

## PREVALENCE OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG BAHRAINI ADULTS : A PILOT STUDY

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### ABSTRACT

In Bahrain, circulatory system diseases are now the leading cause of death averaging 32% of all causes of death since 1982. An epidemiological survey comprising a random sample of 185 Bahraini adults (94 men and 91 women) aged 30-77 years was conducted as a first step to examine the current level of cardiovascular disease (CVD) risk factors. It was found that 15% and 10% of the subjects had a history of hypertension and diabetes, respectively. The prevalence of smoking was relatively high (31%), and more men were current smokers (39%) than women (23%). About 40% of subjects did not practice physical exercise (walking). The prevalence of obesity (BMI > 30) was high (32%) and women had a higher rate of obesity (49%) than men (29%). Of the subjects, 12% and 6.5% did not or rarely consumed fresh fruits and vegetables, respectively. It would appear that the prevalence of the known risk factors of CVD among the adult Bahraini population is high. This is a source of great concern and indicates the need for a comprehensive community survey to confirm these findings.

**Key Words :** Bahrain, diabetes, food frequency intake, hypertension, lifestyle, obesity, smoking.

### INTRODUCTION

The rapid socio-economic, demographic and behavioural changes in Bahrain over the last two decades have had a marked influence on health patterns in the community. While the incidence of infectious diseases have decreased remarkably, the incidence of non-communicable diseases have increased and have become the main public health problem in the country. Circulatory system diseases are the leading cause of morbidity and mortality in Bahrain (MOH, 1992). The death rates from diseases of the circulatory system, for those aged 50 years and older, have increased from 77 per 1000 in 1976 to 120 per 1000 in 1986. Deaths from these diseases occur as early as the 20-34 years age group and rise sharply thereafter (Musaiger, 1990).

There is no specific programme to prevent and control cardiovascular diseases (CVD) in Bahrain. This is mainly due to the

lack of information about risk factors affecting CVD in the country. Sharp contrasts among countries or among social groups within a country are often evident in the special or environmental conditions known to place population at risk for CVD (WHO, 1990). Investigation of such differences among populations or groups can be important information for determination of risk factors in childhood and adult population. Studies on risk factors for CVD are urgently needed to increase understanding of the known differences among various population.

The aim of this pilot study, was to determine the prevalence of some of the risk factors known to be related to CVD in Bahrain. Such information would be valuable as a baseline data for any further community-base study on CVD risk factors.

## **MATERIALS AND METHODS**

The subjects studied were Bahraini residents aged 30-77 years. A simplified general method for cluster-sample survey of health was used to select these subjects. (Bennett et al., 1991). Bahrain was divided into 100 blocks distributed in 10 geographical areas, and 15 blocks were selected for obtaining the subjects. Households were selected randomly from blocks taking into consideration the proportional distribution of the population in the geographical areas. Selected households were those which housed persons aged 30-79 years old. Only one person, either male or female, was selected from each household. The population studied was 185, of whom 94 were men and 91 women.

Subjects were interviewed at home by two trained female assistant researchers, using a pretested questionnaire, which include information on socioeconomic background, lifestyle, smoking, history of diabetes and hypertension, food habits and anthropometric measurements.

Anthropometric measurements include weight and height. Weight was measured without shoes and with minimal clothing to the nearest 0.2 kg using portable digital scales with a 130 Kg capacity. Height was measured without shoes to the nearest 0.1 cm using a portable stadiometer. Body mass index [weight (kg)/Height(m)<sup>2</sup>] was employed as a measure of obesity.

Data were first stored in Dbase files and analysed using EPI-INFO-5 programme (CDC/WHO, 1990). Odds ratios for association, Chi-square and confidence intervals for the odd ratios were calculated using the same programme.

## RESULTS

### Socio-economic status

The mean age of subjects studied was  $46.7 \pm 13.7$  years. The distribution of subjects by age and sex showed a higher prevalence of men aged 60 years and over compared to women (28.7% and 16.5% respectively). There were significant differences for age and sex in the sample studied ( $p < 0.01$ ) (Table 1).

The prevalence of illiteracy was high in subjects studied (40%), furthermore 19% could only read and write, making the overall low educational level (illiterate and those who only read and write) about half of the sample. Illiteracy was higher among women than men. In contrast higher education (secondary and above) was more observed among men. Winkleby et al. (1992) found that the relationship between socio-economic status measures and risk factors for CVD was strongest and most consistent for education, showing higher risk associated with lower levels of education.

As shown in many community studies in Bahrain, most women were not externally employed (93.4%), whereas employment status was 77% among men. The relatively high percentage of unemployment among men is due to the fact that 29% of men passed the retirement age (60 years and over). The patterns of marital status of subjects were very similar among both sexes, and the Chi-square value showed no significant association between these two variables (sex and marital status).

### Lifestyle

Four variables were measured to exhibit the lifestyle of subjects studied; walking, sedentary time spent at work, daily hours of watching television and smoking habits (Table 2). A significant association has been reported between men and women in relation to daily practising of walking ( $p < 0.03$ ). Of men, 67% practised walking compared to 51.6% of women. The relatively high percentage of subjects who practice walking may be due to the increase of health awareness among the public regarding the role of exercise in reducing the risk of several chronic illness. In the recent years, the mass media in Bahrain has intensively focused on the preventive measures to reduce the risk of heart diseases, and exercise has been always been given as an easy and less expensive measure to overcome these diseases.

Time spent sedentary at work and daily hours of watching television can provide a good picture about sedentary lifestyle of the population. As expected, men were less likely to spend their time at

TABLE 1  
Socio-demographic characteristics of Bahraini subjects by sex.

Factors	Male		Female		Total	
	No.	%	No.	%	No.	%
<b>Age (years)</b>						
30 - 39	35	37.2	33	36.3	68	36.8
40 - 49	15	16.0	26	28.6	41	22.2
50 - 59	17	18.1	17	18.7	34	18.4
60 >	27	28.7	15	16.5	42	22.7
<b>Education</b>						
Illiterate	30	31.9	45	49.5	75	40.5
Read & Write	10	10.6	10	11.0	20	10.8
Primary	15	16.0	14	15.4	29	15.7
Intermediate	6	6.4	5	5.5	11	5.9
Secondary	22	23.4	11	12.1	33	17.8
University	11	11.7	6	6.6	17	9.2
<b>Employment</b>						
Unemployed	22	23.4	24	26.4	46	24.8
Housewife	-	-	61	67.0	61	33.0
Employed	72	76.6	6	6.6	78	42.2
<b>Marital Status</b>						
Currently married	83	88.3	80	87.9	163	88.1
Not married	11	11.7	11	12.1	22	11.9
<b>TOTAL</b>	<b>94</b>	<b>100.0</b>	<b>91</b>	<b>100.0</b>	<b>185</b>	<b>100.0</b>

TABLE 2  
Distribution of Bahraini subjects by walking, time spent sedentary at work, hours of watching television and smoking.

	Male		Female		Total	
	No.	%	No.	%	No.	%
<b>Practicing walking</b>						
Yes	63	67.0	47	51.6	110	59.6
No	31	33.0	44	48.4	75	40.5
	p < 0.03 (OR = 1.9, 1.00-3.63)					
<b>Time spent sedentary at work</b>						
All time	34	36.2	85	93.4	119	64.3
More than half the time	4	4.3	-	0.0	4	2.2
Half the time	1	1.1	-	0.0	1	0.5
Less than half the time	13	13.8	3	3.3	16	8.6
Rarely	32	34.0	3	3.3	35	18.9
<b>Daily hours of watching TV</b>						
None	15	16.0	14	15.4	29	15.7
< 2 hours	35	37.2	27	29.6	62	33.5
2-3 hours	28	29.8	25	27.5	53	28.6
> 4 hours	16	17.0	25	27.5	41	22.2
<b>Smoking</b>						
Current smoker	37	39.4	21	23.1	58	31.4
Non-smoker	57	60.6	70	76.9	127	68.6
	p < 0.02 (OR = 2.2, 1.08 - 4.35)					

work being sedentary than women (36% and 93%, respectively). This is obviously due to low percentage of external employment among women. The recent population census in Bahrain (1992) showed that 93% of household have at least one television set. It has been shown that television occupied most of leisure time of the Bahraini population, especially females. Our result indicated that only 15.7% of subjects did not watch television, while the rest watch television between one to six hours daily. Women were more likely to watch television daily than men (27.5% and 17% of women and men watch television for more than four hours a day). Television viewing has been identified as a risk factor for childhood and adolescent obesity because spending long time in watching television reduce physical activity, as well as encourage the audience to eat snacks during watching (Gortmaker et al. 1990)

The prevalence of smoking among the adult population in Bahrain is lower than in most developed and many less developed countries. However, a secular trend of increasing cigarette smoking among Bahraini adults has been reported (Hamadeh et al., 1992). Findings of this study showed that the prevalence of smoking was higher among men than women, and the association was highly statistically significant ( $p < 0.001$ ). Of men, 40% were current smokers compared to 23% of women. Most women used the hubble bubble. Similar finding was confirmed in Bahrain (Hamadeh et al., 1992).

### **Obesity**

Although the precise role of obesity in the aetiology of CVD remains controversial (Sharpnel et al., 1992), obesity was found to be highly correlated to other risk factors for CVD such as diabetes and hypertension (NDC, 1991). The prevalence of obesity in our subjects was alarming as 33.7% were overweight (BMI 25-29.9) and 38.6% were obese (BMI > 30). Obesity occurred more among women than men. About 10% of women had severe obesity (BMI > 40) and the association between obesity and sex was highly statistically significant ( $p < 0.0001$ ) (Table 3).

### **History of diabetes and hypertension**

Diabetes and hypertension have been shown repeatedly to predict the development of CVD in adults. Our findings showed that the prevalence of diabetes was almost 3 times greater among women compared to men (14.3% and 5.3%, respectively). The association between sex and diabetes was statistically significant ( $p < 0.04$ ) (Table 4). Taking age into consideration, the prevalence of diabetes increased steeply with age and the trend was both similar in men and women. At age 30-39 none of the subjects reported a history of diabetes, but at age 40-49 years, the prevalence of diabetes was 6.7%

TABLE 3

Prevalence of obesity among Bahraini subjects by sex

Grade of obesity	Male No.	Male %	Female No.	Female %	Total No.	Total %
Underweight (BMI<20)	7	7.5	4	4.4	18	6.0
Normal (BMI 20-24.9)	32	34.4	8	8.8	40	21.7
Overweight (BMI 25-29.9)	28	30.1	34	37.4	62	33.7
Obese (BMI 30-39.9)	25	26.9	34	37.4	59	32.1
Severe obesity (BMI 40+)	1	1.1	11	12.1	12	6.5
<b>TOTAL</b>	<b>93</b>	<b>100.0</b>	<b>91</b>	<b>100.0</b>	<b>184</b>	<b>100.0</b>

**TABLE 4**

**Distribution of Bahraini subjects by history of diabetes and hypertension**

	Male		Female		Total	
	No.	%	No.	%	No.	%
<b>History of diabetes</b>						
Yes	5	5.3	13	14.3	18	9.7
No	89	94.7	78	84.7	167	90.3
p < 0.04 (OR = 0.34, 0.10 - 1.08)						
<b>History of hypertension</b>						
Yes	13	13.8	15	16.5	28	15.1
No	81	86.2	76	83.5	157	84.9
p < 0.6. (OR = 0.81, 0.34-1.95)						

TABLE 5

Distribution of Bahraini subjects by frequency intake of fresh fruits and vegetables.

	Male		Female		Total	
	No.	%	No.	%	No.	%
<b>Frequency intake of fruit *</b>						
None	16	17.0	6	6.6	22	11.9
Daily	51	54.3	61	67.0	112	60.5
4-6 per week	22	23.4	20	22.0	42	22.0
1-3 per week	5	5.3	4	4.4	9	4.9
<b>Frequency intake of vegetables **</b>						
None	10	10.6	2	2.2	12	6.5
Daily	55	58.5	71	78.0	126	68.1
4-6 per week	24	25.5	16	17.6	40	21.6
1-3 per week	5	5.4	2	2.2	7	3.8

\* N.S.

\*\* P &lt; 0.02

and 15.8% among men and women respectively. At age 50-59 years, the prevalence of diabetes in men decreased slightly to 5.9%, while that for women continued to increase to 29.4%. At age 60 years and over, the prevalence was doubled in men (11.1%), but slightly decreased in women (26.7%).

Hypertension was more prevalent among the subjects studied than was diabetes. The overall prevalence was 15%, and women (16.5%) have higher prevalence of hypertension than men (13.8%). However, there was no statistically significant association between sex and hypertension. Stratified analysis by age and sex showed that the prevalence of hypertension increased until age 59 and then slightly declined at age 60 years and over, particularly among women.

### **Frequency intake of fruits and vegetables**

A high intake of fruits and vegetables is thought to reduce the risk of CVD through several mechanisms, including lowering serum cholesterol and blood pressure levels (Sharpnel et al., 1992). The weekly intake of fresh fruits and vegetables by subject studied is given in Table 5. The daily intake of these foods were higher in women than men. A significant association between intake of vegetables and sex was found ( $p < 0.02$ ).

### **DISCUSSION**

Many factors that are known to contribute to the risk of developing CVD in western populations are prevalent among Bahraini adult population; however, the prevalence estimates for most risk factors were not similar for men and women. The importance of age and sex as cardiovascular risk factors should not be underestimated even though they cannot be modified. Several studies showed that the incidence of CVD increase significantly with age, and men have higher rates than women (Isles and Hole, 1992). These findings have been confirmed in Bahrain by recent statistics of the Ministry of Health. The death ratio of CVD is 3 to 1 for men and women respectively, and the death rate increased remarkably with age (MOH, 1992). The longer life expectancy of the Bahraini population has increased the risk of developing certain chronic illness such as CVD, diabetes and hypertension.

Physical activity and exercise have profound effects on the cardiovascular system, most of which are beneficial (Narthcote, 1992). Our findings revealed that more than half of subjects studied practised walking, and the rate was significantly higher among men and women. Nevertheless, we did not ask about the frequency of walking per day and the duration of daily walking in general and walking for exercise purposes. We suggest that in further studies, the

question of walking as well as for exercise should be more elaborated in order to get precise data about exercise habits in the community. However, we strongly believe that the phenomenon of exercise, especially walking has increased among adult population in Bahrain due to the increase in awareness and availability of places for practising such activity.

As in many other Arabian Gulf countries, the type of work of Bahraini inhabitants is mostly sedentary. Moderate and heavy work which need more muscular efforts are mostly practised by expatriates workers (Musaiger, 1987). The availability of car, housemaids, and electronic household appliances, in addition to long exposure to television all played an important role in diminishing the physical activity of Bahraini adults. This study showed that most of the population studied spent their time sedentary at work and watched television for at least two hours a day. This lifestyle will increase the risk of CVD, especially for those who have additional risk factors such as diabetes and hypertension.

The sedentary lifestyle and intake of high density foods may be the main causes of obesity in this part of the world. However, despite the fact that there is a well-established association between obesity and an increased cardiovascular risk profile, epidemiological studies relating obesity and CVD yield inconsistent results (Sharpnel et al., 1992). Obesity is however, highly associated with two major risk factors for CVD; diabetes and hypertension (NDC, 1991). Our data showed a high association between obesity on one side and diabetes and hypertension on the other side (not shown in tables).

Hypertension and diabetes are amongst the most common public health problems managed by physicians in Bahrain. It is well-documented that hypertension and diabetes continue to be major risk factors for CVD. The prevalence of these two diseases in our subjects was relatively high creating an urgent need for prevention strategies to control them. Diabetics develop long term complications such as CVD in this region at a rate similar to that reported in developed countries (Alwan, 1993).

In most countries where the incidence of CVD is high, cigarette smoking appears to be the most important risk factor for CVD. Recent evidence suggest that passive smokers may also be at risk (Isles and Hole, 1992). Hamadeh and McPherson (1993) found that smoking is one of the main factors that contribute to acute myocardial infarction (AMI) in Bahrain. The risk for AMI is doubled for smokers when compared to non-smokers.

It can be concluded that most risk factors that are known to be associated with CVD are highly prevalent among the adult

population in Bahrain. An epidemiological community-base survey is highly recommended to confirm the findings of this pilot study as well as to provide baseline data for any intervention programme to prevent and control CVD diseases in the country.

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