CARDIOVASCULAR RISK ASSESSMENT AND PREVENTIVE ACTIVITIES ASSOCIATED FACTORS AMONG WOMEN NURSES IN HOSPITAL UNIVERSITI SAINS MALAYSIA

By

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LIST OF ABBREVIATIONS

%	Percentage
BMI	Body mass index
CPG	Clinical practice guidelines
CVD	Cardiovascular disease
DBP	Diastolic blood pressure
DM	Diabetes Mellitus
FRS	Framingham risk score
FBS	Fasting blood sugar
HDL	High density lipoprotein
kg	Kilogram
m^2	meter square
NHMS	National health and morbidity survey
SBP	Systolic blood pressure
SPSS	Statistical Package for Social Sciences
TC	Total cholesterol
WHO	World Health Organisation

ABSTRAK

Bahasa Malaysia

Pengenalan: Penyakit kardiovaskular merupakan punca utama kematian dan kecacatan di kalangan lelaki dan perempuan seluruh dunia, termasuk Malaysia dan disasarkan sebagai punca utama kematian sehingga tahun 2030. Risiko gaya hidup kardiovaskular seperti amalan pemakanan, aktiviti fizikal dan merokok merupakan komponen asas dalam aktiviti pencegahan kardiovaskular dan ia berkait rapat dengan tekanan darah, paras kolesterol darah, paras gula darah, dan BMI yang juga merupakan penyumbang kepada penyakit kardiovaskular.

Objektif: Untuk menentukan kadar risiko penyakit kardiovaskular sederhana ke tinggi dan faktor-faktor berkaitan aktiviti pencegahan dan perkaitan antara bekerja syif dan risiko kardiovaskular di kalangan jururarawat wanita di Hospital Universiti Sains Malaysia.

Metodologi: Kajian keratan rentas ini telah dijalankan di kalangan jururawat wanita yang sedang bekerja di Hospital Universiti Sains Malaysia. Soalan soal selidik berstruktur berdasarkan Langkah Pertubuhan Kesihatan Sedunia (WHO) telah digunakan sebagai alat kajian. Pemeriksaan kardiovaskular untuk tekanan darah, paras gula darah, paras kolesterol

darah dan pengukuran BMI dilakukan ke atas setiap peserta. Penilaian risiko kardiovaskular dilakukan menggunakan ramalan penyakit kardiovaskular Framingham (FRS).

Penemuan: Seramai 202 jururawat wanita memberikan respon di dalam kajian ini. Risiko penyakit kardiovaskular sederhana ke tinggi dan rendah adalah 33.2% and 66.8% masing-masing berdasarkan ramalan penyakit kardiovaskular Framingham. Aktiviti fizikal (dengan nisbah kemungkinan terlaras 3.36, 95% keyakinan selang (CI) 1.70-6.64, nilai $p<0.001$), amalan pemakanan (dengan nisbah kemungkinan terlaras 16.87, 95% keyakinan selang CI 3.84-74.39, nilai $p<0.001$), pemeriksaan DM (dengan nisbah kemungkinan terlaras 3.59, 95% keyakinan selang CI 1.81-7.10, nilai $p<0.001$), dan kerja syif (dengan nisbah kemungkinan terlaras 9.85, 95% keyakinan selang CI 4.71-20.60, nilai $p<0.001$) adalah selaras dengan kadar sederhana ke tinggi risiko penyakit kardiovaskular.

Kesimpulan: Langkah-langkah perlu dilakukan untuk mengalakkan pemakanan sihat dan aktiviti gaya hidup sihat. Promosi gaya hidup sihat merupakan asas kepada kesihatan primer di dalam pencegahan penyakit.

ABSTRACT

English

Introduction: Cardiovascular diseases are the leading cause of death and disability among both women and men globally, including Malaysia and are projected to leading cause of death up to 2030. Lifestyle cardiovascular risks such as dietary habits, physical activities, and smoking are fundamental components in preventive cardiovascular activities and reflected to blood pressure, level of blood lipid, level of blood sugar, BMI that contribute to development of cardiovascular disease.

Objectives: To determine the rate of moderate to high CVD risk and preventive activities associated factors and association between shift work with cardiovascular risk among women nurses in Hospital Universiti Sains Malaysia.

Methadology: This cross sectional study was done among women nurses who are working in Hospital Universiti Sains Malaysia. A structured question derived from WHO STEPs questionnaire was used as study tool. Cardiovascular screening of blood pressure, blood glucose, serum lipids and BMI measurement were done for each participants. Cardiovascular

risk assessment were done based on Framingham Coronary Disease Risk prediction score (FRS).

Findings : A total of 202 women nurses were involved in this study. The cardiovascular disease risk of moderate to high and low were 33.2% and 66.8% respectively based on Framingham Coronary Disease Risk prediction. Physical activities (adjusted odds ratio of 3.36, 95% confidence interval (CI) 1.70-6.64, $p<0.001$), dietary habit (adjusted odds ratio of 16.87, 95% CI 3.84-74.39, $p<0.001$), screening of DM (adjusted odds ratio of 3.59, 95% CI 1.81-7.10, $p<0.001$) and shiftwork (adjusted odds ratio of 9.85, 95% CI 4.71-20.60, $p<0.001$) were significantly associated with moderate to high cardiovascular disease risk.

Conclusion: Measures needed to be done to promote appropriate healthier diet and healthy lifestyle activities. Promotion of healthy lifestyle should be a fundamental action of primary care in disease prevention.

CHAPTER 1

INTRODUCTION

Cardiovascular disease (CVD) is one of main health burdens and is an important cause of mortality among women worldwide. CVD is a leading cause of death among Malaysian women and reported about two and half times more common after comparing with other causes of death for example cancer [1]. According to Malaysian clinical practice guidelines (CPG) of prevention of cardiovascular disease in women, 2008, about 26.1% of all female death is due to cardiovascular disease [1].

From the National Health and Morbidity Survey (NHMS) 2011 reported that our women population recorded the highest body mass index (BMI) when comparing with the women in neighboring South-East Asian region [2]. The NHMS 2011 reported that from 17,000 women involved in the survey, 29.4% were reported overweight while another 15% were reported obese [2]. They also conveyed that prevalence of hypertension among Malaysian women were the highest in South-East Asia, and surprisingly more than men. Another contributing factors for development of CVD among Malaysians were total cholesterol levels. They found that 60% of our population had elevated total cholesterol levels [2].

There is no doubt that occurrence of cardiovascular disease has become one of the significant burden in Malaysia women, and primary prevention should be prioritized. Unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol are the main behavioral risk factors in development and progression of CVD [3]. The magnitudes of unhealthy diet and physical inactivity later on may reflect to individuals health status markers such as elevated blood pressure, elevated blood glucose, elevated blood lipids and overweight and obesity; and this will lead to the development and progression of cardiovascular disease [3].

Cardiovascular risk factors are inter linked with each other, thus a proper assessment need to be carried out in order to identify accurately or precisely women at risk in developing cardiovascular disease. Several tools are used to estimate the 10-year cardiovascular risk (e.g Systemic Coronary Heart evaluation, WHO/ISH Cardiovascular Risk Prediction Charts, QRISK), the most commonly used and extensively validated assessment tool is the Framingham Risk Score [1, 4].

In Beijing, a study reported that high of knowledge on CVD risk reduction among nurses. However, practice behavior related to CVD risk reduction was poor. 95% of respondents did not achieved desirable physical activities and 70% of respondents had unsuccessful to achieve an assessment of lipid profile in five years [5]. A large study was performed and they recruited 79, 109 female nurses in over four years duration to investigate the association nonshift work and night shift work between CVD. They concluded that nurses with longer duration of night shift had greater coronary heart disease [6]. Another local study, reported

that high prevalence of metabolic syndrome among female nurses who performed shiftwork was 24% [7].

1.2 Justification of study :

From year to year in Malaysia, cardiovascular disease has progressively increased in trend as reported by national prevalence [2, 8]. This is critically important element that need an urgent and specific measures to overcome in primary care level. Death due to cardiovascular disease reported as number one killer in Malaysia as stated in Malaysia clinical practice guidelines of cardiovascular disease prevention in women 2008 which accounted 26.1% in year 2006 [1]. Most of our women population are unaware with this problem, and the situation is worsening as women population tend to underestimate the risk of developing of CVD event and often under diagnosed by the health personnel.

CVD can affects both men and women. Women reported higher in morbidity and mortality related to CVD as compared to men [11]. Hence, female population was chosen for this study population, as early detection of disease will reflect better disease management and reduction of mortality and morbidity related to CVD.

Preventive activities in reduction of CVD is also not well study as whole especially among women. A few studies done to look into the relation of jobs and CVD, they noted that workers who practiced shift work were significantly associated with high prevalence of CVD as compared with workers who practiced non shift work [6, 9]. Thus, it is important to identify lifestyle or behavioral of CVD preventive activities as preventive activities more promising in reducing the cardiovascular events.

At the present, studies to determine the CVD risk preventive activities among women as well as association between shift work and CVD risk in Malaysia are limited. Based on the result that available from this study later on, we are hoping that it will be able to generate a valuable information to the health care organization. This result might be useful in the future as a reference in terms of creating or innovating preventive methods regarding protection, safety and health at work place for nurses, as well as creating an awareness toward cardiovascular risk reduction for creation of healthy women.

CHAPTER 2

LITERATURE REVIEW

2.1 Epidemiology of CVD

According to Malaysia CPG; Prevention of cardiovascular disease in women 2008, cause of death due to cardiovascular disease reported as the leading death among Malaysia women, accounted for 26.1% in 2006 [1]. The prevalence of cardiovascular related diseases (diabetes mellitus 17.5%, hypertension 30.3%, and hypercholesterolemia 47.7%) has increased significantly as stated by the National Health and Morbidity Survey (NHMS) 2015 [8]. The weight of illness is increasing in trend as compared to the National Health and Morbidity Survey (NHMS) 2011. An epidemiological survey by Chia et al, 2009 performed in semi-rural community of Malaysia revealed that the 10-year CVD risk <10%, 10-20% and >20% based on Framingham Risk Score were 33.5%, 51.4% and 15.1% respectively among women [10].

Mosca et al, 2011 claimed that CVD affected women as many as men and reported death due to CVD is higher among women compared to men [11]. Many women have a perception that they are more prone for cancer rather than CVD [1]. The misconceptions about the CVD among women lead to lower prevalence of CVD as it was under detected [1].

2.2 Cardiovascular disease risk factors in women

Cardiovascular disease (CVD) risk factors had been studied extensively. The progression and development of cardiovascular disease depends on presence and severity of risk factors. There are many risk factors that identified to be responsible in formation of cardiovascular disease. CVD risk factors further categorized into modifiable and non-modifiable risk factors. Biological modifiable risk factors for CVD are hypertension, hypercholesterolemia, obesity and diabetes mellitus, while lifestyles modifiable risk factors are physical inactivity, unhealthy dietary habits and smoking [12, 13]. Other than that, non-modifiable risk factors are age, race, gender and ethnicity [14].

To date, enormous studies were carried out to explore further into the relation of risk factors in development of CVD. The was a large case control study that conducted over 52 countries which performed in order to investigate for risk factors of development of acute myocardial infarction [13]. The study concluded that, nine modifiable risk factors such as smoking, abnormal lipids, hypertension, diabetes mellitus, obesity, unhealthy diet, physical inactivity, excessive alcohol consumption and psychosocial stress were identify in cardiovascular disease development. Optimization and modification of these potentially modifiable risk factors will lead to 90% reduction of disease [13].

Another distinctiveness about CVD in women was gender specific risk factor. Usage of oral contraceptive usage and hormone replacement therapy are considered CVD risk to women

[1]. A meta-analysis study summarized that current usage of oral contraceptive pills had significantly increased the risk for development of CVD particularly, myocardial infarction and ischaemic stroke [15].

Taking age of 40 years and above as our study population was appropriate as CVD risk factors were present earlier than that and calculation of global risk assessment for CVD is recommended at this age [16]. A study reported at more than half of male participants and nearly half of female participants age below 35 years old had minimal two of modifiable risk factors for CVD [17].

2.2.1 Modifiable risk for CVD

Hypertension is one of the national public health distress. In the National Health and Morbidity survey (NHMS) 2015 conveyed that 30.3% of adult Malaysian population aged above 18 years old were reported to have hypertension [8]. Hypertension by definition is having persistent raise of systolic blood pressure of 140 mmHg or greater and/or diastolic blood pressure reading above 90 mmHg or greater [18].

Hypertension as a major risk factor for cardiovascular disease has been established for decades. The connection of cardiovascular disease and hypertension are unswerving and uninterruptedly. A clinical study reported that coronary events in hypertensive patients with controlled blood pressure are markedly reduced [19]. This is later supported by Gu et al, found hypertension adult age above 65 years continued to greatly amplify CVD mortality.

A person with blood pressure measurement of less than 120/80 mmHg was related with reduction of cardiovascular mortality as compared with a person at pre hypertension stage (130-139/84-89 mmHg) [20]. The higher the blood pressure, the greater the chance of development of cardiovascular diseases.

Diabetes mellitus is one of the recognizable modifiable risk for CVD. It is a major public health distress in Malaysia that is closely related to increase macro and micro vascular complications, as well as premature and preventable mortality. The National health and Morbidity survey (NHMS) 2015 reported diabetes incidence figures 17.5% of adult's Malaysian age 18 years and above diagnosed with diabetes. Among those, only 8.3% are known case of diabetes while others previously undiagnosed with diabetes [8].

Numerous epidemiological data documents stated that diabetes is one of established predictor factor for cardiovascular diseases in both sexes. In the prospective Framingham study, the authors concluded that morbidity and mortality rate for cardiovascular disease among diabetes women were higher [21]. In the landmark studies which were The Diabetes Control and Complication Trial (DCCT) and the United Kingdom Prospective Study (UKPDS) reported that improvement in blood sugar control can inhibit and decrease microvascular disease and may decrease macrovascular disease in patients with diabetes mellitus [22, 23]. A cross sectional study done locally also showed high prevalence of cardiovascular disease 19.6% among diabetes patients, and one of significant predictive factors which consistent with other western studies [24].

Another identified modifiable risk factor is hypercholesterolemia. A study by Amin et al, 2013 done among 3722 individuals of urban residential community housing projects in Malaysia, reported incidence of hypercholesterolemia (51.5 %) was one of the most common cardiovascular risk factors [25]. According to NHMS 2015, hypercholesterolemia (47.7%) among Malaysian adults aged above 18 years reported in increased prevalence [8] as compared to NHMS 2011 (35.1%) [2]. The significance of serum lipid level as cardiovascular risk factor is well proven. Al-Khateeb et al, 2016 performed a study to investigate the cardiovascular risk factor among diabetes patients, found that the risk of cardiovascular disease was increased in a patient with persistently high level of total cholesterol (TC) and low level of high density lipoprotein cholesterol (HDL-C), [24].

Multiple studies have proven the significance of physical activity in decreasing the morbidity and mortality rates related to cardiovascular disease. Physical activity is one of determinants in development and progression of the cardiovascular disease. The prevalence of physical inactivity among adult Malaysian aged 16 years and above was 33.5% by NHMS 2015 [8]. About 14 million of the Malaysian population actively are actively engaged in physical activity [8].

Physical activity plays an important role in health status of individuals. The benefits of physical activities apply to all individual regardless of ages and races of both sexes. Coronary heart disease risk factors can be reduced through physical activity, when it was done on

regular basis with intensity of moderate and vigorous activity. It can help control development or progression of cardiovascular disease by lower blood pressure and triglyceride, raised HDL levels, help control blood sugar and insulin levels, help reduce overweight and obesity and may help in quitting to smoke [26]. For individuals who have established coronary artery disease, aerobic type of physical activity aids the heart to work better when it was performed regularly. Other than that, it also may reduce the risk of recurrence heart attack in persons who already have experienced heart attack previously [26].

The risk of CVD and heart attack increased in persons who were overweight or obese. This is mainly due to overweight and obesity are interrelated to other cardiovascular disease risk factors, such as elevated blood cholesterol and triglyceride levels, elevated blood pressure, and development of diabetes mellitus. A person who is in obese category (BMI more than 25) had associated 2.5 risk in cardiovascular disease formation [12]. Malaysian citizen has been ranked as the top highest ranked for obesity among other Asian countries. Report from the National Health and Morbidity Survey of 2015 revealed 17.7% of Malaysian were obese and another 30% of Malaysian classified as overweight [8]. When both of these categories combined together, it concluded that nearly half the residents of Malaysia are either overweight or obese [8].

Many data point the proof that cigarette smoking or tobacco usage is a major culprit that led to formation of coronary heart disease, which points to myocardial infarction. Smoking will affects individual by surges blood pressure, decreases exercise tolerance and upsurges the tendency for blood to clot. The prevalence of tobacco use of adult Malaysian population

was 22.8% [8]. In addition to smoking with other risk factors such physical activity, diabetes or hypertension, substantially accelerates the risk of cardiovascular disease. Studies have also proved the benefits in cessation of smoking. In the patients with proven coronary heart disease, almost 50% reduction in risk of re-infarction, sudden cardiac death, and total mortality upon cessation of smoking after the initial myocardial infarction [27]. Smoking can increase the risk of myocardial infarction to occur 7 years earlier compare to the nonsmokers [28].

2.2.2 Non-modifiable risk for CVD

Risk factors are circumstances that increase a person is risk of developing cardiovascular disease. In cardiovascular risk factors are called "non-modifiable' because these factors cannot be changed or modified by a proper preventive activities toward cardiovascular. Recognizable non-modifiable risk factor are increasing age, male gender, female aged more than 55 years old and presence of premature coronary heart disease in the first degree family [14].

2.3 CVD risk assessment tools

Primary prevention of CVD requires a proper and accurate assessment of cardiovascular risk. Risk assessment is a vital step in determining the proper approach of CVD screening. By identifying those at high risk group for future cardiac events and need of preventive care. This action will prevent cardiovascular disease mortality and morbidity. Several validated tools are used to estimate to 10-year cardiovascular risk that can be used to estimate CVD

risk in asymptomatic individuals. These tools are Framingham Risk Score (FRS), Systemic Coronary Heart evaluation (SCORE), WHO/ISH Cardiovascular Risk Prediction Charts, QRISK and Assessing cardiovascular risk using SIGN guidelines (ASSIGN) [1, 14, 16].

2.3.1 Framingham risk score (FRS)

Risk estimation assistsa clinician to detect persons at high risk for developing CVD [1]. This risk calculation will aids the clinician to propose and modify the preventive interventions to reduce the total cardiovascular risk as low as possible. In order to calculate absolute risks, a validated risk assessment is needed which represent the risk factors of the disease. Absolute risk is summation of all cumulative effects of the cardiovascular risk factors present and is clearly stated as probability that an individual will have a cardiovascular event in a defined period, usually 10 years [4]. Consequently, risk assessment tools are crucial because the treatment benefits may not outweigh treatment harm in individuals.

Therefore, multiple validated risk estimation tools available to predict 10-year CVD risk [1]. The most widely used and extensively validated assessment tool is the Framingham Risk Score (FRS) [4]. It is a mathematical model calculating the prospect of developing CVD in the next 10 years' time. Risk factors used in calculation of FRS include age, total cholesterol, high density lipoprotein cholesterol, blood pressure, diabetes mellitus and cigarrete smoking. Later on the score further categories as >20%, 20-10% and <10% [1, 4].

FRS is chosen and has been validated in Asian and particularly in Southeast Asian countries such as Malaysia, Thailand and Singapore [29-32]. Current evidence based on clinical guidelines for CVD prevention in U.S recommend estimating 10-year risk with Framingham risk score as initial important step in primary prevention [3] which similar to recommendation in Malaysia [16]. A retrospective cohort study was done to validate the FRS in multiethnic patients in primary care teaching hospital in Malaysia reported despite may overestimate in female patients as the study subjects were patients on treatment, the researchers concluded that FRS can be used and have a good calibration [30]. Apart from that, it was the recommended tools by the Ministry of Health Malaysia as global CVD risk assessment for adults age 40 years and above (level of evidence grade B) [14, 16].

2.4 Preventive activities and recommendation

Preventive activities can encompass many factors that promote healthy wellness of individual and widely established as effective way in reduction of disease burden [3]. The preventive activities of cardiovascular disease emphases on monitoring lifestyle risk factors, where components linked with the incidence and mortality of the disease [13]. Many literatures reported that preventive activities such as dietary, physical activities, smoking and alcohol, gave greater impact towards CVD morbidity and mortality [13, 28, 33, 34]. For the purpose of this study, preventive activities are behaviors reflecting a healthy diet, active physically, cessation of smoking, screening of DM, screening of BP, screening of cholesterol and screening of BMI.

Many forms of heart disease can be prevented or treated in the future by adopting with healthy lifestyle choices. Cardiovascular disease may be preventable by making heart-healthy lifestyle changes. The effect of preventive activities on decreasing the burden of cardiovascular disease are significant as demonstrated in literature [33]. Researchers further explained that if persons received the activities for which they are eligible, myocardial infarctions can be reduced by 63% [33]. A landmark study provided conclusive evidence that CVD is preventable by lifestyle modification [13]. The results from this study has reported that physical activities, healthy diet and cessation of smoking were possible to reduce risk of myocardial infraction [13].

Implementation of early interventions to reduce cardiovascular disease burden by health promotion and early risk factors identification. Early treatment of cardiovascular disease risk factors have resulted in significantly reduction of mortality in cardiovascular disease [35]. A prospective cohort study reported that by adopting healthy lifestyle which were cessation of smoking, moderate physical activity, healthy diet and modest alcohol consumption as part of preventive activities may prevent of the development and progression of CVD by more than 80% [36].

Consensus guide to cardiovascular disease (CVD) risk factors: screening for healthy adult, outlined that screening as preventive activities similar to western guidelines or recommendation [37] except for recent amendment on interval of lipid screening as below; [16].

a. Blood pressure measurement – yearly screening interval if BP < 120/80 mmHg
b. Blood glucose measurement – yearly screening interval
c. Lipid profile measurement – yearly screening interval
d. Body mass index - every 2 years screening interval
e. Smoking – opportunistic screening

Add on screening components are physical activity and dietary habits [16, 37]. Recommendations from our local guidelines had similarity with western guidelines with minor amendment to suit with local setting [16, 18].

2.4.1 Screening for smoking

Smoking or using tobacco of any kind is one of the utmost vital risk factors for emerging heart disease. Chemical components that contained in tobacco can harm heart and blood vessels, leading to narrowing of the arteries due to plaque accumulation (atherosclerosis). An update United State preventive service task force (USPSTF) 2015, recommends that clinicians screen for tobacco usage and provide smoking cessation interventions accordingly [34]. Ministry of Health Malaysia outline on management of tobacco has recommended that all patients should be asked regarding the tobacco usage and should be documented on tobacco usage on regular basis [16]. When it moves toward to heart disease prevention, no amount of smoking is considered safe. Evidence showed that by brief screening and intervention has proven increased rate of smoking cessation [34]. A study reported that by stop smoking as part of preventive lifestyles may prevent of CVD by 80% [36].

2.4.2 Physical activities

Moderate exercise such as brisk walking for accumulation of at least 150 minutes per week is recommended for general advice on cardiovascular health [18, 38]. U.S preventive services task force 2014 and American College of Sport Medicine (ACSM) recommend basic for cardiorespiratory exercise as follows [39, 40];

- Adults should achieve at least 150 minutes of moderate-intensity exercise per week.
- Exercise recommendations can be met through 30-60 minutes of moderate-intensity exercise (five days per week) or 20-60 minutes of vigorous-intensity exercise (three days per week).
- One continuous session and multiple shorter sessions (of at least 10 minutes) are both acceptable to accumulate desired amount of daily exercise.

2.4.3 Dietary habits

In Malaysian Dietary Guidelines 2010, recommendation intake of fruit and vegetables is five servings daily, of which two servings are fruits and three servings for vegetables [38]. Screening of dietary ideally should be done in 2 yearly in every individuals [16]. Based on updated and refined USPSTF 2014, recommendations of fruits and vegetables consumption in individuals is dichotomized into two groups; less than five servings of fruits and vegetables per day which is labelled as unhealthy and more than five servings of fruits and vegetables per day which is labelled as healthy [39]. Antioxidants, potassium and fiber contained in fruits and vegetables contribute to the reduction of cardiovascular disease. Data from many studies over decades proved the benefit of vegetables and fruits intake. A study

in Japan showed reduced number in death related to cardiovascular diseases among Japanese women who consumed higher intake of vegetables in a day [41].

2.4.4 Screening for body mass index

A healthy weight is determined by evaluation of body mass index (BMI), which deliberates height and weight in defining whether a person has a healthy or unhealthy percentage of body fat. BMI of 25 and higher are normally linked with higher cholesterol, higher blood pressure, and an increased risk of heart disease and stroke. Local recommendation stated that screening of BMI should be screened once in every 2 years [16]. Similar to recommendation by the USPSTF that recommends that all women must be screened for obesity by using body mass index (BMI), at least every 2 years [42].

2.4.5 Screening for hypertension

Blood pressure screening should be done at every clinic visit for all adults age more than 18 years and above, as recommended by Malaysia clinical practice guidelines [16, 18] . The interval duration of each screening measurement depends on previous recorded blood pressure measurement; for individuals with blood pressure measurement less than 130/85 mmHg, recommendation for next follow up measurement is within 12 months duration [18]. Practiced of blood pressure screening in adults as part of hypertension treatment may decrease the level of blood pressure and subsequently reduce the cardiovascular diseases such as stroke, myocardial infarction and heart failure [43]

2.4.6 Screening for hypercholesterolaemia

A recommendation by Malaysia clinical practice guidelines stated that all adult age 20 years and above should be screen for blood lipid profile once in a year [14, 16]. While western guidelines recommended that hypercholesterolaemia screening should done every 5 yearly [3].

2.4.7 Screening for diabetes

Detection of diabetes can be done by random capillary blood or venous blood using glucometer and strip or by using fasting plasma. Screening should be considered in all individuals who have symptoms of diabetes or have risk factors for diabetes regardless of age. While 30 years is cut of age for screening in person without risk factor for diabetes and if the screening result turns out to be normal, annually screening should commerce [16] Recommendations of screening for diabetes should be start at age of 45 or younger aged in women who are at higher risk of the disease, and if the result turn out to be normal, screening should be done in every 3 yearly [3].

2.5 Nurse, preventive activities and job description (shift and non shift)

Nurses are backbone of health care system and serve as an ambassadors in promoting of healthy living to public. However, little is known about their actual lifestyles practice in prevention of the illness. The knowledge about healthy lifestyles which reflected to preventive activities among nurses are undoubtable, but it does not necessarily reflect to their

own behaviors as demonstrated by literature [44]. A study done in Beijing among nurses, they investigated the knowledge and behavior of nurses toward cardiovascular prevention, they found that the participants showed high level of knowledge but demonstrated low level of practice [5].

The relationship between employment and CVD has not well demonstrated. Multiple factors were found, such as long working hours, shift work and continually changing work environment may affect the nurse lifestyles and risk them for obesity. A total of 662 nurses had joined a study done in Hong Kong. This study aimed to explore the association between shift work and eating habits, they found that 64% of participants had abnormal eating habits [45]. Another study was performed among nurses in multiple hospital, reported that majority of participants were low engagement of physical activity and low consumption of healthy diet [44]. Up to our knowledge, there was no study of screening habits of BP, DM, cholesterol and BMI in relation to nurses or CVD yet.

Kawachi et al, 1995 performed a study among female nurses to investigate incidence of coronary heart disease in association with rotating shiftwork, and the study concluded higher incident of CVD occurred among those in longer duration of shiftwork especially the night shift [6]. The reasons for findings might be due to the disturbances in eating habits, sleep deprivation and social interruption. Another local study, revealed that high prevalence of metabolic syndrome among female nurses who performed shiftwork was 24% which was higher as compared to non shift [7].

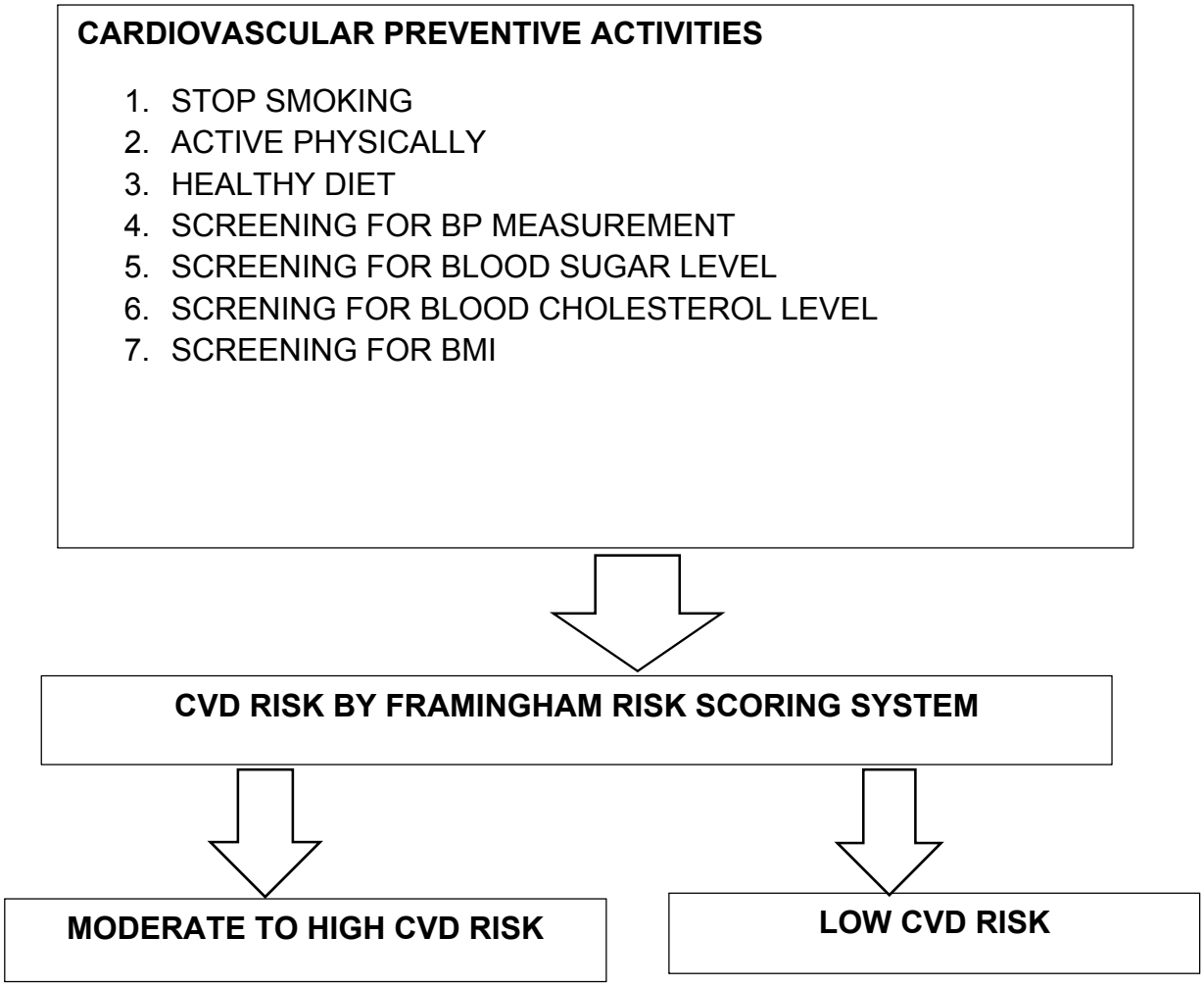

Figure 1 Conceptual framework

CHAPTER 3

OBJECTIVE AND RESEARCH HYPOTHESIS

3.1 General objective

To determine the proportion of moderate to high cardiovascular risk assessment and preventive activities associated factors among nurses in Hospital USM.

3.2 Specific Objectives

1. To determine the proportion of moderate to high cardiovascular risk among women nurses.
2. To determine preventive activities associated factors for moderate to high cardiovascular risk among women nurses.
3. To determine the association between shift works with moderate to high cardiovascular risk among women nurses.

3.3 Research hypothesis

1. Cessation of smoking, unhealthy diet, physical inactivity, less screening of BP, less screening of DM, less screening of cholesterol and less screening of BMI are associated with moderate to high cardiovascular risk.
2. There is association between shift works with moderate to high cardiovascular risk.

3.4 Operational definitions

1. Cardiovascular risk

Cardiovascular risk is defined as possibility of an individual experiencing any form cardiovascular events over a 10 year period based on Framingham risk score which describe as below;

i) Moderate to high cardiovascular risk is defined as risk >10% of experiencing cardiovascular events.

ii) Low cardiovascular risk is defined as risk <10% of experiencing cardiovascular events

2. Preventive activities

Preventives activities are repetition of activities that persons initiate and achieve on their own behalf in sustaining life, health and well-being. In this study, preventive activities that being surveyed included smoking, good dietary habit, active physical activity, screening for blood pressure measurement, screening for blood glucose level, screening for blood cholesterol level and screening for body mass index.

i) Smoking

Refers to usage of tobacco, categorized as active or non-smoking.

a) Active smoking refers to individual who actively smoking or recently cessation of smoking within 6 months duration.
b) Non-smoking refers to individual who not smoking or stop smoking more than 6 months duration.

ii) Active physical activity

Active physical activity refers to individuals who participate in 150 minutes per week moderate intensity of exercise or 75 minutes per week high intensity of exercise.

iii) Good dietary habit

Defines as individuals who taking five servings of fruits or vegetables in a day.

iv) Screening for blood pressure

Refers to individuals who have measure their blood pressure either at clinic or at home, once in last one year.

v) Screening for blood sugar level

Refers to individuals who have measure their blood sugar level either by capillary or venous upon their request or advice by clinician, once in last one year.

vi) Screening for blood cholesterol level

Refer to individuals who have measure their fasting blood cholesterol either by capillary or venous upon their request or advice by clinician once in last one years.

vii) Screening for body mass index

Refers to individuals who have measure their weight and height either at clinic or at home once in last two years.

3. Shift work

Defines to hours of the day in which nurses are scheduled to be in workplace and assignment for 3 rotating schedule, including 7 hours of morning, 7 hours of evening and 10 hours of night shifts.

i) Shift work refers to those nurses who are currently practice shift work based on definition above or last practice shift work within 6 months duration.

ii) Non shift work refers to those nurses who are currently working in office hours (from 8 am to 5 pm) or last practice shift work more than 6 months duration.