*International Journal of Academic Scientific Research*
*ISSN: 2272-6446 Volume 4, Issue 4 (November - December 2016), PP 199-212*
*www.ijasrjournal.org*

# Comparison of physical activity between sedentary & non-sedentary lifestyles on cardiovascular health in adult male and female Gulf co-operative Council (GCC) country nationals

Abdulkarim Al-Raddadi, Abdulaziz Al-Anazi, Fahad Al-Ruwaili, Othman Al-Amouidi, Turki Khalid Al-Qhatani, Abdullah Al-Khaldi , Feisal Subhan

*College of medicine and medical secinse , Arabian Gulf University Bahrain*

**Abstract**

***Background:*** *cardiovascular disease (CVD) and associated risk factors have been noted across ethnic groups both within and between countries. In GCC countries, physical inactivity, high diet intake & metabolic syndromes make the prevalence of CVD higher than any other country in the Middle East.* ***Aim:*** *to compare the levels of physical activity between sedentary and non-sedentary adult male and female Gulf co-operative Council (GCC) country nationals and study its effect on their cardiovascular health .*

***Methodology :*** *A cross- sectional study involving 100 subjects among GCC to compare of physical activity between sedentary & non-sedentary lifestyles on cardiovascular health in healthy adult male and female Gulf co-operative Council (GCC) country nationals.*

***Result:*** *The major finding in this study was that subjects with a positive history of cardiovascular disease had significantly less physical activity levels relative to negative CVD history subjects. Likewise, subjects with a negative history of cardiovascular disease showed significantly more moderate physical activity levels relative to positive CVD history subjects. Therefore there is strong negative relationship between physical activity and cardiovascular disease history in our subjects. Our study also showed a gender difference in physical activity. Males had lower physical activity than females, using the IPAQ data analysis. Our data also showed that subjects with a history of unhealthy diet showed lower physical activity levels relative to healthy diet subjects.*

***Conclusion:*** *we found the major points were that our subjects with a positive history of cardiovascular disease had significantly less physical activity levels relative to subjects with no history of cardiovascular disease and that subjects with a history of unhealthy diet showed lower physical activity levels relative to healthy diet subjects.*

**Keywords:** *CVD , risk factor , life style , healthy food , exercise*

# Introduction & Background

Differences in the prevalence of cardiovascular disease (CVD) and associated risk factors have been noted across ethnic groups both within and between countries. In GCC countries, physical inactivity, high diet intake & metabolic syndromes make the prevalence of CVD higher than any other country in the Middle East [1]. Recent lifestyle change in Saudi Arabia may be leading to physical inactivity; therefore studies have shown a high prevalence of physical inactivity among Saudi children & adults (43.3%-99.5%) [2].

Other risk factors that may participate in the development of CVD are gender and behavior [3]. Some studies have shown a significant difference between males and females in the mean number of cardiovascular risk factors, so cardiovascular risk factors vary dramatically by gender. Hazards were higher in women than man (passive smoking, obesity, hypertension and diabetes) [4]. In another study conducted on students of in UAE medical college, energy drink use and stress have shown a significant association [5].

This research group will investigate if there is any relationship between CVD & physical inactivity, their prevalences and the risk factor association in adult male Saudis. We hope that at the end of this study, this research project will help a small proportion of our society, by educating them and making them understand the dangers of CVD and lack of regular physical activity.

## Aim and Objectives

**The Aim**

The aim of this study is to compare the levels of physical activity between sedentary and non-sedentary adult male and female Gulf co-operative Council (GCC) country nationals and study its effect on their cardiovascular health.

**The study objectives are to:**

- Investigate if there is a link between physical activity and CVD.
- Estimate the prevalence of physical activity in GCC nationals.
- Determine the age group with greater risk cardiovascular disease in GCC nationals.
- investigate if different geographical location has an effect on physical activity or cardiovascular health in the GCC
- inform study subjects about the benefit of physical activity and complications of physical inactivity

## Methodology

**Study design:**

A cross- sectional study involving comparison of physical activity between sedentary & non-sedentary lifestyles on cardiovascular health in healthy adult male and female Gulf co-operative Council (GCC) country nationals.

**Study population:**

Adult GCC country nationals. Sample size analysis was conducted and an estimate of four hundred subjects was the result; however the total number of subjects collected was one hundred. The subjects were students and staff of the Arabian Gulf University.

**Case definition:**

Comparing between healthy adults who have little physical activity and have sedentary life style and healthy adults who have a high physical activity and have non-sedentary lifestyles, and the effect of that on CVD in healthy adult GCC nationals.

**Sample technique:**

Convenient sampling techniques.

**Procedures of data collection:**

Interviewing the patients and filling up the questionnaires.

**Study instruments:**

A written questionnaire about comparison of physical activity between sedentary & non-sedentary lifestyles on cardiovascular health in adult male Saudis using (IPAQ) and (MacNew). It includes other data such as:

**Qualitative:**

- Sex
- Family history of CVD
- Smoking history
- Dietary history
- Nationality
- Occupation
- Marital status

**Quantitative**:

- Age

**Background about IPAQ [6 – 8]**

The purpose of the International Physical Activity Questionnaires (IPAQ) is to provide a set of well-developed instruments that can be used internationally to obtain comparable estimates of physical activity. There are two versions of the questionnaire. The short version is suitable for use in national and regional surveillance systems and the long version provide more detailed information often required in research work or for evaluation purposes. And in our research we plan to use the short one. IPAQ has been used in Saudi Arabia, including Prof Al-Hazzaa [7].

**Background about MacNew questionnaire**

The MacNew Heart Disease Health-related Quality of Life questionnaire is a self-administered instrument to assess and evaluate health-related quality of life [HRQL] in patients with ischemic heart disease (IHD) with psychometric properties established internationally (9-12). The instrument health care has been developed to better than the past; the health related quality of life (HRQL) has been defined by various authors; which is a measure of the patients perspective about his\her effect of an illness and its consequent therapy. Nowadays HRQL is considered an important outcome measurement of therapeutic intervention especially for the patient with chronic condition, such as cancer and heart disease. The MacNew HRQL instrument consist of 27 question fall into three domains; 13 question for physical, 14 for emotional and 13 for social. The maximum scoring of

MacNew is 7 at any domain (high HRQL) and the minimum is 1 (poor HRQL) missing response and sexual intercourse do not altering the domain if they excluded. The MacNew Questionnaire is easy to follow-up especially with availability of SPSS syntax to score the MacNew.

A HRQL instrument must exhibit good discriminative, evaluative and predictive properties. A discriminative instrument is designed to distinguish between individual or groups at a single point in time and needs to demonstrate reliability. Evaluative instrument is used when one needs to measure change in HRQL over time and needs to be responsive. Predictive instrument classifies individuals to a set of predefined measurement categories.

The Original Quality of Life after Myocardial Infarction (QLMI) Questionnaire was developed by the help of physicians, nurses, allied health professionals and patients with Myocardial Infarction (MI) for use in a trial of cardiac rehabilitation in moderately anxious and\or depressed patients with a documented Myocardial Infarction (MI), to assess patients feeling about a range of issue and concerns identified by individual who have suffered an acute Myocardial Infarction (MI), and to evaluate how daily activities, such as physical , emotional and social functioning are affected by the disease and its treatment for the disease.

The MacNew is copyrighted by the developers and is conceded to be in the public domain. There is no cost for using the MacNew or its translation. However, at the start of this study, we found that there is no Arabic copy for the MacNew Questionnaire and this made us to translate the form and spent more time. However, during our study we discovered an translation was made, but this was too late, as we had already collected our data. Since then the MacNew has been shown to be reliable, valid and responsive in patients with IHD, specifically in patients with angina, myocardial infarction, and heart failure in 9 languages: Chinese, Japanese, Norwegian, Portuguese [Brazil], Spanish, English, German, Turkish and Swedish.

The MacNew addresses three major HRQL domains, physical, emotional and social and, the MacNew has been favorably reviewed against a selection of other disease-specific HRQL instruments

One of the more important developments in health care in the past decade may be the recognition that the patient’s perspective is as legitimate and valid as the clinician's monitoring of health care outcomes. The added value in better understanding the impact of disease from the patient's perspective has led to the development of instruments to quantify the patients' perception of their health status before and after treatment. Traditional outcomes of treatment for IHD such as mortality and objective physiological or exercise tests give little information about the impact of either the condition or treatment from the patient's perspective.

When choosing an HRQL instrument, the researcher or clinician needs to ask "has an instrument been developed and tested for the purpose for which it is to be used and does it meet my needs?" Asking this question can give direction to reading the literature and will help the researcher or clinician select the instrument best suited for the specific purpose. For HRQL instruments to be useful not only must they demonstrate acceptable validity criteria, they must also exhibit good discriminative, evaluative, and predictive properties. A discriminative instrument is designed to distinguish between individuals or groups at a single point in time, e.g., good and poor HRQL, and needs to demonstrate reliability. An evaluative instrument is used when one needs to measure change in HRQL over time e.g., as a result of an intervention, and needs to be responsive. A predictive instrument classifies individuals into a set of predefined measurement categories, e.g., alive or dead. Another key property

of both discriminative and evaluative instruments is interpretability, i.e., can the differences between subjects at a single point in time be identified by discriminative instrument as trivial, small, moderate, or large and can the changes within subjects over time be identified by evaluative instruments as trivial, small, moderate, or large?

## Statistical analyses

IPAQ data analysis for the as per guidelines [13].

1. The 'cleaned data' sheet (includes the changes in point 1 and) has been cleaned as per section 7.1 as follows: Patients 44, 51 and 52 were excluded because they gave answers for vigorous, moderate or walking activity as 'I don't know'
2. The 'max value outliers removed' sheet (includes the changes in points 1 and 2 and) has been cleaned as per section 7.2 as follows: patients 15, 23, 39, 42, 48, 57 and 81 were excluded because they had a total combined activity (vigorous +moderate +walking) of >16h/day
3. The 'min value outliers removed' sheet (includes the changes in points 1-3 and) has been cleaned as per section 7.3 as follows: there were no such cases.
4. The 'Truncation of data rules' sheet (includes the changes in points 1-4 and) has been cleaned as per section 7.4 as follows: there were no such cases.

The data analysis was conducted on the 'truncation of data rules' sheet as follows:

1. Patients were categorized as 'low' (<600 MET-min/week), 'moderate' (≥600 MET-min/week) or high (≥3000 MET-min/week) physical activity [we calculated the % of patients who were categorized as low, moderate or high]
2. Means and Standard deviations were calculated

The data was analysed by SPSS version 19.0. The results are expressed as means (± SD). The Pearson's Chi squared ($\chi^2$) was used to determine statistically significant associations of categorical variables. For quantitative variables, an unpaired t-test was used. For comparisons between groups, one-way ANOVA was used for analysis. Bonferroni's post hoc analysis was used for comparisons between specific groups. All tests were two-tailed and the level of probability taken as significance was 5% ($p<0.05$).

## Results

**Effect of age on qualitative data**

One hundred subjects (78 male and 22 female) were studied. The minimum age was 18 and maximum age was 60 (range 42 years). Mean age (± Standard Deviation) was 26.67 ± 9.93 years. Mean age for males was 26.09 ± 9.35 years. Mean age for females was 28.73 ± 11.76 years. Independent samples t-test showed no significant difference in age between both sexes (p=0.414).

Mean age (± Standard Deviation) of married subjects was 21.21 ± 3.92 years. Mean age of unmarried subjects was 22.19 ± 3.61 years. Independent samples t-test showed no significant difference in age between married subjects and unmarried subjects (p=0.529).

Mean age (± Standard Deviation) of subjects with a positive history of cardiovascular disease was 20.80 ± 3.75 years. Mean age (± Standard Deviation) of subjects with a negative history of cardiovascular disease 21.71 ± 3.86 years. Independent samples t-test showed no significant difference in age between positive and negative history of cardiovascular disease (p=0.435).

Mean age (± Standard Deviation) of subjects who were smokers was 20.14 ± 3.59 years. Mean age of subjects who were non-smokers was 21.92 ± 3.83 years. 23% of all our subjects were smokers. Independent samples t-test showed no significant difference in age between smokers positive and non-smokers (p=0.841).

Mean age (± Standard Deviation) of subjects with a history of healthy diet was 22.18 ± 3.52 years. Mean age (± Standard Deviation) of subjects with a history of unhealthy diet was 20.76 ± 4.07 years. Independent samples t-test showed no significant difference in age between history of healthy and unhealthy diet (p=0.208).

Table 1 shows the distribution of subjects by occupational in males & females. Most subjects were students or doctors.

**Table 1. Distribution of subjects by occupational in males & females (n=100)**

| | Female | | Male | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| Student | 14 | 63.6 | 53 | 67.9 |
| Doctor | 3 | 13.6 | 9 | 11.5 |
| Maintenance | - | - | 3 | 3.8 |
| Driver | - | - | 2 | 2.6 |
| Unemployed | 2 | 9.1 | 1 | 1.3 |
| Teacher | 2 | 9.1 | 6 | 7.7 |
| Secretary | 1 | 4.5 | - | - |
| Soldier | - | - | 1 | 1.3 |
| Banker | - | - | 1 | 1.3 |
| Policeman | - | - | 1 | 1.3 |
| Total | 22 | 100 | 78 | 100 |

**Data related to physical activity levels**

Subjects were from three countries from the GCC, namely Bahrain, Kuwait and Saudi Arabia. Table 2 shows the distribution of subjects by nationality in males & females measured by frequency and percentage. ANOVA analysis showed no significant difference between these three countries (p=0.209).

**Table 2. Distribution of subjects by nationality in males & females (n=100)**

| | Female | | Male | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| Bahrain | 9 | 40.9 | 43 | 55.1 |
| KSA | 8 | 36.4 | 30 | 38.5 |
| Kuwait | 5 | 22.7 | 5 | 6.4 |
| Total | 22 | 100 | 78 | 100 |

Pearson Chi-squared analysis of the IPAQ physical activity questionnaire for the three countries showed no significant difference in physical activity between these three countries' subjects ($\chi^2$ = 5.503, p=0.239). Table 3 shows the distribution of physical activity levels in different countries. The majority of the subjects (56%) had low physical activity levels, 34% had moderate levels while only 9% had high levels of physical activity.

**Table 3. Shows the distribution of physical activity levels in different countries (n=90)**

**Country * IPAQ Crosstabulation**

| | | | IPAQ | | | |
|---|---|---|---|---|---|---|
| | | | Low activity | Medium activity | High activity | Total |
| Country | Bahrain | Count | 27 | 15 | 6 | 48 |
| | | % within Country | 56.2% | 31.2% | 12.5% | 100.0% |
| | | % within IPAQ | 54.0% | 46.9% | 75.0% | 53.3% |
| | | % of Total | 30.0% | 16.7% | 6.7% | 53.3% |
| | KSA | Count | 20 | 11 | 2 | 33 |
| | | % within Country | 60.6% | 33.3% | 6.1% | 100.0% |
| | | % within IPAQ | 40.0% | 34.4% | 25.0% | 36.7% |
| | | % of Total | 22.2% | 12.2% | 2.2% | 36.7% |
| | Kuwait | Count | 3 | 6 | 0 | 9 |
| | | % within Country | 33.3% | 66.7% | 0.0% | 100.0% |
| | | % within IPAQ | 6.0% | 18.8% | 0.0% | 10.0% |
| | | % of Total | 3.3% | 6.7% | 0.0% | 10.0% |
| Total | | Count | 50 | 32 | 8 | 90 |
| | | % within Country | 55.6% | 35.6% | 8.9% | 100.0% |
| | | % within IPAQ | 100.0% | 100.0% | 100.0% | 100.0% |
| | | % of Total | 55.6% | 35.6% | 8.9% | 100.0% |

Pearson Chi-squared analysis of the IPAQ physical activity questionnaire for gender showed significant differences in physical activity ($\chi^2$ = 8.308, p=0.016). Table 4 shows the distribution of physical activity levels by gender. The majority of the subjects (56%) had low physical activity levels, 34% had moderate levels while only 9% had high levels of physical activity. Males had a higher percentage than females with low (62 vs. 33%) and high (10 vs. 5%) physical activity levels. However, females had a higher percentage than males with moderate (62 vs.28%) physical activity levels.

Pearson Chi-squared analysis of the IPAQ physical activity questionnaire for differences in marital status showed no significant differences in physical activity ($\chi^2$ = 1.131, p=0.568). Table 5 shows the distribution of physical activity levels by marital status.

**Table 4. Distribution of physical activity levels by gender (n=90)**

**Gender * IPAQ Crosstabulation**

| | | | IPAQ | | | |
|---|---|---|---|---|---|---|
| | | | Low activity | Medium activity | High activity | Total |
| Gender | Male | Count | 43 | 19 | 7 | 69 |
| | | % within Gender | 62.3% | 27.5% | 10.1% | 100.0% |
| | | % within IPAQ | 86.0% | 59.4% | 87.5% | 76.7% |
| | | % of Total | 47.8% | 21.1% | 7.8% | 76.7% |
| | Female | Count | 7 | 13 | 1 | 21 |
| | | % within Gender | 33.3% | 61.9% | 4.8% | 100.0% |
| | | % within IPAQ | 14.0% | 40.6% | 12.5% | 23.3% |
| | | % of Total | 7.8% | 14.4% | 1.1% | 23.3% |
| Total | | Count | 50 | 32 | 8 | 90 |
| | | % within Gender | 55.6% | 35.6% | 8.9% | 100.0% |
| | | % within IPAQ | 100.0% | 100.0% | 100.0% | 100.0% |
| | | % of Total | 55.6% | 35.6% | 8.9% | 100.0% |

**Table 5. Distribution of physical activity levels by marital status (n=90)**

**Maritalstatus * IPAQ Crosstabulation**

| | | | IPAQ | | |
|---|---|---|---|---|---|
| | | | Low activity | Medium activity | High activity |
| Maritalstatus | Unmarried | Count | 31 | 23 | 6 |
| | | % within Maritalstatus | 51.7% | 38.3% | 10.0% |
| | | % within IPAQ | 62.0% | 71.9% | 75.0% |
| | | % of Total | 34.4% | 25.6% | 6.7% |
| | Married | Count | 19 | 9 | 2 |
| | | % within Maritalstatus | 63.3% | 30.0% | 6.7% |
| | | % within IPAQ | 38.0% | 28.1% | 25.0% |
| | | % of Total | 21.1% | 10.0% | 2.2% |
| Total | | Count | 50 | 32 | 8 |
| | | % within Maritalstatus | 55.6% | 35.6% | 8.9% |
| | | % within IPAQ | 100.0% | 100.0% | 100.0% |
| | | % of Total | 55.6% | 35.6% | 8.9% |

Pearson Chi-squared analysis of the IPAQ physical activity questionnaire for history of cardiovascular disease showed significant differences ($\chi^2$ = 6.958, p=0.031). Table 6 shows the distribution of physical activity levels with for history of cardiovascular disease. Subjects with a positive history of cardiovascular disease showed more low physical activity levels relative to negative CVD history subjects (74 vs. 51%). Subjects with a negative history of cardiovascular disease showed more moderate physical activity levels relative to positive CVD history subjects (42 vs. 11%). A bar chart shows the distribution of physical activity levels with history of cardiovascular disease (Figure 1).

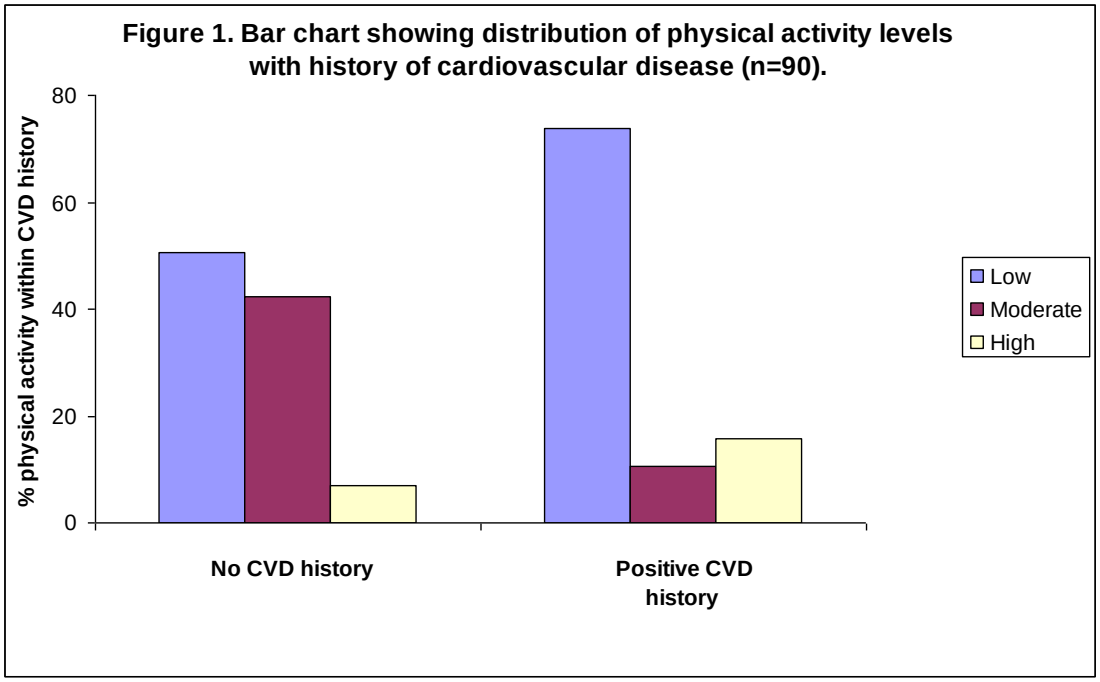


**Table 6. Distribution of physical activity levels with for history of cardiovascular disease (n=90).**

**CVDhistory * IPAQ Crosstabulation**

| | | | IPAQ | | |
|---|---|---|---|---|---|
| | | | Low activity | Medium activity | High activity |
| CVDhistory | No history | Count | 36 | 30 | 5 |
| | | % within CVDhistory | 50.7% | 42.3% | 7.0% |
| | | % within IPAQ | 72.0% | 93.8% | 62.5% |
| | | % of Total | 40.0% | 33.3% | 5.6% |
| | History | Count | 14 | 2 | 3 |
| | | % within CVDhistory | 73.7% | 10.5% | 15.8% |
| | | % within IPAQ | 28.0% | 6.2% | 37.5% |
| | | % of Total | 15.6% | 2.2% | 3.3% |
| Total | | Count | 50 | 32 | 8 |
| | | % within CVDhistory | 55.6% | 35.6% | 8.9% |
| | | % within IPAQ | 100.0% | 100.0% | 100.0% |
| | | % of Total | 55.6% | 35.6% | 8.9% |

Pearson Chi-squared analysis of the IPAQ physical activity questionnaire for history of smoking showed no significant differences ($\chi^2$ = 0.039, p=0.981).

Pearson Chi-squared analysis of the IPAQ physical activity questionnaire for history of healthy diet showed significant differences ($\chi^2$ = 6.836, p=0.033). Table 7 shows the distribution of physical activity levels for history of healthy diet. Subjects with a history of unhealthy diet showed greater low physical activity levels relative to healthy diet subjects (70 vs. 43%). Subjects with a history of healthy diet showed greater moderate (47 vs. 23%) and high (11 vs. 7%) physical activity levels relative to unhealthy diet subjects. A bar chart shows the distribution of physical activity levels with history of healthy diet (Figure 2).

**Figure 2. Bar chart showing distribution of physical activity levels with history of healthy diet (n=90).**

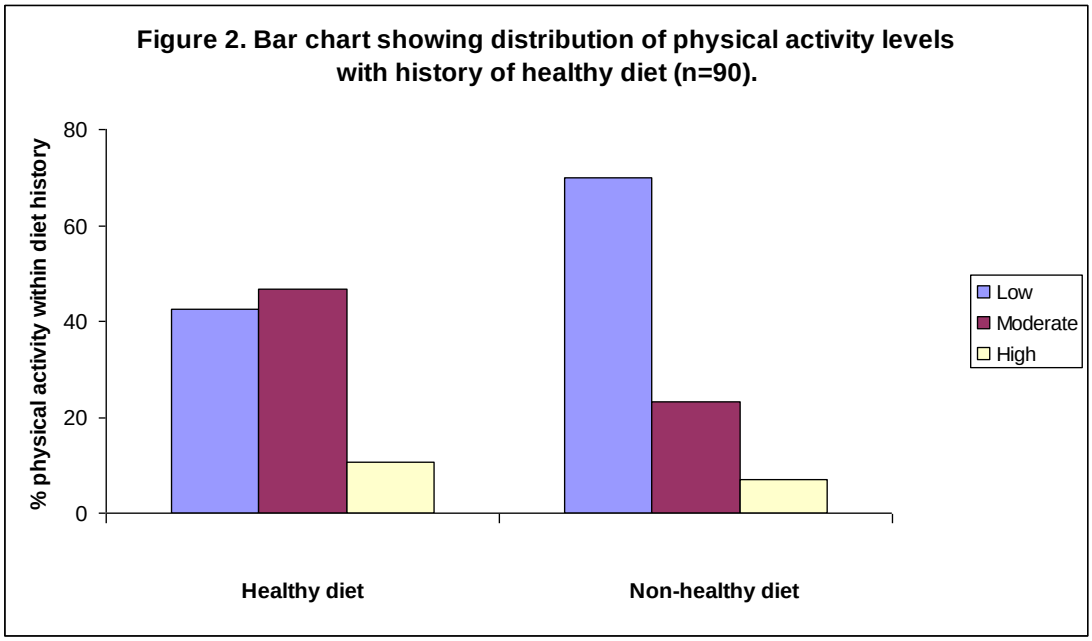


**Table 7. Distribution of physical activity levels with for history of healthy diet (n=90)**

**Diet * IPAQ Crosstabulation**

| | | | IPAQ | | | |
|---|---|---|---|---|---|---|
| | | | Low activity | Medium activity | High activity | Total |
| Diet | Healthy | Count | 20 | 22 | 5 | 47 |
| | | % within Diet | 42.6% | 46.8% | 10.6% | 100.0% |
| | | % within IPAQ | 40.0% | 68.8% | 62.5% | 52.2% |
| | | % of Total | 22.2% | 24.4% | 5.6% | 52.2% |
| | Non-healthy | Count | 30 | 10 | 3 | 43 |
| | | % within Diet | 69.8% | 23.3% | 7.0% | 100.0% |
| | | % within IPAQ | 60.0% | 31.2% | 37.5% | 47.8% |
| | | % of Total | 33.3% | 11.1% | 3.3% | 47.8% |
| Total | | Count | 50 | 32 | 8 | 90 |
| | | % within Diet | 55.6% | 35.6% | 8.9% | 100.0% |
| | | % within IPAQ | 100.0% | 100.0% | 100.0% | 100.0% |
| | | % of Total | 55.6% | 35.6% | 8.9% | 100.0% |

**Data related to health related quality of life (HRQL)**

Based on our result we found that there is no statistically difference between male and female in all HRQL domains. The independent samples (unpaired) t test values were p=0.57 for the MacNew global scale, p=0.56 for MacNew physical, p=0.39 for MacNew emotional and p=0.69 for MacNew social component. The results of the MacNew Questionnaire are shown in Tables 8 to 10. Although no significant differences were found, the values of HRQL were consistently higher for all three domains.

**Table 8. The result for Components of MacNew Questionnaire for all subjects (n=100).**

| Mean ± Standard Deviation | Components of MacNew Questionnaire |
|---|---|
| 5.32 ± 0.91 | Mac New Global |
| 5.71 ± 1.04 | MacNew Physical |
| 4.89 ± 0.90 | MacNew Emotional |
| 5.59 ± 1.13 | MacNew Social |

**Table 9. The result for Components of MacNew Questionnaire for all male subjects (n=78).**

| Mean ± Standard Deviation | Components of MacNew Questionnaire |
|---|---|
| 5.30 ± 0.92 | Mac New Global |
| 5.67 ± 1.11 | MacNew Physical |
| 4.85 ± 0.90 | MacNew Emotional |
| 5.56 ± 1.18 | MacNew Social |

**Table 10. The result for Components of MacNew Questionnaire for all female subjects (n=22).**

| Mean ± Standard Deviation | Components of MacNew Questionnaire |
|---|---|
| 5.42 ± 0.91 | Mac New Global |
| 5.82 ± 0.93 | MacNew Physical |
| 5.04 ± 0.94 | MacNew Emotional |

| | |
|---|---|
| 5.67 ± 0.97 | MacNew Social |

## Discussion

The major finding in this study was that subjects with a positive history of cardiovascular disease had significantly less physical activity levels relative to negative CVD history subjects. Likewise, subjects with a negative history of cardiovascular disease showed significantly more moderate physical activity levels relative to positive CVD history subjects. Therefore there is strong negative relationship between physical activity and cardiovascular disease history in our subjects. Regular physical activity decreases the risk of cardiovascular disease [14]. Physical activity is important for good health. In fact, people who are not active are almost twice as likely to have a risk of cardiovascular disease compared to those who are active. Our results show that our subjects' lack of physical activity is associated with a higher risk of CVD among both sexes.

In our research we found that the distribution of subjects was evenly distributed for the three countries. However, the distribution between the gender was such that there were less the female subjects than males. The results showed there was no significant difference in mean age between genders. Likewise, the independent samples t-test showed no significant difference in the ages of married subjects and unmarried subjects. Also, no significant differences in age between positive or negative history of CVD, between the smoking or non-smoking, and between history of healthy or unhealthy diet. From this, we concluded that age most probably would not be a confounding factor in this study.

Our study also showed a gender difference in physical activity. Males had lower physical activity than females, using the IPAQ data analysis. Our data also showed that subjects with a history of unhealthy diet showed lower physical activity levels relative to healthy diet subjects. This again is of great concern, as work by Al-Hazzaa et al. [14], showed Saudi adolescents had low physical activity levels and also poor diet, where by their subjects did not have a daily intake of breakfast , fruit, vegetables and milk.

Physical activity acts through many metabolic and other pathways which affect cardiovascular risk factors. It improves the plasma lipid profile, reduces body weight، lowers blood pressure, reduces platelet aggregation, increases fibrinolytic activity, improves cardiac function، improves cardio-respiratory fitness and lowers the resting heart rate. Recent research has supported our data. A study of approximately 3,000 subjects in Italy [15], concluded that physical activity was inversely related to cardiovascular disease mortality. Similarly, a recent study of approximately 24,000 male and female subjects from the United Kingdom showed the risk of cardiovascular disease associated with poor metabolic health was lower in those subjects those who were physically active [16]. Both these studies show that physical activity is important and sadly our study population of positive CVD history subjects are not paying heed to their history and instead of increasing their physical activity and improving their diet, their results are worse than the negative CVD history subjects.

The subjects were from three GCC countries namely, Bahrain, Kuwait and Saudi Arabia. Our study did not show any significant difference in physical activity between these three countries. The majority of the subjects 56% had low physical activity levels, 34% had moderate levels while only 9%

had high levels of physical activity. Bahrain showed more activity than the other two countries. Data of adolescents from Saudi Arabia also show a worrying trend of a high prevalence of sedentary behaviors, physical inactivity and unhealthy diet [14]. Although the authors state that these habits are a major public health concern among Saudi adolescents, we extrapolate these concerns to the whole GCC population. We strongly agree with them that there is a need for the GCC health and education ministries to urgently promote a physically active lifestyle with healthy eating behaviors among the whole GCC population.

With regard to the MacNew questionnaire, we found the MacNew physical was highest for both sexes; MacNew emotional for both sexes was the lowest while the MacNew Social for both sexes was in the middle. Based on the results we found that the male and female data were not statistically different between all the three domains (physical, emotional and social). However, the females' actual numerical values were higher in all domains. This might be due to females leading a healthier lifestyle than males. We think if the number of females in this sample was increased, then this might show a statistical difference relative to the male data. It was unclear why that the mean for the MacNew emotional was lowest in both components. There was no data available for healthy persons to compare to, so we can only postulate that there maybe a psychological deficit in our limited population. Testing on a larger scale could answer this question.

As we mentioned previously, at the time of the study there is no Arabic copy of the MacNew questionnaire and because of that we faced difficulty in collecting samples. When we compared our results with a study entitled "The Health Related Quality of Life Questionnaire in patient with Angina and patient with Ischemic Heart Failure" [17] we found that the MacNew global mean of our study was 5.32 for 100 samples, and the mean MacNew global of angina patient was 5.3 for 276 samples and the mean MacNew global of patients with ischemic heart failure was 5.1 for 155 samples, therefore our result was similar to angina patients and slightly higher than the ischemic heart failure patients.
Based on this result we think that the reasons for this similarity could be:

1. The MacNew questionnaire is not suitable for healthy people.
2. Or it may that the people in the GCC have an unhealthy life style leading to low healthy related Quality of life.
3. Or may the sick people who took part in this published study have a higher quality of life, as they already have had a diagnosed serious medical condition and they improved themselves by adopting a new and healthier lifestyle.

It could also be possible that our results are similar to diseased persons by a combination of the above ideas, and we have to wait until new data can be collected to make a conclusive statement.

## Recommendations

From the present study, we found the major points were that our subjects with a positive history of cardiovascular disease had significantly less physical activity levels relative to subjects with no history of cardiovascular disease and that subjects with a history of unhealthy diet showed lower physical activity levels relative to healthy diet subjects. From these findings, we recommend the following:

1. This research should be conducted on a larger scale, above the sample size we estimated, to get better results and more females should also be surveyed.

2. The results are of concern to health policy decision makers in the GCC, especially to persons in the Ministries of Health and Education.
3. GCC Health Ministries should be thinking of how to prevent such results increasing the morbidity and mortality of their citizens.
4. GCC Education Ministries should be also concerned as most subjects in this study (67%) were students and they showed poor health habits, diet and lifestyles. Schools should have programs to inculcate healthy living in children from the beginning, including more physical activity, better diets (by teacher instructions and shops/canteens/cafeterias serving healthy food) and better overall health education.

## References

[1] Al-Sarraj T, Saadi H, Volek JS, Fernandez ML. Metabolic syndrome prevalence, dietary intake, and cardiovascular risk profile among overweight and obese adults 18-50 years old. Metab Syndr Relat Disord. 2010;8:39-46.
[2] Al-Hazzaa HM. Prevalence of physical inactivity in Saudi Arabia: a brief review. East Mediterr Health J. 2004;10:663-70.
[3] Khattab MS, Abolfotouh MA, Alakija W, al-Humaidi MA, al-Wahat S. Risk factors of coronary heart disease: attitude and behaviour in family practice in Saudi Arabia. East Mediterr Health J. 1999;5:35-45.
[4] Musaiger AO, al-Roomi KA. Prevalence of risk factors for cardiovascular diseases among men and women in an Arab Gulf community. Nutr Health. 1997;11:149-57.
[5] Shaikh RB, Mathew E, Sreedharan J, Muttappallymyalil J, Al Sharbatti S, Basha SA. Knowledge regarding risk factors of hypertension among entry year students of a medical university. J Family Community Med. 2011;18:124–129.
[6] Abu-Omar K, Rutten A. 2008. Relation of leisure time, occupational, domestic, and commuting physical activity to health indicators in Europe. Prev Med 47:319-23.
[7] 7. Al-Hazzaa HM. 2007. Health-enhancing physical activity among Saudi adults using the International Physical Activity Questionnaire (IPAQ). Public Health Nutr 10:59-64.
[8] Amorim PR, de Faria RC, Byrne NM, Hills AP. 2006. Physical activity and nutritional status of children of low socioeconomic status. Two interrelated problems: undernutrition and overweight. Asia Pac J Clin Nutr 15:217-23.
[9] Lim LL-Y, Valenti LA, Knapp JC, Dobson AJ, Plotnikoff R, Higginbotham N, et al. A self-administered quality of life questionnaire after acute myocardial infarction. J Clin Epidemiol. 1993;46:1249-56.
[10] 10. Yu DS, Thompson DR, Yu CM, Oldridge NB. Validation of the Chinese version of the MacNew heart disease health-related quality of life questionnaire. J Eval Clin Pract.
[11] Höfer S, Saleem A, Stone J, Thomas RJ, Tulloch H, Oldridge N. The MacNew Heart Disease Health-related Quality of Life questionnaire in patients with angina amd patients with ischemic heart failure. Value in Health. 2012;15:147-50.
[12] Vandereyt F, Dendale P, Vanhees L, Roosen J, Höfer S, Oldridge N. Psychometric properties of the Flemish version of the MacNew Heart Disease Health-related Quality of Life questionnaire. Acta Cardiol. 2012;67:31-9.
[13] http://www.ipaq.ki.se/scoring.pdf
[14] Al-Hazzaa HM, Abahussain NA, Al-Sobayel HI, Qahwaji DM, Musaiger AO. Physical activity, sedentary behaviors and dietary habits among Saudi adolescents relative to age, gender and region. Int J Behav Nutr Phys Act. 2011;8:140. doi: 10.1186/1479-5868-8-140.
[15] Cicero AF, D'Addato S, Santi F, Ferroni A, Borghi C; Brisighella Heart Study. Leisure-time physical activity and cardiovascular disease mortality: the Brisighella Heart Study. J Cardiovasc Med (Hagerstown). 2012 Sep;13(9):559-64.
[16] Hamer M, Stamatakis E. Low-dose physical activity attenuates cardiovascular disease mortality in men and women with clustered metabolic risk factors. Circ Cardiovasc Qual Outcomes. 2012 Jul 1;5(4):494-9. doi: 10.1161/CIRCOUTCOMES.112.965434.
[17] Stefan Höfer, Atif Saleem, James Stone, Randal Thomas, Heather Tulloch, Neil Oldridge**.** The MacNew Heart Disease Health-Related Quality of Life Questionnaire in Patients with Angina and Patients with Ischemic Heart Failure. Value in Health 2012:15; 143-150.