Ethnicity and Cardiovascular Disease in the Middle East

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**Abstract**

The purpose of this study was to compare between ethnicities if there is a difference in survival and treatment when it comes to cardiovascular diseases in the Middle East. To find out if there is a difference 28 articles was selected for inclusion, both qualitative and quantitative studies. Searches were made in the databases Medline, PubMed, Google and Google Scholar.

The results showed that it is possible that there are differences in mortality and morbidity between ethnicities affected by cardiovascular disease. These may be due to differences in abdominal obesity, insulin resistance in diabetes and other risks such as C-reactive protein in the blood plasma which is normally excreted in inflammation in the body and also adiponectin, which is a hormone found in fat tissue whose secretion is diminished in people who have diabetes. But studies saying that a difference does exist are too few and the need for more and larger studies is needed. It may also be that not all ethnicities are as benefited from current treatments available against cardiovascular diseases for example beta-blockers. The conclusion of this study is that more research in this area is needed as well as more comprehensive studies regarding public health in the Middle East.

**Keywords:** cardiovascular disease, Middle East, ethnicity, survival, treatment
Sammanfattning

Syftet med denna studie var att jämföra mellan etniska grupper om det finns en skillnad i överlevnad och behandling när det gäller hjärt- och kärlsjukdomar i Mellanöstern. För att ta reda på det har 28 artiklar valts ut efter inklusionskriterierna, både kvalitativa och kvantitativa studier. Sökningar gjordes i databaserna Medline, Pubmed, Google and Google Scholar.

Resultatet visade på att det sannolikt finns skillnader i dödlighet samt sjuklighet mellan etniciteter som drabbats av hjärt- och kärlsjukdomar. Dessa kan bero på skillnader i abdominal fetma, insulin resistens vid diabetes och andra risker så som C-reaktivt protein som finns i blodplasman och i vanliga fall utsändras vid inflammationer i kroppen och adiponectin som är ett hormon som finns i fettvävnaden vars utsändring är sämre hos personer som har diabetes. Dock är studierna som visar på skillnader alldeles för få, det behövs fler och större undersökningar inom detta område. Denna litteratur översikt visar också att det även kan vara så att inte alla etniciteter gynnas av dagens behandlingar som finns mot hjärt- och kärlsjukdomar som t ex Betablockerare. Slutsatsen i denna studie är att mer forskning inom ämnet behövs samt fler övergripande studier gällande folkhälsan i Mellanöstern.

Nyckelord: cardiovascular disease, Middle East, ethnicity, survival, treatment
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1. Background

Studies have shown that in the last decades, cardiovascular disease (CVD) is one of the primary reasons for mortality and morbidity. An unhealthy lifestyle is associated with the disease and CVD represents 50 percent of the causes of death worldwide [1]. It is also shown that the increase of CVD is mainly in the developing countries such as Afghanistan, Turkey, Iran, Iraq, Lebanon, Saudi Arabia, Syria, Saudi Arabia, United Arab Emirates (UAE) & Israel etc. [2] and primarily in the urban population than the rural population, a pattern seen especially in India [3]. These numbers are expected to continue to rise in the next few years and CVD is also more likely to occur in younger ages in developing countries [2]. Countries where the disease first had its outbreak are now showing a decline in the spread because of major public health efforts. CVD is now representing a larger amount of non-communicable disease in developing countries [3].

1.1 Risk factors

Socioeconomic status is often mentioned as an indicator for CVD because of the knowledge that people with lower income are more often likely to have an unhealthy lifestyle. It is known that risk factors such as smoking, physical inactivity, unhealthy diet, overweight and other lifestyle-related factors [4] are concentrated in groups with low education and income [5].

CVD is also known to vary by ethnicity, with some ethnic groups experiencing higher prevalence than others, for instance in US, CVD is most presented in women from other ethnicities then the US such as African Americans and Hispanic, where the main reason seems to be the lack of education, communication and income [5]. CVD is a leading cause of death and ethnic minority groups are more likely to suffer by the condition [5]. A study which compared Black, Hispanic and White women showed that the knowledge of the cause of death by coronary heart disease (CHD) was low among the participants that where Black in comparison to the White women, and the same results were shown when they compared the Hispanic women with the White women [5]. Similar patterns have been found in European countries. In Sweden a study which investigated immigrant women from Iran and Turkey in comparison with Swedish-born women found a higher risk of developing CVD among Turkish women [6].
Overall, coronary artery disease (CAD) is increasing in the Middle East and Eastern Mediterranean countries such as Egypt, Iran, Turkey, Iraq, Saudi Arabia, Yemen, Syria, Israel, Jordan, Palestine, Qatar, Bahrain etc. [7]. Which has been progressed because of changed food- and eating habits resembling to the Western societies [8]. The pattern of the increasing spread of CVD is observed in many developing countries as a result of the changed eating habits, urbanization and technological advances and reduced physical activity during work and leisure. Infectious diseases dominated these areas earlier but now they are being replaced by non-communicable diseases, particularly CVD and cancer. Currently, approximately 80% of the mortal cases of CVD occur in developing countries [9].

Although CVD is a leading cause of death in many Middle East and East Mediterranean countries, very little is known about inter-ethnic differences in prevalence of risk factors, treatment response and survival. Ethno-cultural differences are known to be associated with cultural practices as well with lifestyles that might be related to different patterns of morbidity and mortality. The regions are home to various ethnic groups such as Arabs, Bedowins, Persians, Israelis and European Jews.

1.2 C-reactive protein

High levels of C-reactive protein is an indicator of inflammation in the body, previously this has also seen be predictive for CVD events [10]. However did newly research performed that the connection between high C-reactive protein and CVD was lower than researchers first thought [10]. It may be a stronger indicator for diabetes because of previous research that has shown that South Asians, especially women shows a higher level of high levels C-reactive protein which also have a connection with obesity and insulin resistance [10]. This has also been shown in migrant Indian men, who also had elevated levels of C-reactive protein [10].

1.3 Homocystein

Homocystein is a protein amino acid found natural in the blood [10]. Elevated levels appear to contribute to CVD and the levels seems to be higher in south Asian men in comparison with Europeans, which may be an explanation why this ethnic group has an excess of CVD risk [10]. Trying to reduce elevated levels with folic acid have not been shown to help reduce the risk of CVD [10].
1.4 Adiponectin

Adiponectin is regulating the glucose levels and it also involves in the fatty acid breakdown [10]. People with central obesity have shown a low levels of adiponectin which seems to be a protective factor against metabolic and vascular dysfunctions [10]. People with type 2 diabetes and who are obese also have lower levels of adiponectin [10]. Adiponectin levels showed to be lower in Indo-Asians in comparison with Europeans with matching age and BMI [10].

1.5 Objective

The aim of this study is to review literature on the impact of ethnicity in treatment and survival regarding cardiovascular disease in the Middle- East and East Mediterranean regions.

Research question: Is prevalence of main risk factors for CVD, treatment and survival different across different ethnic groups regarding morbidity and mortality?

2. Material and methods

2.1 Selection and method

This is a literature study based on qualitative and quantitative articles conducted between 1993 and 2012. No year limit was set because of the limitations in publications regarding this area. Studies relevant to this literature review conducted before 1993 was not to be found. Because of the purpose of this study, regarding investigations of CVD in the Middle East and East Mediterranean, a literature review was necessary. English-language studies were chosen for a wider selection of articles. A search after articles in Swedish was made but because of the limitations the articles needed to be published on English. The large time span is due to the lack of research in this area and a concern that it would be difficult to find articles on the subject occurred from the beginning.

Population or hospital-based CVD studies published in peer reviewed journals, which include ethnic comparisons in adult population. The databases Medline, Pubmed, Google and Google Scholar were selected to cover the information needs of the subject CVD. These databases were chosen because they fit the study's purpose best which is public health. Searches have also been made in DiVA without any findings. The selected databases were searched systematically using various combinations of the keywords "Cardiovascular Disease AND Mortality AND Ethnicity" or "CVD AND
Middle East AND Morbidity/Survival" or "East Mediterranean AND income AND eating pattern / eating habits / diet" etc. Other combinations of the search words might have resulted in more or other articles and a different result like “Middle East AND Economic Status”. But it had become a large detour that might not have led to any result.

2.2 Data collection
Search engines as Medline, Pubmed, Google and Google Scholar were undertaken to identify relevant studies.


2.3 Data Analysis
After sorted to remove articles not relevant to the purpose of the study 28 articles remained. Due to the lack of material, detours have been taken to find additional research in this area. Such detours have been to immerse themselves in the risk factors for CVD, such as diabetes and obesity which could lead to information regarding the spreading of cardiovascular disease. Texts validity has been measured by seven different criteria [11]:
1. Whether the article contained method and results.
2. The selection process is described.
3. The study contains an ethical discussion.
4. If there is a discussion about drop-outs (response rate).
5. If the reliability of the measuring instrument is discussed.
6. If the validity of the measuring instrument is discussed.
7. Whether the text has been quoted.
The more criteria the article fulfilled the higher the quality of the article.

2.4 Quality review
To ensure the quality of the chosen literature the audit templates by Forsberg & Wengström (2003) was used. Forsberg & Wengström (2003) says that in a literature review quality assessments shall be made of the included articles to avoid the risk of erroneous conclusions [11]. They also say that a literature review not shall contain
articles with low quality. All articles used in the results (12 articles) have been read separately and then been reviewed using the templates. When the reviews and analysis of the articles were made they were divided into categories for low, medium and high quality. To achieve high quality, articles would contain as many positive replies when following the examination templates as possible. Each article got scores between 0-14 points, the article got 2 points for each criterion it contained. 1 point for criteria marked with a star (* = indistinct described), if the criterion was not met at all it got 0 points. For low quality judged the article to be between 0-6 points, medium was 7-10 points and high quality was 11-14 points. The articles are reported in Annex 1 (Table 1), which contains the articles author / year and country, design, purpose, study area and sample, data collection methodology, results and quality.

2.5 Ethical approach

Ethical considerations were made before the study started by using studies that are carefully reviewed by a Steering Committee or in which careful ethical considerations has been made [11]. Research results in the articles may not be distorted; all the presentation of the result has the intention to be objective [12]. All of the items included is reportable and presented even if the result is positive or negative versus purpose of the study [11]. To avoid cheating and unreliable research it is important that the ethical aspects are being considered [11].

3. Results

The results are presented in various subheads containing the main risk factors, the spread of the disease and ethnical differences.

3.1 Prevalence of main risk factors for CVD by ethnicity

There are many risk factors for CVD, such as sex, age, smoking, physical inactivity, high consumption of alcohol, hypertension, high blood cholesterol, overweight, obesity, diabetes etc. [13]. Because of the many risk factors there are more people in the population worldwide who are at higher risk to suffer from CVD, but since the most risks are lifestyle related the high prevalence can be prevented [13].

Research carried out in the region shows that in Lebanon 60% of all deaths are caused by CVD in people the age 50 years and older [9]. In Syria and Jordan CVD is the leading cause of death among adult people, 45% of all deaths is caused by CVD [9]. In
Egypt the reporting of deaths in CVD has steadily increased between the years 1961 to 1985 from 5.0% to 39.1% in men and from 2.9% to 27.2% in women [9]. In the year 2000 the prevalence of CVD was about 43%. Regarding the prevalence of diabetes in the region, empirical evidence indicates that there is an increase of diabetes in the Middle East and North Africa region. For instance consistent with current levels of obesity as shown on highest prevalence of diabetes among natives in Bahrain, Saudi Arabia and UAE, with 23% among adults in the age of 20 years and older [9]. In the past eight years there’s been an rapid increase in diabetes prevalence in adults in Jordan in people aged 25 years and older from 6.8% in 1996 17.9% in 2004. These changes are corresponding with a 50.0% increase in obesity in the country [9].

3.2 Main risk factors

Hypertension is one important risk factor for CVD. In Syria and Bahrain in comparison with other countries in the region has showed the highest prevalence of reported hypertension with over 40% [9]. The trend in these two countries includes increases hypertension among the older population. In addition, findings from Tunisia suggest that between the years 1995 and 2004 the overall prevalence of hypertension increased by almost 20% among the elderly [9].

Smoking is also an important risk factor for CVD and there has been a wide variation in the prevalence of smoking across countries in the Middle East and North Africa with highest rates in Lebanon (55.8%) Jordan (29.0%) and Syria (28.1%), with a peak in the means of age and a higher rate of male smokers than women. Women in these regions often begin to smoke at a later age and smoke fewer cigarettes than men. But in the middle-income countries this trend is seen to turn as more and younger women taking up smoking [9]. A population-based cross-sectional study carried out the year 2004 with 2038 citizens of Syria in the region Aleppo. The prevalence of tobacco use, counting cigarettes and/or water pipe, was 63.6% in men and 19.2% in women. In a study carried out 1995, 2% of the women in Kuwait and 34% of the men reported use of tobacco, also showing that the women often were subjected to second-hand smoking [14].

Obesity is considered to be an important risk factor to CVD and is increasing worldwide [15]. An overview of data from 2001-2005 concerning obesity and mortality in patients with heart failure showed that patients with a BMI <21.5 and those with BMI >34.1 had poorer survival rate [15]. The last 3 decades obesity in some regions of the Middle East
has tripled [14]. The Middle East is now facing an epidemic of diabetes and obesity having the highest rates of national prevalence of type 2 diabetes and extremely high levels of obesity in comparison with the rest of the world [16].

3.3 The spread of CVD in Middle East and East Mediterranean

In Iran a study of 3024 individuals was carried out, the mean BMI between the participants was in general higher in women than in men although the mean waist circumference didn't differ [17]. Regardless age or sex, the urban population had higher waist circumference and BMI than populations in the rural areas of Iran. And it also increased by age, from 25 to 45 years, after that it leveled out [17]. Also find was high prevalence of lipid disorders that may have a relation to the high prevalence of overweight and obesity of the individuals being studied [17]. A review of the whole Middle East showed that the prevalence of obesity in women was 30,6% and 16,6% in men but the rates of obesity was almost the same in both genders (9,3% in women and 9,6% in men) [14]. In Iran older women, about 50 years, were those with the highest BMI and waist circumference [14].

In Iran a cross-sectional study called Isfahan Healthy Heart Program showed that 35,9% of the women were overweight and 28,1% of the women were obese [14]. Researches of Palestinian people living in Ramallah found that the prevalence of obesity in women was 49% in comparison with 30% in men, but the central obesity was higher in men (59%) than in women (25%) [14].

Studies carried out in the region of the Middle East and North Africa revealed that the prevalence of obesity was highest in those countries that is oil-rich and affluent, such as Kuwait, Saudi Arabia and Qatar with a rate of over 40%, and the lowest prevalence rates, below 20%, were in Lebanon, Morocco, Oman, Algeria and Iran [9].

Available literature states that Middle East is expected to have the highest levels of increasing diabetes which is also a known risk factor for CVD. It is suggested that these changes might be related to the changes in food habits combined with high prevalence of obesity in the population [18]. Currently the Middle East is the area with the highest numbers of aged-standardized frequency of diabetes, 22% in men and 19% in women in the age of 18-80 years [14]. However, currently there are no national data on the degree of how the metabolic syndrome is spread over the Middle Eastern regions [18]. But in
the 30 provinces of Iran a study based on 3,024 people living in the urban and rural regions overweight was documented in 34.2 % of the population with higher prevalence in women than in men. And the prevalence of both overweight and obesity was higher in urban than in rural population [18].

The Middle East does have a lower median age (51 years) for myocardial infarction which is 12 years younger than in Western Europe [19]. The smoking rates in the Middle East are still increasing and at the same time they are decreasing in the most of the Western countries [19]. There are not many data available for the individual countries about the prevalence of risk factors of CVD [18]. What is known is that in Egypt hypertension is an important risk factor with a prevalence of 26% of developing cardiovascular diseases, cardiovascular diseases is also in Egypt with greater occurrence in women (8.9%) than in men (8.0%) [19]. Also in Kuwait, Oman, Qatar, Saudi Arabia and the UAE there is a high prevalence of hypertension (26%) and diabetes (22%) still more often seen in women than in men and more likely in urban than in rural population [19]. In a new study that investigated the impact of non-communicable diseases in Tunisia and Algeria a high prevalence of hypertension is shown, 30% in Tunisia and 24% in Algeria and obesity 27% in Tunisia and 21% in Algeria [19].

3.4 Ethnic differences in treatment, mortality and survival

Various studies have found differences in internal obesity, insulin resistance and other signs of risks such as C-reactive protein, adiponectin and plasma homocystein across different ethnic groups [19]. In addition, the differences between ethnic groups seems to in part due to genetics, environmental factors and the body mass susceptibility, and may provide important etiologic guidance to detect differences in disease patterns how the disease manifests itself, therapeutic needs and response to treatment [19].

Some differences have been seen in studies suggesting that all people are not as benefited by CVD treatment [20]. This have been seen most in black people in comparison to their white peers [20]. For example, black women with significant coronary artery disease (CAD) had the highest death rate in comparison to white women and even black men [19]. Black people were shown having a higher BMI, more likely to have a higher prevalence of medical comorbidities including diabetes mellitus, hypertension and cerebrovascular disease [20]. But angina, cigarette smoking and hyperlipidemia were more common in white people [20]. In a study which investigated
CAD in US found that even after adjustment for socioeconomic status, baseline, clinical factors, initial treatment selection and demographics being black were an independent factor of long-term mortality, but gender was not [20]. Black women had lower 15-year survival in comparison with white women after adjustment for clinical and treatment factors [20]. The same results were seen in black compared to white men.

The same results were found in cohort study in Kaiser Permanente’s Northern California using diabetes registry [21]. 94% of the participants of the study had at least one risk factor for CVD [21]. When adjusting for socioeconomic status and insurance coverage, African American, Hispanic, Native American and some Asian populations were more likely to die or to have CVD-related diseases compared to the white population in US [21]. Black and Hispanic people are overall more likely to have diabetes mellitus and hypertension [22].

Immigrant women from Iran and Turkey in general have been shown in comparison with Swedish women to have a disadvantageous lipid profile which may be linked to a higher incidence in diabetes and atherosclerotic cardiovascular disease [17].

Different evidence-based treatments have in Lebanon 1996 been shown to reduce the numbers of mortality in patients lying in hospital, such as beta-blockers [19]. Although beta-blockers is shown to be effective, hospitals especially in Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE only prescribes it for 63 % of the patients in a 24h range after having an acute coronary syndrome versus 87% in the Global Registry of Acute Coronary Events. [19]

4. Discussion
4.1 Result discussion
The study did not find literature which addressed any significant ethnic differences in treatment and survival in Middle-East and East Mediterranean countries. However CVD research in US has found that African Americans compared to white Americans have a lower life span due to their socioeconomic status and more often low educational level [23]. African Americans have measured having higher blood pressure, more often diabetes and cerebrovascular disease [20].
In the Arab countries of Eastern Mediterranean there are only sketchy numbers of hypertension, diabetes and dyslipidemia in the area, which are high and still increasing. And it also seems like this problem already consists mainly among people with low socioeconomic status and low educational level [24].

In the industrialized countries CVD has been the leading cause of death for a long time, which have led to much investment in health care programs and developed primary and secondary prevention programs [24]. In countries with predominant old population coronary heart disease and brain stroke has decreased. In Egypt, Iraq and Yemen there have been some instability during the decades, poverty or pandemonium consisting socioeconomic status [24]. In North Africa and the Eastern Mediterranean there have been some political and military conflicts. These countries do all have a very young population were the median age varies from 17 to 28 years, even in these countries CVD is the leading cause of death and morbidity [24].

The Arabian Peninsula grew quickly into a welfare society, which consists mainly out of expatriate population [24]. Studies based on the native population of the UAE showed a high prevalence of all risk factors of CVD, and a high amount of diabetes in the adult population, 23%, the highest rate shown in the world. This also corresponds to increased obesity and lipid disorders. The country's rapid transformation into a welfare society has come with some bad consequences, a sedentary lifestyle and an unhealthy diet [24].

In the reviewed literature, there was a constant assumption regarding changed eating patterns, physical inactivity and the increasing use of tobacco [25]. Industrialization has increased the availability of cheap vegetable oils and fat, expanded the consumption of energy-dense foods [25]. In addition there has also been a switch from plant to animal protein, refined carbohydrates and sweets. This dietary change has also led to the increasing prevalence of obesity [25]. These changes are now taking place in groups and countries with low-income and are also accelerated by the ongoing urbanization. For instance, it is reported that in South Africa this eating pattern’s is strictly associated with how long people have lived in an urban environment [25]

The overall incidence of CVD did not significantly differ between ethnicities, some articles showed a little difference in the survival factors, death and treatment between
patients. Regarding ethnic differences in prevalence of CVD in Middle-East and East-Mediterranean countries, no study was found which addressed the subject. However, literature elsewhere has found ethnic differences in the distribution of CVD. In Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE, also called Gulf-RACE, the mean age of myocardial infarction (MI) was 10 years lower compared to the Global Registry of Acute Coronary Events, diabetes and smoking were more prevalent in these countries [19]. In one article a difference in C-reactive protein has been noticed between different ethnicities, with a median level of 1.5-1.7 mg/L in Europeans and Americans, 2.96 mg/L in African Americans, 2.06 mg/L in Hispanic population and 1.12 mg/L in Asians [26].

There is not much documented of CVD in the Middle East and even less about the differences between ethnicities. Some studies have reported a difference between ethnicities found but then it's about the lack of knowledge in the field of population and the lack of distribution of medicine and treatment. Also cultures where people are less likely to get help and use medications such as beta-blockers.

In studies on ethnic differences in treatment and survival no good explanation is to why people from different ethnicities don’t respond the same to treatment and the rate of survival. One problem seems to be communication but that only explain the problem of a country with immigrants not the increasing death of CVD in all countries worldwide. Another reason may be the use of medication and prescription of medicines to patients which also seems to differ between countries in the Middle East and the rest of the world.

4.2 Method discussion
To obtain a wide selection and a broad overview of the problem of CVD a literature study was necessary. Most articles that was used in this study was relatively new, which means that the literature is current and relevant for this study. Annex 1 contains a table of the data analysis carried out on articles to give an overview and to easily assess the credibility of the studies. Because of the lack of long-term population-based studies in the Middle East and East Mediterranean this literature study is built on the results of other literature studies, therefore, the credibility of the results of this study could be questioned [28]. And there have only been a few studies built on similar population. This have made it hard to compare articles with each other to insure that the information
been used not have been angled in the favor of the researcher interpretation or purpose and so the reliability can be questioned [27]. To get more accurate results it would have been desirable to compare the articles regarding CVD in the Middle East with each other.

If more articles in the chosen subject and area had exist, a random selection had been preferred, which could have led to a different result. The advantage of being able to make a random selection is that the study will have a higher scientific value which means that it gives a more credible and reliable results [28].

Another drawback of this study is that there is no time limit for the articles so that the result can be old and no longer relevant [28], but it was an action that was necessary to find as much articles to work with as possible. Although, the oldest article used in this study is from 1993, the rest are relatively new and current so it might not affect the result.

After searching through all the databases and combining different keyword remained 146 articles that schematically was checked through. Afterwards 83 articles have been read thoroughly and then leaving 28 articles relevant to the topic.

5. Conclusion

This study examined the differences across different ethnic groups in prevalence of main risk factors for CVD, treatment and survival. Showing that there are some differences in survival and treatment were white people are more likely to respond to treatment and more likely to survive. This seems to be results of education status and socioeconomic status were those with lower education and socioeconomic status is more likely to suffer from CVD. So far the differences between ethnicities don’t seem to be as big as one can show the class differences. And in countries with many immigrants the lack of communication and understanding seems to be a risk factor for not using medicine properly and in the same extent as the native population.

An interesting finding was that immigrant women from Iran and Turkey showed a disadvantaged lipid profile compared with Swedish women, this shows that ethnic differences may occur.
So is prevalence of main risk factors for CVD, treatment and survival different across different ethnic groups? Differences that have been seen is internal obesity, insulin resistance, differences in C - reactive protein, adiponectin and plasma hymocystein between black and white people but more studies are needed in this field to see if it really is valid and why this difference has occurred. Is it something you are born with or if it is depending on lifestyle.

Another example of differences between ethnicities was black women which more often had a higher death rate in CAD in comparison with white women [20]. But if this is a due to ethnicity or lifestyle is hard to tell. Black women had a lower 15-year survival in comparison with white women but they also had a higher BMI, more likely to have diabetes mellitus, hypertension and cerebrovascular disease [20]. Cigarette smoking and hyperlipidemia where more common in white people [20], so if there is a difference between ethnicities or if some risk factors are more likely to develop CAD or CVD is hard to tell.

Health interventions will be needed to decrease the spreading of CVD in the future, most of the many risk factors are self-caused, and can therefore be changed, the problem is to get the information to reach out to the different communities where it is also shown that well educated people with higher socioeconomic status are more likely to embrace current health advices.

5.1 Future Studies

Today there is a lack of knowledge in the field therefore more studies should be done on the subject. The primary focus should be on a prevention program which seems to be one of the mainly important ways to reduce this world wide spread disease. More studies regarding lipid profile disadvantages are needed to see if differences do exist regarding different ethnicities. Also more studies regarding differences in C - reactive protein, adiponectin and plasma hymocystein. The importance of knowing if a difference does exist is also to know how to treat people depending on their origin.
6. References


14. Shara N. Cardiovascular disease in Middle Eastern women Nutrition, Metabolism & Cardiovascular Diseases 2010; 20, 412e418.


in hospital morbidity and mortality data in Western Australia: a record linkage study. BMC Medical Research Methodology 2010; 10:111.

## 7. Annex

### 7.1 Annex 1: Table 1

<table>
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<tr>
<th>Writer/Year Country:</th>
<th>Design:</th>
<th>Selection:</th>
<th>Method:</th>
<th>Outcome:</th>
<th>Result:</th>
<th>Comments &amp; Quality:</th>
</tr>
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<tr>
<td>Sibai AM, Nasreddine L, Mokdad AH, Adra N, Tabet M, Hwalla N. 2010, North Africa &amp; Middle East. [9]</td>
<td>Literature review.</td>
<td>Men and women, irrespective age, living in the Middle East and North African (MENA region).</td>
<td>Data on CVD risk factors were collected from scholarly papers. Dietary patterns were acquired from the WHO Food and Agriculture Organization Statistical Databases.</td>
<td>The burden of CVD in the MENA region and what they have to do with eating patterns and nutrition transition.</td>
<td>High obesity in the MENA region, especially in oil-rich and affluent countries with a higher rate of obesity in women. A higher rate of diabetes in comparison with Europe and White Americans. This is due to the urbanization, modernization, the technological development &amp; economic growth.</td>
<td>The authors also point out the segregation between men and women where there are very few training facilities intended exclusively for women. A difficulty may also be that in some of these countries to be plump is considered to be beautiful. 1, 2 &amp; 7.</td>
</tr>
<tr>
<td>CATI Technical Reference Group. 2003, Australia. [13]</td>
<td>Question and development paper.</td>
<td>The surveillance and monitoring of CVD in Australia.</td>
<td>An observation of the monitoring and surveillance method being used in Australia to prevent CVD.</td>
<td>To present data requirements regarding the ongoing monitoring and surveillance of cardiovascular disease in Australia.</td>
<td>Because of the prevention and medical treatment there have already been some big advances in cardiovascular health in Australia.</td>
<td>Not an ordinary article, more an observation that in various aspects brings up CVD, the disease, spread, prevention etc. 5, 6 &amp; 7.</td>
</tr>
<tr>
<td>Shara N. 2010, Middle East. [14]</td>
<td>Literature review. Population- based and cross-sectional studies in lack of real surveillance data.</td>
<td>Women living in the Middle East.</td>
<td>Using reliable and well-designed studies of women and CVD in the Middle Eastern region.</td>
<td>Showing that more knowledge is needed in this region regarding CVD. Also more studies regarding CVD are required.</td>
<td>CVD mortality and morbidity are increasing among Middle Eastern women. Yet the knowledge of CVD is too low. Existing studies are two small and short-term that they can't be generalized in all women of Middle Eastern regions.</td>
<td>Somewhat weak study because it is based on other studies done in the Middle East that is not as extensive. 1*, 2*, 3*, 5, 6, 7.</td>
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1. Whether the article contained method and results.  
2. The selection process is described.  
3. The study contains an ethical discussion.  
4. If there is a discussion about drop- outs (response rate).  
5. If the reliability of the measuring instrument is discussed.  
6. If the validity of the measuring instrument is discussed.  
7. Whether the text has been quoted.  

*Indistinct described. [11]
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<td>Morse S, Gulati R &amp; Reisin E. 2010, USA. [15]</td>
<td>Article review.</td>
<td>Articles studied “the obesity paradox”, related to heart failure, CAD, peripheral arterial disease, kidney disease and a cohort of patients undergoing non-bariatric surgery</td>
<td>Recent publications regarding “the obesity paradox” have been reviewed.</td>
<td>Overweight people doing better than others in the development of CVD.</td>
<td>People with a BMI between 22.5 and 25 in both men and women at all ages had the lowest rates in overall mortality. The ideal range for mortality risk increased by each 5kg/m² by 20% to 120% depending on disease.</td>
<td>The “obesity paradox” seems to be connected to individuals (affected by CVD, CAD and other diseases), going through surgery. 1, 2, 3*, 5, 6 &amp; 7.</td>
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<td>James W.P.T. 2008, The United Kingdom. [16]</td>
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<td>-</td>
<td>Delay weight-gain, reduce and prevent obesity and type 2-diabetes. Develop the technology and knowledge.</td>
<td>An article describing the development of CVD. Interventions, roots of the problem, what is a normal BMI, physical inactivity. 7.</td>
</tr>
<tr>
<td>Delavari A, Kelishadi R, Forouzanfar M.H, Safaei A, Birjandis F, Alikhani S. 2009, Iran. [17]</td>
<td>Population-based study.</td>
<td>3,024 men and women from Iran living in urban and rural areas of all 30 provinces in Iran. Age 25-64 years old.</td>
<td>A two-stage cluster sampling-method. The participants were asked to leave blood samples.</td>
<td>The prevalence of dyslipidemia and cut-off points for BMI.</td>
<td>The optimal cut-off value of BMI to identify lipid disorders with maximum sensitivity and specificity was 25 kg/m² for males and 26-28 kg/m² for females.</td>
<td>The first nationwide population-based sample in the Middle East. More long-term studies are needed in this region. 1, 2*, 3, 4 &amp; 7.</td>
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1. Whether the article contained method and results.
2. The selection process is described.
3. The study contains an ethical discussion.
4. If there is a discussion about drop-outs (response rate).
5. If the reliability of the measuring instrument is discussed.
6. If the validity of the measuring instrument is discussed.
7. Whether the text has been quoted.

*Indistinct described. [11]
| Writer/Year Country:                  | Design:                                  | Selection:                                                                                           | Method:                                                                                                   | Outcome:                                                                                                    | Result:                                                                                                  | Comments & Quality:                                                                                       |
|--------------------------------------|------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Delavari A, Hossein Forouzanfar M, Alikhani S & Sharifian A. 2009, Iran. [18] | Population-based study.                 | 3,024 men and women from Iran living in urban and rural areas of all 30 provinces in Iran. Age 25-64 years old. | WHO’s “guidelines of The STEPwise approach to non-communicable disease risk factor surveillance” and adding some modifications. | The burden of the metabolic syndrome in Iran.                                                             | An alarming prevalence of the metabolic syndrome was found. This may be the result of the rapid epidemiological, demographic, and nutritional transition in Iran. | More long-term studies are needed to confirm these findings. This study seems to be built of the same results as the other Delavari et al.–study described on page 8. 1, 2, 3, 4 & 7. |
| Forouhi N.G, Sattar N. 2006, The United Kingdom. [10] | Literature review.                      | Comparing Asians with other ethnicities.                                                              | Reviewing literature using the keywords: ethnicity, cardiovascular disease and Risk Factors. Mainly Asians who were one of the first groups noted to have a higher risk for coronary heart disease. | Relationship between CVD and ethnicity.                                                                     | Measurable differences between ethnicities have been seen, such as insulin resistance, fat location and relative fat mass. | A small study where methods and selection would have been desirable, although the result is very interesting. The studies reliability and validity can be questioned, additional surveys are needed. 1* & 7. |

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<td>Thomas K, Honeycutt E, Shaw L, &amp; Peterson E. 2010, USA. [20]</td>
<td>Cohort study</td>
<td>22,618 patients, 19,304 (85.3%) white patients and 3,314 (14.7%) black patients who underwent cardiac catheterization at Duke University Medical Center.</td>
<td>Compared the patient’s unadjusted and adjusted long-term survival by race and gender using the Kaplan-Meier and Cox modeling.</td>
<td>Relationship between CVD and ethnicity.</td>
<td>Black patients with CAD had a lower economic status, more often female and younger at age. Black had lower long-term survival rates than whites.</td>
<td>The differences in survival may depend on the various types of risk factors between the white and black population. 1, 2, 4 &amp; 7.</td>
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<tr>
<td>Traylor A, Schmittiel J, Uratsu C, Mangione C &amp; Subramanian U. 2010, USA. [21]</td>
<td>Cohort study.</td>
<td>31,277 adult diabetes patients California, 2005.</td>
<td>African American, Hispanic, Asian and white adult who were identified as having diabetes before January 1, 2005 and actively got medication throughout 2005.</td>
<td>The role of language for the treatment of patients with diabetes.</td>
<td>African American, Hispanic and Asian patients were less likely to adhere to CVD medications than white patients. The cause may be differences in attitudes and beliefs, however they afford the medication, language and communication problems.</td>
<td>Ethnical differences may refer to lifestyle differences and class. 1, 2, 4, 6 &amp; 7.</td>
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<td>Meadows T, Bhatt D, Hirsch A, Creager M, Califf R, Ohman M, Cannon C, Eagle K, Alberts M, Goto S, Smith S, Wilson P, Watson K &amp; Steg G. 2009, USA. [22]</td>
<td>Register-based study.</td>
<td>68000 outpatients in 44 countries aged 45 years and older.</td>
<td>Using The international, prospective, observational REduction of Atherothrombosis for Continued Health (REACH) Registry comparing different ethnicities, risk factor profile, use of medication, etc.</td>
<td>Ethnic differences in the prevalence of CVD risk factors and outcomes among individuals with stable arterial disease.</td>
<td>The study showed that African American living in the US had the highest cardiovascular death rate. Asians had a significantly lower rate of cardiovascular death and all-cause mortality.</td>
<td>In this study there were mostly African Americans representing a black population. So the result might have been different if black people living in Africa or Middle East participated. 1, 2, 6 &amp; 7.</td>
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