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Knowledge, Attitude and Practice on Cardiovascular Disease among Women in North-Eastcoast Malaysia

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ABSTRACT

Introduction: Coronary heart disease (CHD) is a leading killer not only in men but also in women worldwide and primary target for prevention. However, majority initial researchers believed it was mainly a men's disease that resulted in fewer women being informed regarding the disease.

Aim and Objectives: A cross sectional study was conducted to determine the level of knowledge, attitude and practice on cardiovascular disease among women attended outpatient clinics with Family Medicine Specialists in Kelantan from June to December 2010.

Methods/ Study Design: A total of 448 women from 7 out of 14 clinics run by Specialist with age ranged between 25 and 65 years were selected via systematic random sampling in the ratio of 1:2 based on clinic attendance lists. Excluded were those who illiterate and having psychotic symptoms. All of consented participants were given a set of validated KAP questionnaire to be completed within 15 minutes.

Findings: Majority of respondents were Malays with mean age of 39.9 years. Among them, 3.1% were smokers and 41.1% claimed having medical illness, the commonest was obesity (23.6%). About 87% of women knew that smoking is a risk factor. However, less than 20% knew about menopause. More than 80% knew typical symptoms whereas less than half realised atypical symptoms. Less than 20% of them knew the cholesterol risk target. Only 13% of women practiced exercise as required. The mean (SD) for knowledge and practice score were 70.6 (13.76) and 63.7(13.59) accordingly. The median (IQR) for attitude score was 88.2 (14.71). Thus the good knowledge, attitude and practice score were 55.6%, 55.1 % and 51.1% respectively.

Conclusion: A structured educational programme and utilization of available CVD guidelines should be reinforced as a better preventive strategy to overcome this problem.

Keywords: Knowledge, Attitude, Practice, Cardiovascular disease, Women, Coronary Heart Disease

Introduction

Cardiovascular disease (CVD) is still a leading cause of mortality in women worldwide despite of recent advances in diagnostic and therapeutic technologies. Although there has been a decline in the overall mortality due to CVD, still its incidence in women has been gradually increasing[1-3]. In Malaysia, CVD has been the major cause of deaths since early 70's [4,5]. CHD for example, accounted for 19.3% (12,412) mortality in men and the figure was even higher in women, 21.2% (9,746) [6]. The death rate due to CVD among women was 26.1% in 2006, which was 0.7% higher than in 2005. 15.5% Deaths was due to heart attack [7].

Hayes et al., in 2006, reported that deaths due to CVD in women increase every year since 1984 [8]. The Framingham Study had also reported that more sudden death in women occurs due to silent myocardial infarction, with no previous history of heart disease [9]. In developed countries, at 40 years of age, a lifetime CVD risk was 1 out of 3 in women compared to 1 out of 2 in men [10]. Yet, women seem largely unaware of the clinical presentation and their risk of developing CVD, having assumed that CVD is still predominantly a disease that affects mainly men.

In certain circumstances, presuming that women have less risk of developing CVD than men, physicians usually focus on screening reproductive cancers and issues related to menopause. This slows down them to develop the initiation therapies and explore the risk factors, refer for specialist opinion, diagnose, and provide acute care for cardiac conditions, such as myocardial infarction [11,12].

Most women are far more afraid of breast cancer than of cardiovascular disease even though the death ratio is higher in CVD (1 in 2.8 versus 1 in 28) [13] and (1 in 2.6 versus 1 in 4.6) [14]. The unawareness of this preventable disease may lead to the ignorance of the disease and lack of practising CVD risk reduction behaviour. These urge the Ministry of Health to release a Clinical Practice Guidelines on CVD for women, in order to alert all health care providers.

Prevention is always better than cure. One way to reduce CVD incidence is by increasing women adherence to healthy lifestyle by educating, screening, detecting and treating modifiable risk factors since women do not practice heart healthy behaviours on a routine basis. This may be attributed to their limited CVD knowledge and lack of concern for CVD [15] that may result in poor motivation for changing behaviours known to be a risk factor for CVD. Knowing the importance of it, assessing baseline knowledge (K), attitude (A) and practice (P) of women on CVD issues are crucial and important.

Methodology

Study Design and Selection of the Clinics

This study was a cross sectional study done in Kelantan from June till December 2010. Kelantan is one of the states in Malaysia that had 1.7 million populations with 50% of them were women [16] and majority were Malays at 95%. There were 56 health clinics [17] available here with only 14 clinics were run by Family Medicine Specialist (FMS) at the time of the study conducted. Flow chart and recruitment process using multistage random sampling to choose clinics and patients are shown in figure 1.

Patients

A total of 448 women ranging from 25 to 65 years were selected via systematic random sampling in the ratio of 1:2 based on clinic attendance lists were encouraged to participate. Excluded were those who illiterate and having psychotic symptoms. Informed consent was signed prior to enrolment into the study. All of them were given a set of KAP questionnaire to be completed within 15 minutes.

KAP Questionnaire

A set of KAP questionnaire were developed. First part consists of socio-demographic data. Part II consists of 31 items for knowledge regarding cardiovascular disease. The sub-domains included risk factors, symptoms and target levels for CVD risk factors. Part III and IV assess participant's attitude and practice. The Cronbach's alpha for these questionnaires were 0.73, 0.71 and 0.60 respectively. Categorical responses (true, false and don't know) were used for knowledge (K), 3 likert scales (agree, neutral, not agree) for attitude (A) and (never, seldom, always) for practice items (P). The total score was categorized as good and poor based on mean/ median of total score.

Analysis

Descriptive analysis was used to analyze the socio-demographic and the level of KAP on CVD among women.

Results

Socio-demographic and CVD risk characteristics of the respondents

The response rate was 100%. The socio-demographic and clinical characteristics of the respondents summarises in table 1. Majority of respondents were Malay (98.4%) with the mean (SD) age of respondents were 39.9 (10.04) years. Most of them had secondary education, unemployed (49.8%) and had low household income. Around 60% of them were either active or passive smoker. 41.3% had self-reporting medical illness with the commonest was obesity (23.7%). Hypertension was the highest (43.1%) reported risk in the family of the respondents followed by diabetes mellitus (30%).

Knowledge on cardiovascular disease

The mean (SD) knowledge score was 36.8(7.14) [70.7% (13.76)] So the percentage for good knowledge score was 55.6% (249).

Table 2 shows the items for good knowledge of CVD. For the general knowledge question, less than 40% knew that CVD is the main cause of death among women in Malaysia and two third of them get the definition of MI correctly.

For CVD risk factors, majority of the respondents answered correctly except for menopause. The item with the highest proportion of correct answer for CVD risks were "smoking" (87.1%) followed by "high blood pressure" (79.3%). However only 18% knew that menopause is one of the risk factors.

Regarding CHD symptoms, less than half did not realise the atypical IHD symptoms. The highest proportion of correct answers were "shortness of breath"(86.6%) , "chest pain" (85.9%), followed by "palpitation" (81%) and among the lowest were atypical IHD symptoms include "jaw, left shoulder and neck pain" and "nausea and vomiting", at around 36%.

More than half of respondents recognized the normal level of blood sugar and blood pressure but less than 20% of them knew the specific level of bad and good cholesterol which is LDL and HDL levels.

Self-reported Attitude on cardiovascular disease

Attitude score ranged from 9(26.5%) and 34(100%); however the distribution was skewed to the left with median (IQR) score of 30 (5) [88.2% (14.71)]. The percentage for good attitude score was 55.1% (247). The item with highest proportion of positive attitude was "willing to exercise" and "should know blood pressure level". Among the lowest are "Willingness to take HRT", at 35.5% (159). Other attitudes items were showed in table 3.

Self-reported Practice on cardiovascular disease

Practice score ranged between 5(20.8%) and 22(91.7%). The mean (SD) score for practice is 15.3 (3.26)[63.7(13.59)]. The percentage for good practice score was 51.1%. . In present study, practice on healthy lifestyle was very poor. Only 13.3% exercised as required and 15.1% never eat fatty food more than 3 times per week. Details of the practice were shown in Table 4.

Discussion

Knowledge on cardiovascular disease

The findings showed that only about half of women had good knowledge score for CVD which was also consistent with other studies [17, 18, 19] . With the mean score of 36.8(70.8%), women still had limited amount of CVD knowledge despite many efforts by Ministry of Health and information availability via mass media. This result was compatible with the study done among women without history of heart disease [20] and as well as among those who already had IHD [21]. They found that the mean score for knowledge was only 60% and 64% respectively which indicates limited awareness among regarding CVD regardless their risk and disease status.

The poor knowledge about CVD which is the main cause of death among Malaysian women in current study was much lower compared to women in the U.S which was already 40% in 2003 [8]. Smoking was recognised as CVD risk factors with the highest score compared to other risk factors. This is because smoking is a well-known major risk factor for CVD [22] and is commonly highlighted in the media. However, chronic renal failure (CRF) showed the lowest score since it usually occurs as a consequence of other diseases such as diabetes, hypertension and obstructive nephropathy. It was also given less attention by primary care doctors and even in the media since the individual with CRF more likely to die from CVD then CRF itself [23].

Question that most women got it wrong was menopause as a CVD risk factor which was 82.1%. This finding was comparable with the study done among inpatient women that found only 3 % identified it whereas their medical record stated that 88% of them had menopause as a risk factor [24]. This reflects upon the fact that women and health care workers were more focused on the symptom of menopause rather than its long term effect on the heart.

Regarding the symptoms, most respondents recognised that chest pain, palpitation and sweating as a heart symptom but one third of them still did not recognised the atypical symptoms such as jaw, neck and left shoulder

and epigastric pain, although majority of the women were presented with atypical angina [25]. In women, angina has been postulated due to vasospasm and micro vascular [26]. This may lead to delay in seeking treatment among women [27,28].

Regarding level for risk measurement, more than half of the respondents knew the normal level for blood pressure and blood sugar, however they were not aware of bad (LDL), good (HDL) cholesterols and BMI. This is because blood pressure and diabetes mellitus is a well-known CVD risk factor whereas cholesterol and obesity or overweight were less being discussed during consultation as proven by the Direct Observation of Primary Care (DOPC) study where only about 20% of physicians gave exercise and dietary advice to their chronic care patients [29]. It has also been highlighted in another study that 70% of female patients reported that their physicians had never discussed CVD with them [21]. Furthermore, education or health campaign for women in public is done once or twice per year that covers various women's topics which are not specific to CVD per se.

Attitude on cardiovascular disease

Our results indicates that women in our population had good attitude. Majority of them agreed that they should know their level of blood pressure, blood sugar and blood cholesterol, reduce the sugar and fat intake. These high proportion of positive attitude on screening and measuring risk factors were due to their awareness toward the healthy lifestyles as promoted lately in the mass media regarding healthy eating and regular exercise .

In quitting from smoking, about 20% still did not agree to stop smoking or being a passive smoker even though passive smoking also increase their risk of CVD [30]. This finding was consistent with the study in Kerala India that nearly 70% of the respondents had positive attitude on advising others to stop smoking [31]. In contrast, a study among migrant Chinese in Beijing found that negative attitudes on stop smoking were still high (56.1%) among female restaurant workers and among female commercial sex worker, at 45.1%. Similarly, in a study done among French pregnant smokers also noted that 59.8% of them did not respond to the offer of cessation services [32].

Current result indicates that women in our community are already motivated enough for not involving in any tobacco product and with continuous support, they will be able to implement and maintain it as practice. For those who still had negative attitude on smoking issues, lack of understanding about the definition of passive smoker and its related CVD risk might be a cause. They may be not strong enough to encourage their husband to quit smoking.

Regarding the use of hormone replacement therapy (HRT), women were not fully understand or were not sure of its use especially for CVD prevention as supported by their knowledge on menopause where majority of them did not know that menopause is one of the risk factors for CVD and that HRT is not for CVD protection. Therefore, health care professionals, we should use this opportunity to inform, educate and discuss about CVD risks with them.

Practice on cardiovascular disease

The percentage of good practice in the present study was only around 50% which indicates the behaviour to reduce the CVD risk was still not optimal . It is consistent with the result found in a study done by Kim C et al from U.S that found overall practice regarding CVD risk reduction behaviour were suboptimal in both gender [33].

In the present study half of practice items were reported as positive practice including maintaining the normal weight, reducing life stress, not smoking or being a passive smoker,visiting heath care professional regularly and taking treatment as recommended by the doctor. Another study noted that the practice regarding maintaining the desired weight among CVD patients was lower between 27.6%-52% as compared to our result, at about 58.7% [34]. The comparison here may be biased since the interpretation of normal weight might differ as reported in other studies among British Bangladeshi women, 20% of them perceived that their weight were normal although the actual fact, it was abnormal [35].

On the other hand, the present study showed very poor practice in performing regular exercise (13.4 %)which was much more lower as compared to a study done by Kim et al, at about 63% [33], using less than 3 tea spoons salt daily (25.7%), taking fatty food less than 3 times per week (15.2 %) and taking omega 3 (15.8%). Limited consultation time might be a cause of less physicians' ability to give proper dietary advice to their patients as supported by Kim C et al that only 31.3% women received dietary advice [33].

By right, the Ministry of Health had already provided the health care workers with lifestyle module and training but lack of resourses such as qualified dietitians or educator nurses in primary health centres had caused the problem to become even worse. A lot of campaign via mass media had also been done, yet it seemed ineffective even though our respondents' attitude toward practising healthy lifestyle was good. The reason was modifying someone's lifestyle was not an easy job especially in dietary intake, one of that, which was related to our culture or norms for example eating salty food such as anchovy sauce, and even, sweet food such as traditional cakes that can be found everywhere. Secondly, lifestyle modernisation with increasing trend of eating fast and processed foods, had made them reluctant to resist the temptation of eating delicious and unhealthy food.

With regards to consumption of omega-3 fatty acids, evidence showed that this fatty acids may be considered helpful or therapeutic for women with hypercholesterolemia and/or hypertriglyceridemia for primary and secondary prevention [35]. Current study showed that only a small proportion of respondents take omega 3 for CVD prevention. However, the risk of this respondents was not measured either high or low. The public may be quite aware about taking omega 3 as CVD prevention but they do not really know the recommendation is mainly for high risk patient or those with hyperlipidemia . Apart from that, the emphasis on healthy lifestyles by the current health system may be insufficient [37] as suggested by findings in a study using NHANES data. They measured adherence of adults aged 40-74 years to all 5 healthy lifestyle habits including reduction of weight , regular physical activity and eating more fruits and vegetables a day and the results revealed that the good practice decreased from 15% to 8% within 18 years. It was postulated that the process to change the lifestyle habits are complex and multiplies including unwillingness to change, perceiving that they have low risk [38] and are either too young or too old to contract the disease.

The self reported practice regarding measuring of CVD risks was good in our women population which accounted between 64.3% for cholesterol level and up to more than 92% for blood pressure and even higher for body weight measurement which was almost similar to Kim et al's findings except for cholesterol level measurement, which was slightly higher [32]. Among those who had measured their CVD risk, majority measured their blood pressure (83.1%), blood sugar(74.1%),

cholesterol (58.5%) or body weight (90%) regularly within yearly or more interval . The percentage of them who reported that their blood presure, blood sugar, body weight and cholesterol levels as normal were 77.7%, 67.6%, 60.9% and 44% respectively and it was comparable with Kim et al [33]. The practice of cholesterol measurement in the present study was comparable with the study done among Asian or Pacific Islanders (62.7%) [39].

The practice regarding common CVD risk screening is good in our population and it is most probably due to our Ministry of Health's policy that encourages all government servants to do CVD health screening regularly in the wellness clinics and further check up for women has been done if they are involved in family planning programs and during antenatal care .

Conclusions

The percentage of good score for knowledge, attitude and practice on CVD among women were 55.6%, 55.1% and 51.1% respectively. Women's knowledge on CVD is still limited and not optimal that needs continuous efforts from health care providers. Primary care doctors should focus on the strategies to increase knowledge, attitude and practice in women. As a result, structured educational programme and utilization of available CVD guidelines should be reinforced as a better preventive strategy to overcome this problem.

Competing interests: None

Authors' contributions:

a. Conception and Design: Harmy MY, and Rosediani M

b. Acquisition of Data and Analysis: Ranimah Y

c. Interpretation of Data: Rosediani M, Ranimah Y

d. Drafting: Rosediani M

e. Critical revision and Final approval of completed of Manuscript: Rosediani M, Ranimah Y, and Harmy MY

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References

1. Welty FK. Women and Cardiovascular risk. *Am J Cardiology* .2001;88:48-52.

2. Bello N LM. Epidemiology of Coronary Heart Disease in Women. Prog Cardiovasc Dis 2004;46:287-95.

3. Wenger NK. You've come a long way baby: Cardiovascular health and disease in women: problem and prospects. *Circulation*. 2004;109:558-60.

4. Khoo KL. Tan H SJ, Aljafri AM and Hatijah A. Screening for blood pressure, cholesterol and glucose during National Heart Weeks 1992-1994. *Malaysia Medical Journal*. 1996;51:307-315

5. Khoo KL. Tan H LY. Serum lipid and their relationship with other coronary risk factors in health subjects in a city clinic. *Malaysia Medical Journal* .1997;52:38-52.

6. Population distribution and basic demographic characteristic report population and housing census 2000. In: Department PM, editor. Putrajaya; 2001.

7. Prevention of Cardiovascular disease in women. In: Health Mo, editor. first ed. Putrajaya; 2008.

8. Hayes SN. Preventing Cardiovascular Disease in Women. *American Family Practice*. 2006;74:1331-40.

9. Kannel WB. Silent myocardial ischemia and infarction: insights from the Framingham study. *Cardiology clinic*. 1986;4:583-591

10. Donald ML-J, Martin GL, Alexa B and David L. Lifetime risk of developing coronary heart disease. *The Lancet*. 1999; 353:89-92.

11. Hippisley-Cox J, Pringle M, Crown N, Meal A, Wynn A. Sex inequalities in ischaemic heart disease in general practice: cross sectional survey. *BMJ*. 2001;322(7290):832.

12. O'Donnel S CS, Begley C, Fitzgerald T. Prehospital care pathway delay:gender and myocardial infarction. *Journal of Advanced Nursing*. 2006;53:268-276.

13. Heart and Stroke Statistical Update-2009. In Dallas Texas: *American Heart Association*; 2009.

14. W Rosamond KF, K Furie . Heart disease and stroke statistics-2008 update:a report from the American Heart Association Statistic Committee. *Circulation*. 2008;117:e25-146.

15. Biswas MS CPS, Bosworth HB, Bastian .A Are women worrying about heart disease? *Woman Health Issues*. 2002;12:200-211.

16. Department of Statistics Malaysia. In: Kelantan @ a glance .2011.

17. Kelantan Health Department. List of Health Clinics under Kota District Health Office in Kelantan. Kota Bharu; 2011.

18. Shin JY, Martin R, Suls J. Meta-analytic evaluation of gender differences and symptom measurement strategies in acute coronary syndromes. Heart & amp; Lung: *The Journal of Acute and Critical Care*. 2009;39(4):283-295.

19. Wilson PWF, D'Agostino RB, Sullivan L, Parise H, Kannel WB. Overweight and Obesity as Determinants of Cardiovascular Risk: The Framingham Experience. *Arch Intern Med* . 2002;162(16):1867-1872.

20. Heidi Mochari-Greenberger TM, Susan L. Simpson and Lori Mosca. Knowledge, Preventive Action and Barriers to Cardiovascular Disease Prevention by Race and Ethnicity in Women: An American Heart Association National Survey. *Journal of Women's Health.*2010; 19**:** 1243-1249

21. Lori Mosca JW, king KB, Quyang P, Redberg RF, Hill MN. For the American Heart Association Women Heart Disease and Stroke Campaign Task Force. Awareness, perception and knowledge of heart disease risk and prevention among women in the United States. *Arch Fam Med*. 2000;9:506-15.

22. HughTunstall-Pedoe HTa. WHO, Geneva.2003; 157-197.

23. Neil B Shulman WH, MD Blaufox,D Simon, HG Langford, KA Schneider. Prognostic Value of Serum Creatinine and Effect of Treatment of Hypertension On Renal Function. Results from the hypertension detection and follow-up program. The hypertension Detection and follow-up Program Cooperative Group. *Hypertension* .1989;13:180-193.

24. Sandra Oliver-McNeil NTA. Women's Perceptions of Personal Cardiovascular Risk and Their Risk-Reducing Behaviors. *American Journal of Critical Care.* 2002; 11(3): 221-227.

25. Johnson BD, Shaw LJ, Pepine CJ, Reis SE, Kelsey SF, Sopko G, et al. Persistent chest pain predicts cardiovascular events in women without obstructive coronary artery disease: results from the NIH-NHLBI-sponsored Women's Ischaemia Syndrome Evaluation (WISE) study. *European Heart Journal*. 2006;27(12):1408-1415.

26. Sullivan AK, Holdright DR, Wrigh CA, Sparrow JL, Cunningham D & Fox KM. Chest pain in women: clinical, investigative, and prognostic features. *BMJ.* 1994;308(6933): 883-886.

27. Stevenson JC. Metabolic effects of hormone replacement therapy. *Menopause International,* 2004;10(4): 157-161.

28. Miracle VA. Coronary Artery Disease in Women: The Myth Still Exists. Dimensions of Critical Care Nurse 2006;25:209-215

29. Flocke SA and Stange KC. Direct observation and patient recall of health behavior advice. *Preventive Medicine*. 2004; 38(3): 343-349.

30. Jiang He SV, Krista A, Monica RP, Janet H and Paul KW. Passive Smoking and The Risk of Coronary Heart Disease- A Meta- analysis of Epidemiologic Studies. *New England Journal of Medicine*. 1999;340:920-926.

31. Tiwari R. Tobacco use and cardiovascular disease: A knowledge, attitude and practice study in rural Kerala. *Indian J Med Sci*. 2006;60:271-276.

32. Baha MY, Le Faou A-L. Attitude towards cessation among French pregnant smokers: Explaining the poor uptake of specialised support. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2009;147(1):46-51.

33. Kim C and Beckles GL. Cardiovascular disease risk reduction in the Behavioral Risk Factor Surveillance System. *American Journal of Preventive Medicine*. 2004;27(1):1-7.

34. Robinson JG, Fox KM, Grandy S, Bays H, Bazata DD, Gavin Iii JR, et al. Attitudes about health and health-related behaviors in patients with cardiovascular disease or at elevated risk for cardiovascular disease. *Preventive Cardiology* . 2009;12(3):136-143.

35. Salma Khanam VC. Attitudes towards health and exercise of overweight women. *The Journal of the Royal Society*. 2008;128(1):26-30.

36. Lori Mosca CEJB, Kathy B, Bezanson JL, Rowena JD, Donald M. Lloyd-Jones, et al.

Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women- 2011 Update. *Journal of the American College of Cardiology*. 2011;57:1404-1423.

37. King DE, Mainous AG, Carnemolla M, Everett CJ. Adherence to Healthy Lifestyle Habits in US Adults, 1988-2006. *The American Journal of Medicine*. 2009;122(6):528-534.

38. Leanne L, Lefler JAH, Claire M. Fagan. Perceived Cardiac Risk Among older, High-Risk Black and White Women. *Southern Online Journal of Nursing Research*. 2009;9.

39. Brown DW, Giles WH, Greenlund KJ, Croft JB. Disparities in Cholesterol Screening: Falling Short of a National Health Objective. *Preventive Medicine* .2001;33(6):517-522.

Table 1: Socio-demographic and risk factors data of respondents (n=448)

Variables	Mean (SD)a	n(%)
Age	39.9 (10.04)	
Ethnic		
Malay		441(98.4)
Non Malay		7(1.6)
Marital status		
Married		383(85.5)
Single		65 (14.5)
Education		
No formal education		13(2.9)
Primary		55(12.3)
Secondary		316(70.5)
Tertiary		64(14.3)
Occupation		
Working		225(50.2)
Not working		223(49.8)
Household income (RM)/month		
< 1000		192(42.9)
> 1000- 3000		188(42.0)
> 3000		49(10.9)
Smoking Status		
Smoker		14(3.1)
Passive Smoker		240(53.7)
Non Smoker		191(42.6)
Presence of Medical Illness		
Diabetes mellitus		185(41.3)
Hypertension		49(10.9)
IHD		79(17.6)
High Cholesterol		8(1.8)
Obese		68(15.1)
Stroke		106(23.7)

First Degree Family History of:	3(0.7)
heart disease	
hypertension	62 (13.8)
diabetes mellitus	194(43.1)
	135(30.0)

[a] standard deviation

Table 2: Knowledge items with mean score (SD) and percentage (%) for good knowledge towards CVD (n=448)

Items	Mean(SD)	Good knowledge n(%)[a]
Knowledge on CVD risk		
Smoking	1.83(0.48)	390(87.1)
Regular exercise	1.63(0.66)	329(73.2)
High LDL cholesterol	1.61(0.61)	301(67.2)
Stress	1.64(0.64)	326(72.8)
High blood pressure	1.74(0.55)	356(79.2)
Family history of heart disease	1.49(0.77)	296(66.1)
History of previous heart attack	1.32(0.87)	264(58.9)
Increasing age(>55years)	1.45(0.74)	269(60.0)
Obesity	1.72(0.75)	346(77.2)
Menopause	**0.73(0.75)**	**80(17.9)**
Diabetes mellitus	1.46(0.78)	285(63.6)
Chronic renal failure	1.38(0.74)	240(53.6)
Knowledge on CHD symptoms		
Chest pain	1.84(0.43)	385(85.9)
Pain at the jaw, neck and left shoulder	1.14(0.74)	159(35.5)
Sweating	1.55(0.66)	285(63.6)
Palpitation	1.77(0.53)	367(81.9)

Headache	1.11(0.77)	166(37.1)
Epigastric pain	1.28(0.79)	222(49.6)
Shortness of breath	1.83(0.46)	388(86.6)
Nausea and vomiting	1.12(0.77)	163(36.4)
Dizziness	1.12(0.79)	171(38.2)
Knowledge on normal CVD risk level		
HDL-C normal < 1 mmol/L	0.77(0.66)	56(12.9)
LDL-C > 2.6 mmol/L	0.89(0.67)	79(17.6)
Fasting blood sugar normal	1.48(0.63)	247(55.1)
Blood pressure normal<140/90	1.51(0.66)	273(60.9)
BMI normal < 25 kg/m^2	1.40(0.65)	218(48.7)

[a]Proportion good knowledge who give a "correct" answer for knowledge that they should know

Table 3: Attitude items with mean score (SD) and percentage (%) for positive attitude towards cardiovascular disease (n=448)

Items	Mean(SD)	Positive Attitude n(%)[a]
Willing to exercise[b]	1.94(0.30)	425(94.9)
Change eating habit easily[b]	1.55(0.74)	314(70.1)
Eat without restriction as feel well[c]	1.55(0.77)	326(72.8)
Maintain normal weight[b]	1.83(0.47)	392(87.5)
Enjoy life without healthy lifestyle[c]	1.42(0.86)	296(66.1)
Not smoking or being a passive smoker[b]	1.66(0.70)	355(79.2)
Not ready to change the lifestyle[c]	1.50(0.79)	308(68.8)
Willingness to take HRT[c]	1.08(0.79)	159(35.5)
Take treatment as recommended by doctor[b]	1.91(0.37)	419(93.5)
Do regular medical check up[b]	1.75(0.56)	363(81.0)

Prefer traditional medicine[c]	1.58(0.60)	286(63.8)
Should know blood sugar level[b]	1.91(0.36)	418(93.3)
Should know blood pressure level[b]	1.92(0.36)	421(94.0)
Should know lipid level[b]	1.88(0.40)	407(90.8)
Try to reduce sugar intake[b]	1.89(0.40)	410(91.5)
Try to reduce fat intake[b]	1.87(0.43)	404(90.2)
Increase knowledge about CVD through mass media or electronic[b]	1.82(0.49)	391(87.3)

[a] Proportion positive attitude who answer "agree" for attitude that they should have and "disagree" for attitude that they should not have
[b]Positive attitude item
[c]Negative attitude item

Table 4: Practice items with mean score (SD) and percentage (%) for good practice (n=448)

Items	**Mean(SD)**	**Positive practice n(%)[a]**
Exercise more than 20 min 3x/week[b]	0.91(0.6)	60 (13.4)
Use more than 3 teaspoon salt/day[c]	1.01(0.71)	115(25.7)
Taking fatty food more than 3 times/week[c]	1.00(0.55)	68 (15.2)
Maintain normal weight[b]	1.43(0.75)	262(58.5)
Reduce stress[b]	1.70(0.62)	353(78.8)
Not smoking or being a passive smoker[b]	1.68(0.65)	349(77.9)
Take treatment as recommended by doctor[b]	1.81(0.49)	382(85.3)
Taking traditional medicine/herb[c]	1.35(0.64)	192(42.9)
Visit doctor for advice regularly[b]	1.42(0.63)	233(52.0)
Taking omega3 for heart disease prevention[c]	0.64(0.74)	71(15.8)
Doing nothing[c]	1.64(0.70)	344(76.8)
Increase knowledge about CVD through mass	0.70(0.74)	76(17.0)

media or internet[b]

[a] Proportion good practice who answer "always" for practice that they should adopt and "never" for practice that they should avoid
[b]Positive practice item
[c]Negative practice item

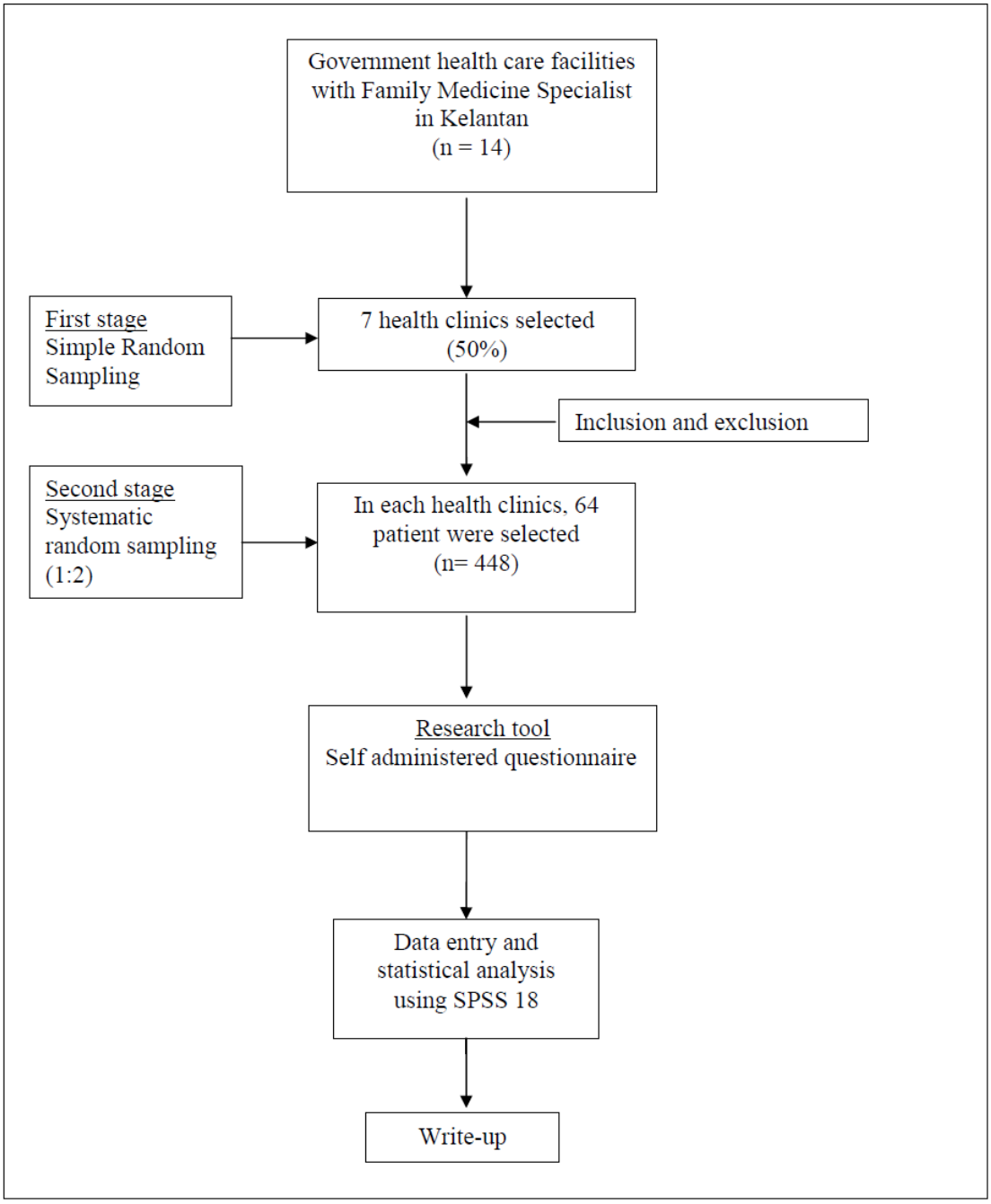

Figure 1: Flow chart and recruitment process using multistage random sampling