Nevertheless, there was no statistically significant difference observed in KAP across different education levels of the subjects regarding the risk of CVD (P -value = 0.332, 0.185, and 0.160, respectively). **Conclusion:** This study revealed that patients had good knowledge and attitude regarding CVD risk factors. Yet, the number of smokers is still quite high. Development of better public information system is essential for the well-being of the society.

KEYWORDS: Cardiovascular disease, KAP, Kuantan, Malaysia, outpatient, risk factors

INTRODUCTION

Cardiovascular disease (CVD) is a noncommunicable disease that has become the ultimate cause of death worldwide. Ischemic heart disease (IHD) is the single largest cause of death in the developed countries and is one of the main contributors to the disease burden in developing countries.^[1] It was estimated that 17 million people die over a year globally and 23.6 million people will die by 2030 due to coronary heart disease and stroke.^[2] CVD is not a new disease entity among Malaysian adults. Since the early 1970s, CVD has

been identified as the major cause of mortality and morbidity in Malaysia.^[3] Despite new technologies and new developments in the health-care system, Malaysia still cannot escape the risks of CVD. IHD was assessed on top of the list of the 10 principal causes of death in Malaysia in 2008 with 12.9% (9806 cases) of medically

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certified cases.^[4] Of the 10 principal causes listed, 4 were CVDs that include heart disease (5.6%), diabetes mellitus (3.3%), stroke (1.7%), and hypertension (1.6%), which were from the total of 48,841 cases, for nonmedically certified cases of deaths.^[5]

Hypertension, dyslipidemia, diabetes mellitus, and smoking habit are the most prevalent modifiable risk factors for CVD.^[6-8] Unhealthy lifestyle is also identified as a risk factor for CVD.^[9] Realization of risk factors for CVD and its prevention steps are an important key that can ensure early detection of CVD.^[10-12] Early detection of CVD can save lives and resources.^[13,14] A study was conducted in the northeast coast of Malaysia regarding knowledge, attitude, and practice (KAP) on the risk of CVD among Kelantanese women.^[15] But unfortunately, no such study was conducted in Kuantan. Therefore, this study was conducted to determine KAP of patients regarding the risk of CVD in Kuantan population. In future, the result of this study might bring a positive implication for the benefits of Kuantan population. The research objective was to study the KAP of patients regarding the risk of CVD and its associated factors.

MATERIALS AND METHODS

Study design

A cross-sectional study was conducted.

Study subjects

This study was conducted among 100 patients attending an outpatient clinic in Kuantan, Malaysia.

Selection of the subjects

Subjects who were below 17 years of age, too ill, or could not understand either English or Malay languages were excluded from this study.

Sample size

The single proportion formula were used for sample size calculation and the proportion was obtained from the earlier study,^[15] where $P = 55.6\%$, and precision value of 0.09, the sample size obtained was 118. However, this study only managed to get 100 subjects due to certain limitations.

Sampling method

The method used for this study was convenient sampling.

Survey tools

A structured questionnaire that consisted of four parts was developed, which was specifically constructed for the purpose of this study to obtain patients' demographic data and KAP regarding risks of CVD. Content validity of the questionnaire was verified by experts. A pilot study was conducted to validate and to make sure that the questions were easily understood and related to the

subjects of interest. Some adjustments were made to obtain the best questionnaire. At first, the questionnaire was constructed in English but then translated into the Malay language using back-to-back translation to facilitate data collection. The adjustments were made to ensure that the questionnaire was easily understood by the subjects. The first part of the questionnaire consisted of demographic data such as gender, age, and occupation. The next part of the questionnaire included 19 questions on knowledge, 13 questions on attitude, and 14 questions on practice regarding the risks of CVD. The knowledge part was aimed to assess the subjects' general information on CVD. Subjects just need to answer "true," "false," or "do not know" as the answer for the statements given. As for the questions on attitude, it was designed to know the subjects' general feelings about statements given in this part by using a Likert scale of five degrees of agreement from "strongly agree" to "strongly disagree." Finally, for questions on practice, subjects were questioned about their physical activities. Answers were based on how often the study population (SP) underwent that activity. Subjects were given choices from one to four based on how frequent the SP did that activity, whether "almost every day" (six to seven times per week), "frequent" (more than two times per week), "seldom" (less or equal to two times per week), and "never." Prior to the data collection, investigator's agreement, head of departments' approval, and institutional approval were obtained to conduct the survey. Both verbal and written consent were obtained to avoid any circumstances in future before each session with the subject. The survey was carried out using both self-administered questionnaire for those who can read the questionnaire by themselves, and interview-administered questionnaire for those who cannot read. Some patients wanted to answer the questionnaire by themselves and some of them wanted the questions to be read for them. Each page was carefully checked to make sure that there are no unattended questions upon retrieval for the unguided interview. Scores given for the correct answers on knowledge were three, two for "do not know," and one for incorrect answers. On the other hand, scores given for questions on attitude depended on positive and negative statements. If the statement was positive, five marks were given for "strongly agree," four for "agree," three for "neutral," two for "disagree," and one for "strongly disagree," and vice versa for the negative statements. Finally, the scores for questions on practice were given as four for "almost every day," three for "frequent," two for "seldom," and one for "never," if the activities were positive, and vice versa for the negative activities.

Duration of study and data analysis

Completion of data collection took place from February 27 to March 19, 2012. All data that were collected were keyed in and analyzed by using Statistical Package for the Social Science (SPSS) version 21.0 for Windows. Descriptive statistics using frequency and percentage for categorical variables and mean with standard deviation for numerical variables were analyzed for the data in this study. Besides, inferential tests using parametric analysis of independent *t*-test were carried out if all the assumptions for the test were satisfied, otherwise the nonparametric analysis of Mann–Whitney test was used to compare the KAP scores between two independent groups in this study. The 95% confidence interval or the significant value of 0.05 was used in making the conclusion for the statistical tests used in this study.

Ethical approval

This study was approved by the Office of Deputy Director of Health, Ministry of The Health of Malaysia, Level 12, Block E7, Percel E, Precinct 1, Federal Government Administrative Centre, 62950 Putra Jaya Malaysia (Memo No.: (2) dim KKM/MIHSEC/08/0804/P 12-243 Dated: 6 June 2012 and Research Code: NMRR-12-163-11518).

RESULTS

Sociodemographic characteristics of the subjects

This study reported that most of the SP were Malays (86%) with the median of age 25 (13.13) years. This

study managed to get 52 (52%) male subjects and 48 (48%) female subjects. Other than that, 35 (35%) subjects were unemployed, 27 (27%) worked for private sectors, 22 (22%) were from government sectors, 12 (12%) were self-employed whereas 4 (4%) were retirees. Half of the subjects had higher education, whereas the other half had lower education. Of the 100 subjects, only 2 (2%) subjects were divorced whereas 60 (60%) of them were single and 38 (38%) were married. Around 82 (82%) subjects were free from any medical history of CVD. Other than that, more than half of the total subjects did not smoke (66%).

Knowledge on cardiovascular disease risk factors

The mean (standard deviation [SD]) knowledge score obtained from this study was 60.75 (4.82) from the full scores of 75.00. The minimum and maximum scores for knowledge were 47.00 and 71.00, respectively. Thirty-five percent (35%) of the SP got the scores of 65.0 and above, which can be considered that the SP had a good knowledge about CVD because the lowest score obtainable was 29.00. Tables 1 and 2 summarize the responses to questions regarding CVD and its risk factors. Half of the subjects could answer general questions on CVD correctly, such as adequate exercise and effects of irregular eating patterns, except for question related to obstructed blood vessels associated with CVD. For that question, only 37% could answer correctly. As for the prevention factors of CVD, light walking cannot prevent CVD. However, only a minor proportion of the SP answer correctly regarding brisk walking can prevent CVD. Other than that, it is

Table 1: Knowledge regarding CVD and its risk factors (*n* = 100)

Items	Answer choices		
	True <i>n</i> (%)	False <i>n</i> (%)	Do not know <i>n</i> (%)
CVD is related to heart	56 (56)*	2 (2)	42 (42)
CVD is not related to obstructed blood vessels	24 (24)	37 (37)*	39 (39)
CVD is the leading cause of death in Malaysia	58 (58)*	16 (16)	26 (26)
CVD is the disease of women only	5 (5)	76 (76)*	19 (19)
CVD occurs in young people only	7 (7)	80 (80)*	13 (13)
Light walking can prevent CVD	80 (80)	11 (11)*	9 (9)
Irregular eating patterns bring harm	88 (88)*	8 (8)	4 (4)
HDL is a good cholesterol	16 (16)*	20 (20)	64 (64)
Housework is enough exercise per day	51 (51)	45 (45)*	4 (4)
Adequate exercise prevents CVD	84 (84)*	10 (10)	6 (6)
BMI > 30 is considered obese	50 (50)*	10 (10)	40 (40)
Fruit and/or vegetables prevent CVD	88 (88)*	7 (7)	5 (5)
Most CVD cases are hereditary	28 (28)	53 (53)*	19 (19)
Controlling high-fat food is essential	79 (79)*	13 (13)	8 (8)
Tobacco cessation program is available	39 (39)*	12 (12)	49 (49)
Slender people do not need to exercise	8 (8)	89 (89)*	3 (3)
Prayer can reduce stress	88 (88)*	10 (10)	2 (2)

*Correct answers.

Table 2: Responses on question regarding CVD risk factors

CVD risk factors	Yes n (%)	No n (%)
Diseases		
Hypertension	58 (58)	42 (42)
Cancer	16 (16)	84 (84)
Diabetes mellitus	38 (38)	62 (62)
Heart attack	78 (78)	22 (22)
Asthma	26 (26)	74 (74)
Stroke	39 (39)	61 (61)
Allergies	3 (3)	97 (97)
Conditions		
Stress	59 (59)	41 (41)
Sedentary lifestyle	37 (37)	63 (63)
Smoking	80 (80)	20 (20)
High-abdominal fat	59 (59)	41 (41)
Obesity	71 (71)	29 (29)

Maximum mark for each item = 2.

Bold items indicate CVD risk factors.

Table 3: Attitude toward prevention of CVD (n = 100)

Items	Agree ^a n (%)	Neutral n (%)	Disagree ^b n (%)
Stop smoking	88 (88) ^c	3 (3)	9 (9)
Doing exercise	96 (96) ^c	0 (0)	4 (4)
Prefer walking to go somewhere near	90 (90) ^c	4 (4)	6 (6)
Maintain BMI	83 (83) ^c	9 (9)	8 (8)
Fruit and/or vegetables intake	91 (91) ^c	2 (2)	7 (7)
Take less oily food	87 (87) ^c	5 (5)	8 (8)
Read nutrition facts for each product	87 (87) ^c	6 (6)	7 (7)
Avoid carbonated drinks	90 (90) ^c	3 (3)	7 (7)
Control stress to prevent illness	89 (89) ^c	5 (5)	6 (6)
Regular medical checkup	88 (88) ^c	5 (5)	7 (7)
Stress management	70 (70) ^c	19 (19)	11 (11)
Prefer fast food	26 (26)	22 (22)	52 (52) ^c
Prefer lazing around than exercise	35 (35)	13 (13)	52 (52) ^c

^aCombined response of “strongly agree” and “agree.”

^bCombined response of “strongly disagree” and “disagree.”

^cExpected answers.

observed that only a few subjects knew about good and bad cholesterol. For questions on CVD risk factors, most of the subjects answered correctly except for diabetes mellitus (38%), stroke (39%), and sedentary lifestyle (37%). Almost all the subjects answered correctly to asthma, knowing that asthma is not a risk factor for CVD. Most subjects were well informed of the increased risk of CVD due to smoking (80%) and obesity (71%).

Table 4: Practice toward the prevention of CVD (n = 100)

Activity	Always n (%)	Frequent n (%)	Seldom n (%)	Never n (%)
Work involves vigorous activity >10 min	53 (53) ^a	23 (23)	18 (18)	6 (6)
Walking >10 min to places	63 (63) ^a	24 (24)	12 (12)	1 (1)
Exercises for >20 min per session	37 (37) ^a	27 (27)	35 (35)	1 (1)
Special diet/supplements for heart	22 (22) ^a	24 (24)	23 (23)	31 (31)
Fruit intake	44 (44) ^a	36 (36)	17 (17)	3 (3)
Vegetables intake	66 (66) ^a	21 (21)	8 (8)	5 (5)
Fast-food intake	11 (11)	27 (27)	59 (59)	3 (3) ^a
Fried food intake	38 (38)	33 (33)	25 (25)	4 (4) ^a
Snacking	16 (16)	28 (28)	31 (31)	25 (25) ^a
Stressful life	14 (14)	27 (27)	40 (40)	19 (19) ^a
Hours on television and/or computers	>8 h	6–8 h	3–5 h	1–2 h ^a

^aExpected positive practices.

Attitude toward cardiovascular disease risk factors

The mean score obtained for attitude section was 54.36 ± 8.71 , with the minimum and maximum scores as 19.00 and 65.00, respectively. Thereafter, it can be concluded from Table 3 that SP demonstrated a positive attitude towards CVD as they scored almost all items tested above 50%. Most of the subjects answered, “strongly agree” and “agree” toward exercise (96%), prefer walking than taking any other means of transportation (90%), eat fruits and vegetables (91%), and avoid carbonated drinks (90%). However, only 52% agreed on a statement regarding avoiding fast food and lazing around.

Practice toward the prevention of cardiovascular disease

The mean (SD) practice score obtained was 33.43 ± 4.046 , with the minimum and maximum scores as 24.00 and 43.00, respectively. Table 4 shows practices toward the prevention of CVD as answered by the subjects. More than half of the subjects had work involving vigorous activities for more than 10 min (52%), walking for more than 10 min to places (63%), and eating vegetables (66%). Only 11% of the subjects took fast food every day whereas more than half of them seldom took fast food.

Results for the association of genders, races, and academic levels with knowledge of CVD are summarized [Table 5]. An independent sample *t*-test or Mann–Whitney test was carried out to determine the *P*-value of each variable tested against knowledge. As a conclusion, there was a significant difference in knowledge across the different genders and races regarding risks of CVD. On the other hand, there was

Table 5: Comparing knowledge scores between different genders, races, and academic levels (*n* = 100)

Variable		<i>n</i> (%)	K-score* Mean (SD)	<i>t</i> -Statistic (df)	<i>P</i> -value
Gender	Male	52 (52)	59.83 (4.862)	-2.023 (98)	0.046 ^a
	Female	48 (48)	61.75 (4.624)		
Race	Malay	86 (86)	61.60 (4.347)	-	0.001 ^b
	Others	14 (14)	55.50 (4.363)		
Academic levels	Lower	50 (50)	60.28 (4.704)	-9.74 (98)	0.332 ^a
	Higher	50 (50)	61.22 (4.942)		

*Total scores for knowledge.

^aIndependent sample *t*-test.

^bMann–Whitney test.

Table 6: Comparing attitude scores with different genders, races, and academic levels (*n* = 100)

Variable		<i>n</i> (%)	A-score* Mean (SD)	<i>t</i> -Statistic (df)	<i>P</i> -value
Gender	Male	52 (52)	54.46 (6.952)	0.121 (98)	0.904 ^a
	Female	48 (48)	54.25 (10.362)		
Race	Malay	86 (86)	54.58 (8.818)	-	0.441 ^b
	Others	14 (14)	53.00 (8.200)		
Education level	Lower	50 (50)	53.20 (10.268)	-1.337 (84.45)	0.185 ^a
	Higher	50 (50)	55.50 (6.720)		

*Total scores for attitude.

^aIndependent sample *t*-test.

^bMann–Whitney test.

no significant difference in knowledge of CVD risk factors between different academic levels.

Association of genders, races, and academic levels with attitude of cardiovascular disease

Results for the association of genders, races, and academic levels with attitude of CVD are summarized [Table 6]. After testing with independent sample *t*-test or Mann–Whitney test, *P*-values obtained were all more than 0.05, which indicate that there were no significant differences in attitude scores regarding risk factors of CVD between different genders, races, and academic levels.

Association of genders, races, and academic levels with practice toward prevention of cardiovascular disease

Results for the association of genders, races, and academic levels with practice toward prevention of CVD are summarized [Table 7]. After testing with independent sample *t*-test or Mann–Whitney test, *P*-values obtained were all more than 0.05, which indicate that there were no significant differences in attitude scores regarding risk factors of CVD between different genders, races, and academic levels.

DISCUSSION

The information obtained from this study was used to determine the KAP of the patients from an outpatient clinic in Kuantan toward the risk factors of CVD. Only

three variables were being used in this study to relate with KAP, which were gender, race, and academic level. However, most of them showed no significant difference in KAP regarding the risk of CVD. Similar study like this was conducted in the northeast coast of Malaysia in 2010 for patients attending clinics around Kelantan. The study evaluated KAP of women regarding CVD risk factors and concluded that half of the study subjects have good KAP in CVD.^[15]

Knowledge on cardiovascular disease risk factors

The findings showed that almost half of the subjects could answer at least half of the general questions regarding CVD. It was also found that women have better knowledge of CVD than men. A similar finding was stated in one Malaysian study conducted earlier.^[16] However, another overseas study stated that men had a higher awareness of many risk factors than women.^[17] One earlier study reported that males were more aware than their female counterpart regarding increase risk of CVD with menopause and low level of estrogen.^[17] However, the picture is much different in Malaysia, only 17.1% of SP had clear understanding that menopause increases the risk of CVD.^[15] Therefore, it cannot be concluded as to which gender had higher knowledge on CVD. As the mean of knowledge score obtained in this study was 60.75, it can be inferred that both men and women had limited knowledge of CVD. Malaysian government's collaboration with press and mass

Table 7: Comparing practice scores between different genders, races, and academic levels (*n* = 100)

Variable		<i>n</i> (%)	<i>P</i> -score* Mean (SD)	<i>t</i> -Statistic (df)	<i>P</i> -value
Gender	Male	52 (52)	33.46 (3.958)	0.081 (98)	0.936 ^a
	Female	48 (48)	33.40 (4.181)		
Race	Malay	86 (86)	33.50 (4.175)	-	0.643 ^b
	Others	14 (14)	33.00 (3.234)		
Academic level	Lower	50 (50)	34.00 (3.855)	1.416 (98)	0.160 ^a
	Higher	50 (50)	32.86 (4.189)		

*Total score for practice.

^aIndependent sample *t*-test.

^bMann-Whitney test.

media has produced publications and reports about CVD, but still, the result is not as good as expected. However, those publications were easily accessible in health-care system. Therefore, there was a gap in knowledge of CVD between public and health-care workers. Other than that, the result obtained in this study showed that Malays were generally high in knowledge regarding CVD than other races. Malay language is the national language of Malaysia and is used in most of the publications including media and press. Besides, English language is also used in the dissemination of information. Unable to understand both Malay and English language might be the cause as to why other races had slightly lower knowledge of CVD. In brief, this was an indicator of low awareness of CVD in this population consistent with findings in other studies.^[15,18] This study showed that more than half of the participants answered correctly to general questions related to eating pattern and exercises, which infer that the study subjects knew the consequences of diet and exercises to health. This study also observed that not all the SP knew what cardiovascular really meant. Therefore, the SP could not answer questions with the word “CVD” in it. However, general questions regarding prevention of diseases such as questions regarding diet and exercises were easily answered by the SP.

Poor knowledge about CVD in this study was about high-density lipoprotein (HDL). Only 16% of the total subjects answered correctly for this question. In fact, most of the subjects (64%) answered “do not know” for this question. Most of the subjects admitted that the SP have heard the term “good” and “bad” cholesterol but the SP could not distinguish when it is in medical terms from the interview session. As for body mass index (BMI), only 50% could answer the questions correctly, whereas 40% did not know the answer and 10% answered false. The result was consistent with that of the study conducted in Kelantan,^[15] and indicated that not all were aware of this matter. As for stress,

it showed that 98% of the subjects answered prayer activity can reduce stress. This was because 86% of the subjects were Malays and Muslim. Therefore, most of the subjects believed that prayer activity does help people to release stress and attain tranquility. Mayo clinic also reported similarly that meditation relieves stress.^[19] Regarding the risk factors for CVD, smoking and obesity are the most recognized CVD risk factors. The result was consistent with an earlier study, which reported that 87.1% recognized smoking as a risk factor for CVD whereas 77.2% recognized obesity,^[15] and 91.9% believed that smoking can cause CVD whereas 85% believed that quitting smoking can help reduce CVD.^[17] In conclusion, smoking and obesity were the main CVD risk factors perceived by the subjects.

Attitude on cardiovascular disease risk factors

Attitude score obtained for this study was generally good. Most of the subjects agreed that the SP must maintain an active lifestyle, take healthy diet, maintain BMI, do regular medical checkup, and control stress to prevent CVD. Most of the SP agreed that stoppage of smoking is an absolute necessity to prevent CVD. This finding was consistent with the result of a study conducted in Kerala, India, in which 70% of the subjects had positive attitude pertaining to this issue.^[20] This result indicated hope for reducing CVD prevalence in Malaysia as smoking was one of the main risk factors for CVD. Globally, smoking is considered as a major risk factor not only for CVD but also many other diseases. A continuous smoking cessation program should be maintained to produce a healthy generation that is free from smoking. Modernization and industrialization have caused rapid opening of fast-food and 24-hour restaurants. This might be the reason why almost half of the SP answered strongly agree to laze around in fast-food restaurants. Furthermore, most youth, nowadays, preferred to hang out at those places with their friends. Most of the fast food contains trans fat.^[21] This trans fat can reduce HDL level in the body and thus increase the chances

of developing CVD.^[22] Nevertheless, attitude toward vegetables and fruits intake among the subjects is very high. The key point in having a healthy food intake is to have a balance diet. There is an urgent need to encourage the society in promoting a healthy diet for their own benefits.

Practice on cardiovascular disease risk factors

The current SP very often do vigorous work in their working hour and take plenty vegetables. However, other practices were not frequently carried out, which indicated that the SP behavioral activities to prevent CVD were not optimal, as the mean of practice score (33.43) was less than half of the total marks (35.00). The result was consistent with the earlier Malaysian study conducted among women in Kelantan.^[15] Only a few of the subjects took special food or supplements for the heart as found in this study. This might be because the SP was not aware of the importance of the special diet. The present SP does not suffered from CVD, thereafter, they were not on special diet regime. This finding was consistent with the earlier study conducted in Kelantan as only 15.8% of the subjects were taking Omega 3 for the prevention of CVD.^[15] In terms of diet, subjects were aware of the importance of vegetables and fruits intake, as more than half was consumed by them at least four times a week. Furthermore, the number of subjects that took fast food everyday was quite low. However, most of the subjects were having fried food almost everyday. Oily food is not good for health as it can increase the bad cholesterol level in the body. Moreover, it can also cause accumulation of fat in the body and will lead to obesity if coupled with physically inactive lifestyle. In this study, less than half of the subjects were smoking. The Malaysian government always conducted campaigns to stop Malaysian from smoking. The anti-smoking campaign in Malaysia did not achieve its goal as a big proportion of Malaysian still continuing smoking. It had been observed that only a little proportion of the population were motivated to stop smoking. The earlier study found a small number of active smokers.^[15] Different geographical areas and social cultures might influence the number of smokers in that area.

Association of other cardiovascular disease factors

It is difficult to determine the effect of heredity in this study because the information was not complete. However, another study demonstrated that diabetes mellitus and hypertension were the highest medical history of CVD risk factor obtained.^[15] One more study conducted in the rural area of Malaysia determined that the prevalence of hypertension was 35.6%.^[23] Since

hypertension increases risks of developing CVD when combined with other factors such as diabetes mellitus, obesity and high cholesterol level,^[6,24,25] complete information regarding hypertension can help increase public awareness on CVD. Smoking, on the other hand, was a risk factor that was present in multiple studies.^[15,20] In contrast, most subjects in a study conducted among African-Americans never smoked cigarette.^[17] As 38% of the subjects in this study were smokers, it was considered quite high compared to other studies.

Elevated blood lipid level can increase the risk of CVD. One Malaysian study reported that 67.2% of the total subjects knew the effect of low-density lipoprotein (LDL).^[15] The result was inconsistent with this study in which only 16% of the subjects knew about HDL. Level of total cholesterol in the blood can be strongly associated with coronary heart disease and stroke.^[26] So, knowing the function of both HDL and LDL can lead to healthy living. This study could be beneficial to the Malaysian population, if the result of this study are taken into consideration by the concern authorities for prevention and control. Other than that, the data will be significantly accepted and reliable, if the number of sample size is increased and it includes patients from other clinics as well rather than from a single clinic.

CONCLUSION

This population can be considered to have good knowledge and attitude regarding CVD risk factors. However, the number of smokers is considerably high that took account of one-third of the total number of the sample size. In addition, the practice of the subjects was still not optimal. However, significant differences were observed in the knowledge level of CVD across different genders and races, whereas no significant difference was observed in knowledge across different academic levels regarding the risk of CVD. Meanwhile, for attitude and practice, there was no significant difference across different genders, races, and education levels. Therefore, it is important to have information about KAP of the population so that some action could be taken for good.

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Conflict of interest

There are no conflicts of interest.

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