ISSN 2320 7159

INTERNATIONAL JOURNAL OF MEDICAL RESEARCH

REVIEW ARTICLE

A Review on Cardiovascular Disease Global Health Indicators, Cause Specific Risk Factors, and Quality of life Indicators

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ARTICLE INFO

doi: 10.5455/ijmr.20140226045017

Keywords:
Cardiovascular Health Indicators,
Cause specific Risk factors,
Risk factors,
Quality Indicators,
Quality of Life

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ABSTRACT

Background: Although there are many modifiable risk factors attributed to the cardiovascular diseases, which are amenable for prevention, cardiovascular diseases continue to remain a leading cause of mortality all over the world. Prevalence of global health disparity in primary, secondary, and tertiary levels of care for patients with cardiovascular disease conditions is a known phenomenon. However, the prevalence of global cause specific disparity among modifiable risk factors related to cardiovascular disease is unknown. The association between the Quality of life indicators and cause specific risk factors is unknown among heart disease patients. Identifying the association between risk factors and quality of life among heart disease patients may help to improve the recovery, rehabilitation, and quality of life.

Purpose: The purpose of this review is to describe the cardiovascular health indicators and cause specific risk factors, and quality of life among patients with heart diseases.

Method: A review included the published clinical research studies and systematic reviews from PUBMED. The concepts for the search included heart diseases risk factors, heart disease indicators, and quality of life after heart disease. The review was organized under method and results section of this article.

Conclusion: The review laid foundation for a theoretical framework, containing definitions of the concepts and supporting evidences, that has been organized under the conceptual headings of the review including global disparity in CVD mortality, cardiovascular disease indicators and risk factors, individual risk factors, environmental risk factors, behavioral risk factors, demographic risk factors, summary measures of health indicators, quality indicators, and quality of life indicators.

BACKGROUND

Very little is known about the Quality of life indicators among patients with heart diseases in the context of cause specific risk factors. Although there are many modifiable risk factors attributed to the cardiovascular diseases (CVD), which are amenable for prevention, cardiovascular diseases continue to remain a leading cause of mortality all over the world. Prevalence of global health disparity in primary, secondary, and tertiary levels of care, in planning, providing, coordinating, and evaluating health care for patients with cardiovascular disease conditions is a known phenomenon. However, the prevalence of cause specific disparity of cardiovascular disease's

modifiable risk factors and quality of life indicators is unknown. Although there are multiple reports on health disparity available, there is a gap in the literature in the description of cardiovascular cause specific health indicators and risk factors on quality of life. Cause specific health indicators and risk factors vary depending upon the demographic and geographical distributions. Incidences and prevalence of modifiable risk factors and quality of life among patients with heart diseases vary globally. Description of cause specific health indicators in the context of global risk factors and quality of life may help to identify the preventable cardiovascular risk factors. Identifying the preventable global risk factors and improving the quality of life are imperative in planning, providing, and evaluating holistic health care delivered to the cardiovascular patients. Identifying quality of life indicators among patients with heart diseases may help to improve quality of life. In addition, identifying the cause specific global risk factors and quality of life indicators may help in filling the gap of global health care disparities in providing quality care for patients with cardiovascular diseases.

PURPOSE/ SPECIFIC AIMS

The purpose of this review is to describe the cardiovascular health indicators and cause specific risk factors, and quality of life among patients with heart diseases.

METHOD

A review included the published clinical research studies and systematic reviews from PUBMED. The concepts for the search included heart diseases risk factors, heart disease indicators, and quality of life after heart disease. The review was organized under method and results section of this article.

LITERATURE REVIEW AND DISCUSSION

Cardiovascular disease Indicators and Demographic risk factors

Demographic risk factors indicators related to CVD may include population size, population density, population by race and ethnicity, and poverty. In addition, geographical distribution has been associated with CVD risk factors and health indicators by the existing literature. There are differences in the prevalence of CVD risk factors between rural and urban populations. As per the definitions of Center of Disease Control (CDC) the demographic data is compiled as "Data for population size, poverty level, population by age, and population by race/ethnicity were obtained from the Current Population Survey (CPS) conducted by the U.S. Bureau of the Census. The CPS is an ongoing survey of states from which estimates for counties are derived. Due to the survey's small sample size, the confidence intervals for these measures may be wide and should be consulted when making comparisons to peer counties"(1).Comparing the demographic data upon the cause specific risk factors of CVD may reveal the missing link in the prevention of CVD in the community.

Global disparity in CVD Mortality

Health care disparities are prevalent among rural and geographically isolated population(2). Cause specific mortality related to CVD is in rise in many developing nations, due an increasing fast food life style. While technology helps to increase life expectancy, generally sedentary life style and fast food consumption have resulted in the rise of chronic diseases including CVD. Community level indicators are useful in preventing CVD (3). A time trends analysis report of ischemic heart disease mortality, using an age-period-cohort model to characterize the effects of ischemic heart disease on changes in the mortality rate over time, indicated that the mortality is on the increase, from 1985 to 2009(4).

Individual Risk factors

Individual risk factors indicators data may include, Self-Rated Health Status, Unhealthy Days, Sedentary Lifestyle, Obesity, Current Smoker, Few Fruits and Vegetables, High Blood Pressure (>age 18), and Diabetes (>age 18).The characteristics presented by these data may convey risks for heart disease and they may also include risk factors related to individuals' personal behaviors, and lifestyle choices. As per the definitions of CDC, " the Behavioral Risk Factor Surveillance System (BRFSS), a survey conducted jointly by states and the Centers for Disease Control and Prevention, provides information on the prevalence of adult risk characteristics associated with the leading causes of death"(1). Individual risk factors data are credible as they are adjusted and standardized for age and social strata and including this data set may help to reveal the global CVD risk factors and indicators.

Ethnicity and risk factors

Health disparities are found on the basis of Ethnic and racial context among patients with cardiovascular disease. The association between ethnicity and the health disparities among CVD population remains unexplored. A comparison of health care between older Black and White adults demonstrated the significant difference in health care. The study demonstrated that race remained as a strong indicator for CVD after adjusting to the demographics and comorbidities (5). According to, Kerr et al., (2008), study report, individuals who live a deprived area have higher risk for CVD. The study results indicated that of 973 patients 34% were <55 years and 10% were <45 years, 24.8% were women, and 44.6% lived in areas classified as most deprived. 61.5% were European/other, 13.0% NZ Maori, 15.2% Pacific, and 10.3% South Asian. Smoking was a predominant risk

factor prevalent among youth. Younger patients, regardless of ethnicity, were much more likely to be smokers, be obese, and have elevated LDL and triglycerides, and low HDL levels. Maori and Pacific patients were more likely than European/other patients to smoke, have diabetes, obesity, elevated triglycerides, and low HDL. These ethnic differences persisted across the age range. Increasing deprivation was associated with more smoking, obesity, hypertriglyceridemia and diabetes, with the excess of smoking and obesity being most pronounced in younger patients (6).

Age and Gender

Age and gender are two significant indicators associated with CVD. Age may be used to predict the CVD risk factors. A study report in assessing the effects of age in the CVD risk factors indicated that age effect in women was more remarkable than that in men. Women born from the early 1900s to 1925 observed an increase in ischemic heart mortality. That cohort effect showed significance only in women(4). The researcher recommended (1) the need for future cohort effect studies that may have a lasting impact on the risk of ischemic heart disease in women with the increasing elderly population; and (2) a national prevention policy need to be established for the management of high risk by considering the age-period-cohort effect. Surgical outcomes vary depending upon age, gender, and morbidity among cardiac surgery patients. A secondary analysis report on impact of age, gender, and co-morbidities in cardiopulmonary indicators revealed that there was a significant difference between male and female in hemodynamic parameters among post-operative coronary artery bypass graft surgery patients ($p< 0.01$)(7). Gender is an indicator for CVD. Gender differences are found associated with CVD (8). A longitudinal study report with the purpose of determining the association between self-rated health and major cardiovascular events in a sample 900 women with suspected myocardial ischemia revealed that women have higher CVD risk factors (9).

Cholesterol

Cholesterol is a significant risk factor associated with CVD. Hyperlipidemia is associated with obesity and is a sensitive indicator for CVD (10). The Amsterdam growth and health study concluded that measurement of percentage body fat in the early teenage period seems to be the most important cardiovascular disease indicator in predicting risk levels in the young adult (11). Canadian Heart Health Surveys Research Group reported that waist circumference and BMI correlated significantly with blood pressure and plasma lipid and may be the best simple anthropometric indices to include in the routine clinical examination of adults (12).

Body Mass Index

Obesity is associated with CVD (13). Systematic physical activity has significant effect on reducing CVD risk factor by reducing BMI (Baruth et al., 2011). Body mass index has significant effect on cardiopulmonary indicators such as cardiac output, cardiac index, CVP, oxygen saturation, respiratory rate, pulmonary artery pressures among post-operative CABG patients. Body Mass index is a significant indicator in predicting CVD risk factors(7).

Blood Pressure

Alteration in blood pressures is a significant predictive risk factor for CVD. A cross-sectional study of(14), which included all primary health care physicians of three rural districts of Egypt reported that, "hypertension (HTN) was a priority problem in about two-thirds (62.9%) of physicians, yet only 19% have guidelines for HTN patients. Clinical history recording system for HNT was available for 50% of physicians. Levels of knowledge varied with regard to definition of HTN (61.3%, fair), procedures for BP measurement (43.5%, poor), indications for referral (43.5%, poor), patient counseling (61.3%, fair), patient treatment (59.8%, fair). Availability of clinical history recording system for HNT was a significant predictor for physician's level of knowledge ($P = 0.001$). Overall level of practice was fair (68.5%)." Conclusion included that there is a need for international health education for health care professionals. Hypertension is a sensitive predictor for CVD risk factor. Optimum maintenance of Mean arterial blood pressure (MAP) is essential among coronary artery bypass graft surgery patients. Alterations in MAP are associated with post-operative complications and they delay ventilator weaning after CABG surgery(15). Hypertension may be used to predict the CVD among global population.

Blood sugar

Cardiovascular problems are prevalent among patient with Diabetes mellitus. Diabetes mellitus is associated with cardiovascular problems such as coronary heart disease (CHD), stroke, peripheral arterial disease, nephropathy, retinopathy, and possibly neuropathy and cardiomyopathy. Diabetes Mellitus is a significant predictor for CVD(7). Heart disease related mortality is higher among DM patients. CVD is a major complication of diabetes and the leading cause of early death among people with diabetes. High blood sugar may be used as a predictive indicator for CVD.

Environmental risk factors

Air pollution

Air pollution is a new significant risk factor, which is an inevitable consequence of industrialization and human activities. The predictive association between air pollution and prevalence of CVD is unexplored. CDC and WHO measure the air quality of nations and regions as a health indicator, which could be used to correlate and predict CVD. Global warming and ozone layer impairment pose various health haz-

ards throughout the world. Communicable diseases, epidemic, and endemic diseases, and airborne pathogens gain virulence in the polluted environment. There is association between air pollution and CVD and air pollution may be used as an indicator to predict CVD risk. Establishing the association between CVD and air pollution may open a new avenue of health care knowledge, which may help to prevent CVD by reducing air pollution. Air pollution is associated with CVD. A cross sectional study report revealed the association between air pollution and increase in the blood pressure and heart rate (16).

Socio - economic status and Health care access, utility, economics

Socio- economic status is associated with heart disease mortality. Health indicators are associated with the health care access, utilization, and equitability. There is a prevalence of health care disparity related to socio- economic status of the individual, community, nation, and region, which is a global health care issue. Neighborhood and individual socio- economic status are found associated with subclinical disease prevalence in this elderly cohort (17) .The majority of the death related to CVD occurs in the community before hospitalization due to lack of health care access, which could be prevented. A time trend analysis in heart disease mortality rates revealed that there is reduction in mortality related to heart diseases according to socioeconomic status. The time trend analysis included all heart diseases (all circulatory diseases, except rheumatic, cerebrovascular, and aortic diseases) comparing three different household income levels (high, middle, and low) in the city of Sao Paulo from 1996 to 2010. The result indicated reduction in deaths due to heart diseases is greatest for men and women living in the wealthy neighborhood(18). In England, the CVD mortality is in decreasing trend last six years but there is a disparity in the decrease between socioeconomic groups (19). Socioeconomic status may be used as a sensitive predictive indicator for CVD.

Access to health care varies globally. Access to health care is defined as, "Access to care measures include health care resources available in a county and provide measures of medical care coverage or lack thereof" (1). Access to health care is associated with CVD risk factors and health indicators. Accesses to care indicators included in this study include Primary physicians, Health professional shortage, Community health centers, and Health Insurance status. Comparing these indicators globally may reveal the disparities prevailing in the regional health care compared to the global standards. Access to care may be used to predict the health care outcomes and CVD outcomes.

Summary measures of health indicators

Summary measures of health reports health indicators including average life expectancy, average number of unhealthy days, and self-rated health status. These measures may be used to predict the CVD risk indicators including cause specific morbidities and mortality. There are many highly credible Indicators sets that address health and heath care at the state or community level, that draw their data from public government-sponsored surveys and other reliable public sources. While the precise definitions of the indicators may vary, prediction of cause specific risk factors of CVD may help to understand, discuss, and take action to improve the health of the global community.

Quality Indicator and Quality of life among patients with Heart diseases

Functional status is a quality indicator. Functional status including the adaptation to the physical activity may be an indication of quality of life among heart disease patients those who have atherosclerosis (20).In addition, exercise tolerance is a quality indicator for heart disease patients. Improvement in the exercise tolerance is related with physical improvement and it may improve quality of life (21).

Adipose tissue parameters may be used as quality indicators. Maintenance of optimum BMI may help to prevent morbidity and may improve functional status and quality of life (22). Socioeconomic status is a quality indicator. Low socioeconomic status is associated with heart diseases. Among the socioeconomic indicators education has association with the incidence of heart failure among heart disease patients (23). Health care access is a quality indicator. Spatial distribution has association with heart disease morbidity. Health care access availability may improve quality of life among patients with heart diseases (24). Health care delivery methods and interventions may affect the quality of life. Implementation of National disease management guideline for CHF is a quality indicator and it has association with quality of life among patients with CHF (25).

There is difference among the gender in the quality of life. Women reported less quality of life than men after heart diseases (26). Women may need periodic assessment of quality of life. Life style modification by adopting healthy life style is an indication of quality of life. Participation in the disease related training program is a quality indicator that may improve quality of life (27). Cardiac rehabilitation program has association with the quality of life. Participation in a comprehensive rehabilitation program may improve psychological wellbeing and quality of life (28).

A factor analysis revealed that there four factors related to quality of life among cardiac patients including post infarction cardiac remodeling, neurotization, obesity, and the degree of heart and coronary failure. Among these four factors obesity is the major factor that influences the quality of life (29). Intervention to prevent obesity may improve quality of life among cardiac patients.

Conclusion

The review explored concepts including heart disease indicators, cause specific risk factors, quality indicators, and quality of life indicators. The major concepts include CVD risk factors, cause specific risk factors indicators for CVD, health indicators (regional and global), and quality of life indicators among patients with heart disease. The review laid foundation for a theoretical framework, containing definitions of the concepts and supporting evidences, has been organized under the conceptual headings of the study including global disparity in CVD mortality, cardiovascular disease indicators and risk factors, individual risk factors, environmental risk factors, behavioral risk factors, demographic risk factors, summary measures of health indicators, quality indicators, and quality of life indicators. Future studies may identify a Prediction model of the global CVD cause specific risk factors and quality of life indicators, which may help in identifying the significant predictors that are known and unknown. Knowing the cause specific predictors may help in the early deduction of the CVD, which may help to develop preventive care for patients at risk of developing CVD and improve quality of life.

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