Critical Assessment of Cardiovascular diseases (CVDs): Its Signs and Symptoms, Epidemiology and Risk Factors

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ABSTRACT

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and they include; Coronary Heart Disease, Cerebrovascular disease, Peripheral artery disease, Rheumatic heart disease, Congenital heart disease, Deep vein thrombosis and pulmonary. The study outlined the signs and symptoms of CVD (shortness of breath, fatigue, palpitation, light headedness and fainting). The risk factors of CVD are grouped under modifiable and non-modifiable risk factors. Modifiable risk factors are those which the patient can take measures to change them while non-modifiable risk factors cannot be changed. The study also review the health belief model (HBM) which is a psychological health behaviour change model developed to explain and predict health related behaviours particularly in regard to the uptake of health services. The study concluded that impact of CVD can be controlled effectively if patients are aware of their conditions and take precautionary measures and also, good knowledge of CVD risk factors and fair knowledge of the screening tests to detect CVD risk but the level of practice of screening is low the poor level of practice may be attributed to their lack of perception of personal risk or susceptibility to the disease. The study also recommended that government and health policy makers should try to know the level menace of cardiovascular disease with a view to addressing gaps in knowledge with targeted information, education and communication measures.

KEYWORDS: Cardiovascular diseases, epidemiology, risk factors.

Introduction

According to WHO (2015) fact sheet, No. 317 reported that cardiovascular diseases (CVDs) are the number one cause of death globally; more people die annually from CVDs than from any other cause. An estimated 17.5 million people died from CVDs in 2012, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. Over three quarter CVD death takes place in low and middle-income countries. Out of the 16 million deaths under age 70 due to non-communicable diseases, 82% are in low and middle income countries and 37% are caused by CVDs.

Ogundipe, Obinna and Olawale (2015), in their study reported that the number of death due to cardiovascular disease increases globally by 41% between 1990 and 2013, climbing from 12.3 million to 17.3 million. Death rates within specific age groups dropped by 39%, according to an analysis of data from 188 countries. Death rates from cardiovascular diseases were steady or fell in every region of the world except Western sub-Saharan Africa, where the rates increased. In the views of Dr Gregory Roth, the Assistant Professor of

Institute of Health Metrics and Evaluation (IHME), Division of cardiology, University of Washington.

> "Cardiovascular disease will remain a global threat as the population grows and people age, but the progress seen in some regions show that reducing the toll of CVD is possible. Researches show that population aging contributes to 55% increase in CVD death globally and population growth contributed to 25% increase" (pg. 22-25).

Types of CVDS

According to National Heart, Lung and Blood Institute (2013) other types of heart disease also pose a risk to women. They include Coronary Microvascular Disease and Broken Heart Syndrome. These disorders which mainly affect women are not well understood as coronary heart disease.

Coronary microvascular disease (CMVD) affects the hearts tiny arteries. This disease is also called cardiac syndrome X or non-obstructive CHD. In coronary MVD, the walls of the heart's tiny arteries are damaged or diseased. Many researchers think that a drop in oestrogen levels during menopause combined with other heart disease risk factors cause coronary MVD.

Broken heart syndrome: Women are more likely than men to have this condition. In this recently recognized heart problem, extreme emotional stress can lead to severe (but often short term) heart muscle failure. Broken heart syndrome is also called stress-induced cardiomyopathy or takotsubo cardiomyopathy. Doctors may misdiagnose this disease as a heart attack because it has similar symptoms and test results. However, there is no evidence of blocked heart arteries in broken heart syndrome, and most people have a full and quick recovery. Often people who have this disease have previously been healthy.

Signs and symptoms of CVD

- *Shortness of breath:* Fluid backing up into the lungs from a failing heart leads to shortness of breath, which is often made worse by lying down
- *Fatigue:* Caused by insufficient blood flow to the muscle along with the decreased availability of oxygen due to fluid in the lungs
- *Palpitation:* Abnormal heart beats if it occurs with other symptoms point to arrhythmias.
- *Light headedness and fainting:* Cause by insufficient blood flow to the brain due to abnormal heart rhythm or rate, or to insufficient cardiac output.

Signs suggestive of imminent heart attack include:

- High or low blood pressure
- Swollen veins in the neck
- Swelling in the feet and ankles
- Abnormalities in the retina (back of the eye)
- Enlarged heart – cardiomyopathy (measured by placing hand on chest)
- Extra or abnormal heart sounds (via stethoscope)
- Fluid in the lungs (via stethoscope)
- Abnormal sounds of arterial blood flow throughout the body (via stethoscope)
- Pulsating abnormal mass – aortic aneurysm

- Cool extremities
- Reduced or absent pulses in the extremities.

Epidemiology of Cardiovascular Disease (CVD)

The total global burden of CVD in terms of disability adjusted life years (DALYS) stood at 15% in 2010. By 2020, it is estimated that there will be about 6million deaths and 35 million DALYS annually from cardiovascular causes in developed countries and about 19million deaths and 170 million DALYS annually from cardiovascular causes in developing countries. The increase in CVD burden in developing countries is largely the result of an increase in the prevalence of risk factors due to the combined effect of industrialization, rural-urban population drift, urbanization and associated effects on the level of cardiovascular risk factors as well as the relative lack of access to the modern medical intervention measures (Oguanobi, Ejim, Onwubere, Ike, Anisiuba, Ikeh and Aneke, 2014).

Globally, there is an uneven distribution of age adjusted CVD mortality, the longest age-adjusted mortality rates are in the advanced industrialized countries and parts of Latin America, whereas the highest rates today are found in Eastern Europe and a number of low and middle income countries. For example, age standardized mortality rates for CVD are in excess of 500 per 100,000 in Russia and Egypt between 400 and 450 for South Africa, India and Saudi Arabia and around 300 for Brazil and China. This is in contrast to rate of between 100 and 200 per 100,000 for Australia, Japan, France, and the United States. Overall, age adjusted CVD death rates are higher in major low and middle income countries than in developed countries (WHO 2008 in NCBI report 2010). Not only do age adjusted CVD death rate tend to be higher in developing countries, but a significantly higher percent of cardiovascular death also occurs in younger people in the developing world than in developed countries. For example, a proportion of CVD deaths reported for 35 to 64 years is 41% in South Africa, 35% in Brazil, compared to only 12% in United States and 9% in Portugal. As a general rule, men and women in countries with higher development status (measured in terms of gross domestic product (GDP) per capita), experience CVD events older and die much later than in less developed countries. For example, in Japan, Australia, France and Sweden, the median age at death from Ischaemic heart disease averages 85 years in women and 77 years in men. Men in these countries experience an acute myocardial infarction more than a decade before their median age at death (WHO 2009). Indeed, the survival of individuals after a cardiovascular event has increased in high income countries. This trend of increase survival with CVD has caused an increased prevalence of CVD in many high income countries despite decreasing incidence over time. (Roger et al 2012).

Risk Factors for Cardiovascular Disease

According NHLBI, (2013), a person may not necessarily develop cardiovascular disease if he has a risk factor. But the more risk factor he has the greater is the likelihood that he will, unless, action is taken to modify the risk factors and work to prevent them compromising health. The risk factors are grouped under modifiable and non modifiable risk factors. Modifiable risk factors are those which the patient can take measures to change them while non modifiable risk factors cannot be changed.

Modifiable Risk Factors

a. *Diabetes Mellitus:* A lifelong condition that causes blood sugar level to be high. The high blood sugar level can damage the artery walls making them more likely to

develop fatty deposits (artheroma). Many people with type II diabetes are also overweight or obese.

b. *Lack of Exercise:* This predispose to high blood pressure, higher cholesterol levels, higher stress levels and overweight. Insufficient physical activity can be defined as less than 5 times 30 minutes of moderate activities per week, or less than 3 times 20 minutes of vigorous activity per week, or equivalent (World Heart Foundation 2015).

c. *Being overweight or obese:* This increases the risk of developing diabetes and high blood pressure. The body mass index (BMI) is used to calculate the healthy weight range for heights. The calculation of BMI divides the adults weight in kilogram by their height in meters squared. For most adults, a BMI score of less than 18.5 is underweight

18.5-24.9 is a healthy weight
25-39.9 is overweight
30-39.9 is obese

40 or above is severely obese Waist circumference can also be used as an indication of risk. Men with a waist circumference of 94cm or more (about 37 inches) and women with a waist circumference of 80cm or more (31.5 inches) are more likely to develop obesity related health problem (World Heart Foundation 2015).

Non modifiable risk factors

1) *Age:* CVD becomes increasingly common with advancing age. As a person gets older the heart undergoes certain physiologic changes even in the absence of disease. The heart muscle of the aged heart may relax less completely between beats, and as a result the pumping chambers become stiffer and may work less efficiently. When a condition like CVD affects the heart, this age related changes may compound the problem or its treatment (World Heart Foundation 2015)

2) *Gender:* A man is at greater risk of heart disease than a premenopausal woman. Once menopausal, a woman's risk is similar to a man. Risk of stroke however, is similar for men and women.

Risk Factor Calculation

Risk classification has historically been calculated using the Framingham Risk score. Based on the presence of risk factors the likelihood of having a cardiovascular event within the next 10years can be calculated and thus doctors can compute how worried they should be about someone at risk for a cardiovascular event. However, the Framingham score underestimates risk among women and is limited in estimating only the likelihood of coronary artery disease, not all forms of CVD. Because of this an alternative tool, the Reynolds risk score may be more appropriate for women.

The Reynolds Risk Score

The Reynolds risk score was developed and validated using data from 24,558 initially healthy American women who were followed over a 10year period for the development of heart attack, stroke, and angioplasty, coronary bypass surgery or death related to heart disease.

Findings for this project were provided by a research grant from the Donald W. Reynolds foundation and by the National Heart Lung and Blood Institute. The Reynolds risk score for men was similarly by developed using data from 10,724 initially healthy non diabetic American men, who were followed for over a 10year period for the development of heart attack, stroke angioplasty, by-pass surgery or death related heart disease (www.reynoldriskscore.org).

How to enter values for Calculation

Total cholesterol and high density lipoprotein (HDL): The American Heart Association (AHA) recommends that Total cholesterol and HDL should be the average of at least two measurements obtained from a standard blood test. Total cholesterol or HDL can be measured on the same blood sample. And they should be reported in mg/dl. For total cholesterol the typical range for most individuals is between 100 and 400 with higher levels associated with higher risk. For HDL the typical range for most individuals is between 10 and 100, with higher level associated with lower risk. For most individuals the optimal level of total cholesterol is 160mg/dl and HDL is 60mg/dl.

Systolic blood pressure: The systolic reading on the most recent blood pressure check is the required value irrespective of whether the individual is on antihypertensive drugs or not the typical range for most individuals is between 90 to 190mmHg and an optimal systolic blood pressure is 120mmHg.

High sensitive C - reactive protein (hsCRP): HsCRp values should be the lower of at least two values obtained from a standard blood test. The typical range for hsCRP in between 0.01 and 10mg/L, with higher levels associated with higher risk. Some individuals may have very high hsCRP levels on a chronic basis, even after repeated testing. These represent the high risk group. So the Reynolds risk score will accept values up to 50mg/dl. For most individuals an optimal level of hsCRP is less than 0.5mg/L.

Smoking status: the Reynolds risk score considers a man or woman who has smoked any cigarette in the last month as a current smoker.

Parental history: If an individual's parent suffered a heart attack or stroke before age 60years, the Reynolds score considered parental background to be positive.

Theoretical Framework

The Health Belief Model (HBM): The Health Belief Model (HBM) is a psychological health behaviour change model developed to explain and predict health related behaviours particularly in regard to the uptake of health services. The model was developed in the 1950 by social psychologists Irwin M. Rosenstock Godfrey M. Hochbaum, S. Stephen Kegeles and Howard Leventhal at the U.S public health services to better understand the widespread failure of screening program for tuberculosis (Carpenter 2010). The model was later reviewed by Becker and colleagues in 1970s and 1980s subsequent amendments to the model were made as late at 1988 to accommodate evolving evidence generated within the health community about the role that knowledge and perception play in personal perceived responsibility (Berman and Snyder, 2012). It was further amended also in 1988 to incorporate emerging evidence within the field of psychology about the role of self-efficacy in decision making and behaviour (Glanz & Bishop 2010). The following constructs of HBM are proposed to vary between individuals and predict engagement in health related behaviours. These are perceived susceptibility, perceived severity, perceived benefits and perceived

barriers. These were later modified to include these components individual's perception, modify factors and variables likely to affect initiating action.

Perceived Severity: This refers to the subjective assessment of the severity of a health problem and its potential consequences. The HBM proposes that individuals who perceive a given health problem as serious are more likely to engage in behaviours to prevent the health problem from occurring or reduce its severity. Perceived seriousness encompasses belief about the disease itself (eg CVD being the leading cause of death in women) as well as broader impacts of the disease on functioning in work and social roles (Janz & Becker 1984). It therefore goes that if the female civil servants in Uyo perceived heart attack and stroke as being serious they are more likely to carry out screening test that will help discover the risk factors for the disease and also engage in actions and lifestyle modification that will prevent the development and aggravation of risk factors to the disease and subsequent progression to the disease state.

Perceived Susceptibility: This refers to the subjective assessment of risk of developing a health problem. Rosenstock, (1974). The HBM predicts that individuals who perceive that they are susceptible to a particular health problem will engage in behaviours to reduce their risk of developing the health problem. Individuals with low perceived susceptibility may deny that they are at risk for contracting a particular illness, others could acknowledge the possibility that they could develop the illness but believe it is unlikely. Individuals who believe that they are at low risk of developing an illness are more likely to engage in unhealthy or risky behaviours. Individuals who perceive a high risk that they will be personally affected by a particular health problem are more likely to engage in behaviours to decrease their risk of developing the condition. The combination of perceived seriousness and perceived susceptibility to a given health condition is referred to as perceived threat. Perceived seriousness and perceived susceptibility to a given health condition depend on knowledge about the condition. The HBM predicts that higher perceived threat leads to higher likelihood of engagement in health promoting behaviour.

To this end, if the female civil servants in Uyo perceive that they are at risk of developing cardiovascular disease (due to increase age, family history and/or too-much weight gain and following increasing awareness of the condition) they are more likely to personally present themselves for screening to elicit risk factors and also carryout advice given to curb the development of risk factors and the actual disease conditions (heart attack and stroke).

Perceived Benefits: This refers to an individual's assessment of the value or efficacy of engaging in a health promoting behavior to decrease risk of disease. If an individual believes that a particular action will reduce susceptibility to a health problem or disease its seriousness, then he/she is likely to engage in that behavior regardless of objective facts regarding the effectiveness of the action.

Going by this, if the female civil servants in Uyo perceive that carrying out screening tests for early detection of cardiovascular disease risk factors is beneficial in ensuring early intervention which will prevent the disease, they are more likely going to carry out the screening test willingly. On the other hand, if they think that the benefit they shall derive from such screening test is minimal or none at all, they will not see the need to carry out the screening tests.

Empirical Review

Christian, White, Mosca, and Rosanond (2007) carried out a study to evaluate trends in women's awareness knowledge and perception related to CVD. A nationally represented sample of 1005 identified through random digit dialing (mean age 50, 71% white) was surveyed. Awareness, knowledge and perception relate to CVD were evaluated using a standardized interviewer assisted questionnaire. Awareness of heart disease as the leading cause of death among women was 57%. Awareness was lower among black and Hispanic women compared with white women (31% AND 29% vs 68% $p < 0.05$). Hispanic women were more likely than white women to report that there is nothing they can do to keep themselves from getting CVD (22% vs 11% $p < 0.05$). The majority of respondents (>50%) reported confusion related to basic CVD prevention strategies. It was concluded that CVD awareness has increased significantly among women since 1997 yet the racial/ethnic gap in awareness has not narrowed. Educational effort to increase the heart disease and stroke awareness should be targeted to racial/ethnic minorities, especially Hispanics. Method to reinforce basic CVD prevention strategies was needed.

In a community based study carried out by Ulasi, Ijoma, Onwubere, Arodiwe, Onodugo and Okafor (2011) on the high prevalence of low awareness of hypertension in a market population in Enugu, Nigeria, it was discovered that despite the increasing prevalence trend, the awareness of many people about their cardiovascular risk status is still low. The knowledge of the subjects about these risk factors and consequences were very low 15%. The low level of awareness of hypertension is a global phenomenon according to them. In this study, only 29.4% of the hypertensive patients were aware of their hypertension.

Conclusion

Awareness of CVD has increased, although a significant gap between perceived and actual risk of CVD remains. Educational interventions to improve awareness and knowledge are needed, particularly for minority and younger women. The impact of CVD can be controlled effectively if patients are aware of their conditions and take precautionary measures. Good knowledge of CVD risk factors and fair knowledge of the screening tests to detect CVD risk but the level of practice of screening is low the poor level of practice may be attributed to their lack of perception of personal risk or susceptibility to the disease. This therefore calls for concerted and targeted effort by medical personnel to deliver information that will highlight the danger of CVD and the women and men personal susceptibility to the disease and the need for screening.

Recommendations

1. Government and health policy makers should try to know the level menace of cardiovascular disease with a view to addressing gaps in knowledge with targeted information, education and communication measures.

2. Health care practitioners should step up their task of health education (personal and public) to help create awareness and also knowledge of the risk factors for cardiovascular disease to the entire populace to avoid them thereby saves their lives.

3. Medical personnel must themselves keep fit and be free from most of the modifiable risk factors of the disease to serve as a motivation for the women and general population.

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