

## Epidemiological Study of Lipid Profile in Aldiwaniya Governorate

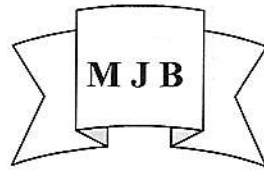
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### Abstract

During the past decade, numerous experimental and clinical studies have demonstrated that many common conditions predisposing to cardiovascular disease, such as hypercholesterolemia, hypertension, diabetes, and smoking. Thus a population-based study in Aldewaniya city was conducted in sera of 432 people (201 males, 231 females) randomly chosen to define the prevalence of various type of hyperlipidaemia and to establish the reference ranges of serum total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL) cholesterol, very low-density lipoprotein (VLDL) cholesterol, and high-density lipoprotein (HDL) cholesterol. People subjects to present study were classified into seven age groups (>20-<70 years). The prevalence of hyperlipidaemia was higher in females than males. TC, TG, LDL-cholesterol, and VLDL-cholesterol found to be associated with progressive of age. HDL-cholesterol found to be depleted with progressive of age.

### الخلاصة

في العقود الماضية اثبت في العديد من التجارب والدراسات السريرية بان العديد من الظروف الشائعة تؤدي إلى الأمراض الوعائية القلبية مثل فرط الكولسترول في الدم و ضغط الدم ومرض السكري والتدخين ، لذلك أجريت دراسة مجتمعية في مدينة الديوانية على أمصال 432 شخص (201 رجل ، 231 أنثى ) تم اختيارهم عشوائيا لتعيين مدى انتشار الأنواع المختلفة من فرط شحميات الدم ولمعرفة وتثبيت القيم المرجعية لكولسترول المصل الكلي (TC) وثلاثيات الكليسيريد (TG)، وكولسترول البروتين الشحمي واطيء الكثافة (LDL-C) ، وكولسترول البروتين الشحمي واطيء الكثافة جدا (VLDL-C)، وكولسترول البروتين الشحمي عالي الكثافة (HDL-C). صنف الأشخاص في هذه الدراسة إلى سبعة مجاميع عمرية 20 - < 70 .  
وجد انتشار فرط شحميات الدم عند النساء اعلى مما هو عليه عند الرجال ووجد ايضا ان الكولسترول الكلي وثلاثيات الكليسيريد وكولسترول البروتين الشحمي واطيء الكثافة وكولسترول البروتين الشحمي واطيء الكثافة جدا ترتفع مع تقدم العمر مع وجود بضعة استثناءات . بينما وجد بان كولسترول البروتين الشحمي عالي الكثافة يقل مع تقدم العمر .

### Introduction

One of the most common causes of death in the most countries in the world is cardiovascular disease. Hyperlipidaemia is one of its major risk

factors. (1,2) More than 961000 persons died from cardiovascular disease or stroke in 1998 and > 58 million Americans have one or more types of

stroke, and rheumatic heart disease (3). Some of the risk factors that can be modified to reduce the chances of developing cardiovascular disease are concentrations of LDL cholesterol, HDL cholesterol, and triacylglycerol. One method used to control the concentrations of plasma lipids is to limit the amount of dietary fat and to control the specific fatty acids consumed. (4)

Current clinical guidelines to estimate the risk of vascular disease attributable to serum lipid concentrations require measurement of total cholesterol (TC), triglycerides (TG), and HDL cholesterol, very low-density lipoprotein (VLDL) cholesterol, as well as calculation of LDL cholesterol and the total cholesterol/HDL cholesterol ratio. (5) The actual decision of whether therapy is necessary is determined on the basis of these values, as well as the presence of other risk factors such as age, sex, increased blood pressure, and whether there is evidence of coronary disease or diabetes. Necessarily, a considerable amount of information must be integrated to reach an appropriate decision. If treatment is decided, current practice is to measure or calculate all five lipid indices on each of the return visits. Again this information must be integrated to determine whether the therapy used has achieved the desired targets. Unfortunately, most patients do not reach their designated target lipid concentrations, although all the reasons for this fact have not been determined. One hypothesis that might partially explain this failure could be because both the patient and the doctor have to assimilate a considerable amount of information. If it were possible to reduce the number of indicators examined at follow-up after therapy had begun, the process might be more effectively executed. (6)

Clinical laboratories will be affected by the new updated guidelines

for prevention and management of high cholesterol in adults. Treatment efforts still focus primarily on treating LDL-cholesterol but include other important changes, including more effective lifestyle changes and considerable expansion of indications for drug therapy. (7)

In the present study, we try to define the prevalence of various type of hyperlipidaemia, and to establish the reference ranges of serum total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL) cholesterol, very low-density lipoprotein (VLDL) cholesterol, and high-density lipoprotein (HDL) cholesterol as well as fasting blood sugar, in Aldewaniya city because this variables is highly affected by lifestyle.

### Subjects and Methods

A descriptive population-based study was conducted and 432 people (201 males, 231 females) randomly chosen in Aldewaniya city were requested to participate in 2003. Aldewaniya is a large, homogeneous city, it is at an intermediate economic level. The participants were grouped into seven age groups (>20, 20-, 30-, 40-, 50-, 60-, < 70 years).

To measure the levels of TC, TG, HDL-cholesterol, LDL-cholesterol, and VLDL-cholesterol as well as fasting blood sugar all participants were asked to fast for 12-14 hours.

TC, TG, HDL-cholesterol was determined using commercially available kits (Biomegreb kit, Morocco). LDL-cholesterol, and VLDL-cholesterol was calculated using the following formula that developed previously (8), in which:

$$\text{TC} = (\text{HDL-cholesterol}) + (\text{VLDL-cholesterol}) + (\text{LDL-cholesterol})$$

{fasting}

and

$$\text{VLDL-cholesterol} = \text{TG} / 5$$

### Statistical Analysis

All values were expressed as mean  $\pm$  standard deviation (SD). Student's t-test was used to estimate differences between the groups and differences were considered significant when the probability was ( $p < 0.05$ ).

### Results

The distribution of the participants by age group is shown in Table 1.

**Table 1** Distribution of the participants by age and sex.

Age group (years)	Females	Males
> 20	25	25
20 -	41	30
30 -	26	27
40 -	30	23
50 -	37	30
60 -	46	45
< 70	26	21
Total	231	201

The mean,  $\pm$  SD for each serum lipids based on different age groups for males and females are shown in Table 2.

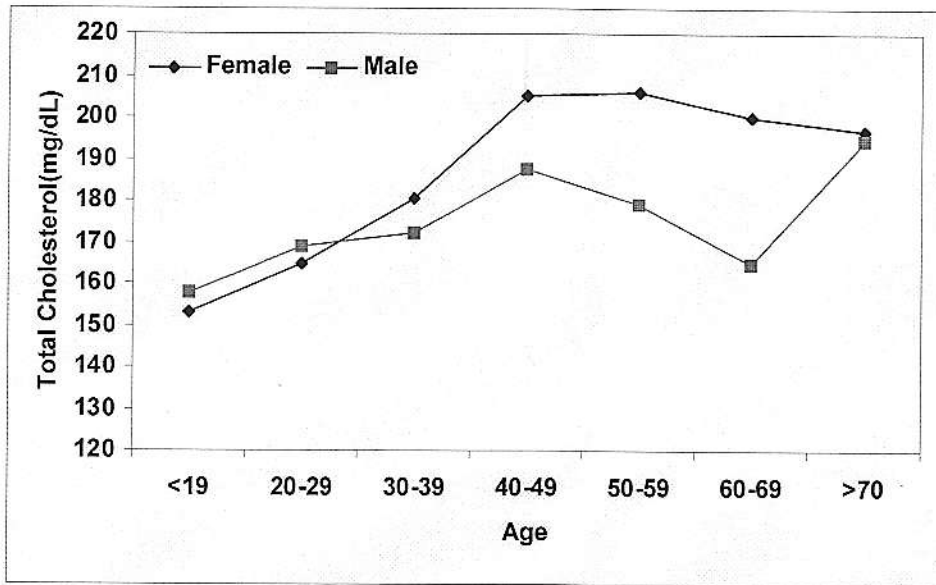
**Table 2** Mean  $\pm$  SD for serum lipids of the participants by age and sex.

Age group (years)	Females		Males		Prob.	Sign.
	Mean	SD	Mean	SD		
<b>Total cholesterol (mg/dL)</b>						
> 20	152.91	21.64	157.5	24.02	0.32	NS
20 -	164.61	25.07	168.84	22.63	0.33	NS
30 -	180.63	23.61	172	25.73	0.21	NS
40 -	205	47.36	187.28	36.04	0.15	NS
50 -	206.14	40.42	179.2	29.78	0.03	S
60 -	200	64.43	164.86	33.92	0.05	S
< 70	196.92	23.33	194.64	23.48	0.4	NS
<b>Low-density lipoprotein cholesterol (mg/dL)</b>						
> 20	80.28	27.14	85.11	25	0.32	NS
20 -	94.46	26.64	96.87	19.56	0.33	NS
30 -	108.34	24.64	101.96	29	0.21	NS
40 -	121.36	48.74	104.73	30.33	0.04	S
50 -	130.25	44.73	96.12	37.36	0.01	S
60 -	113.93	63.76	85.43	30.65	0.01	S
< 70	119.07	24.56	115.8	26.6	0.22	NS
<b>Very low-density lipoprotein cholesterol (mg/dL)</b>						
> 20	28.78	5.78	26.66	9.09	0.22	NS
20 -	30.31	6.4	30.47	5.32	0.47	NS
30 -	31.57	7.3	31.15	8.07	0.44	NS
40 -	40.95	11.34	34	9.8	0.03	S
50 -	36.25	9.44	37.23	16.38	0.22	NS
60 -	41.29	15.85	34.44	14.23	0.1	NS
< 70	35.91	12.98	37.56	13.67	0.36	NS
<b>High-density lipoprotein (mg/dL)</b>						
> 20	43.06	5.98	42.33	4.45	0.37	NS
20 -	40.5	5.96	41.06	3.76	0.38	NS
30 -	41	5.49	39.26	3.12	0.16	NS
40 -	40.05	6.14	41.8	5.3	0.20	NS
50 -	39	5.09	41.13	3.55	0.09	NS
60 -	41	3.77	38.13	4.33	0.03	S
< 70	41.5	3.58	38.93	4.21	0.04	S

Triglycerides(mg/dL)						
> 20	143.93	28.9	142.2	30.66	0.43	NS
20 -	151.56	32	147.52	32.28	0.36	NS
30 -	157.87	36.51	155.75	40.38	0.44	NS
40 -	204.76	56.72	170	49.01	0.03	S
50 -	181.29	47.22	197.81	69.48	0.22	NS
60 -	206.47	79.28	171	69.35	0.09	NS
< 70	179.58	64.91	182.61	69.85	0.44	NS

Total-cholesterol concentrations in sera of participants found to be associated with progressive of age, and

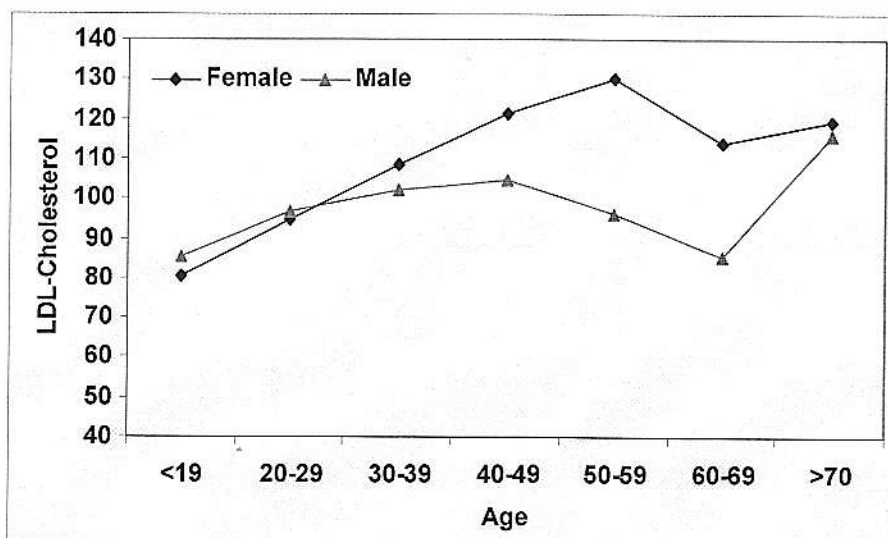
higher in females than males, as shown in Figure 1.



**Figure 1** Prevalence of total-cholesterol concentrations in Aldewaniya city

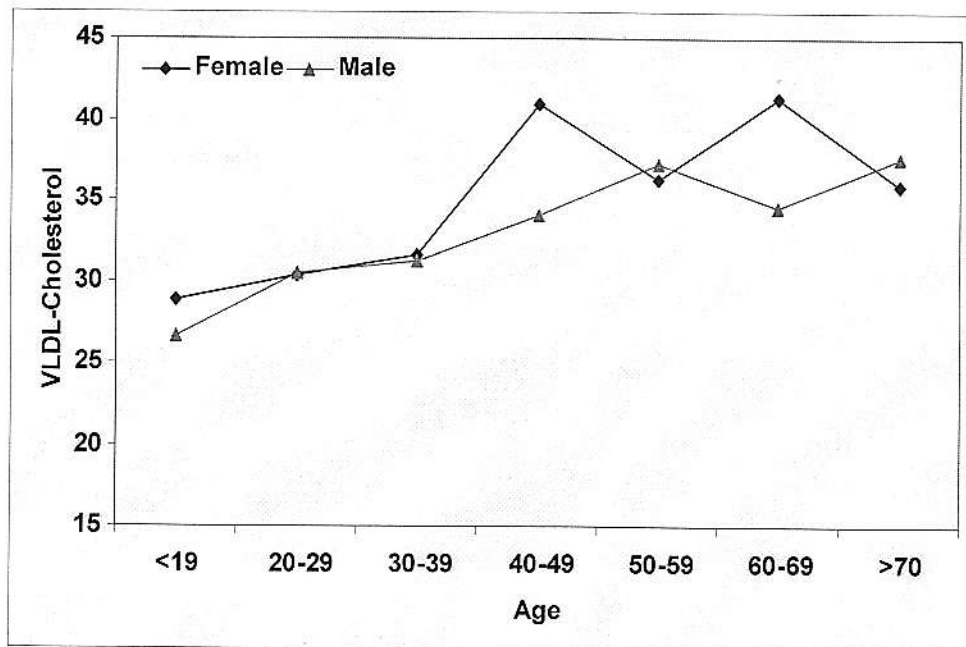
LDL-cholesterol concentrations in sera of participants found to be associated with progressive of age, and

higher in females than males, as shown in Figure 2.



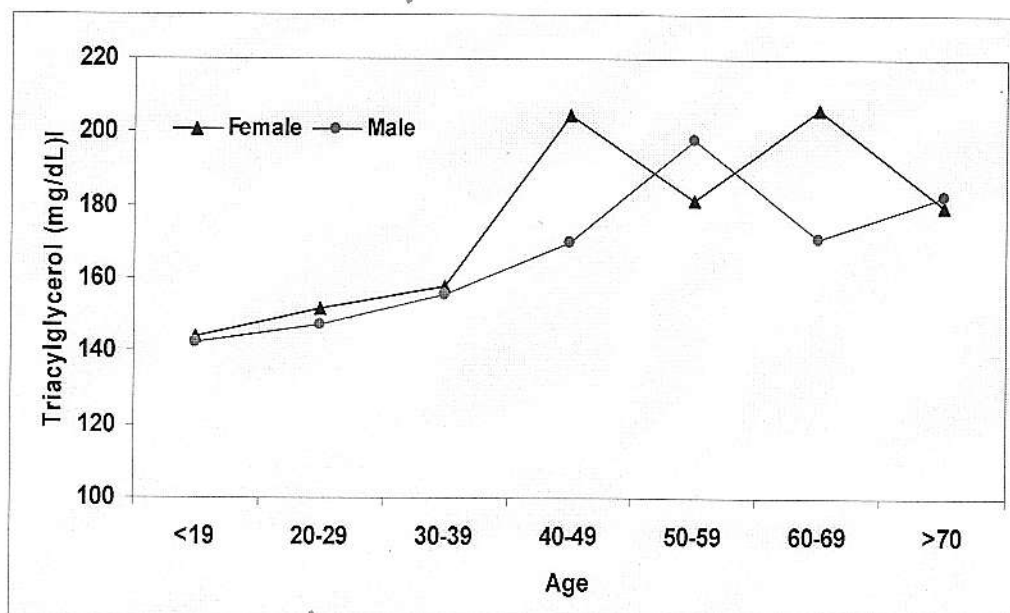
**Figure 2** Prevalence of LDL -cholesterol concentrations in Aldewaniya city

Also VLDL - cholesterol concentrations in sera of participants found to be associated with progressive of age, and higher in females than males, as shown in Figure 3.



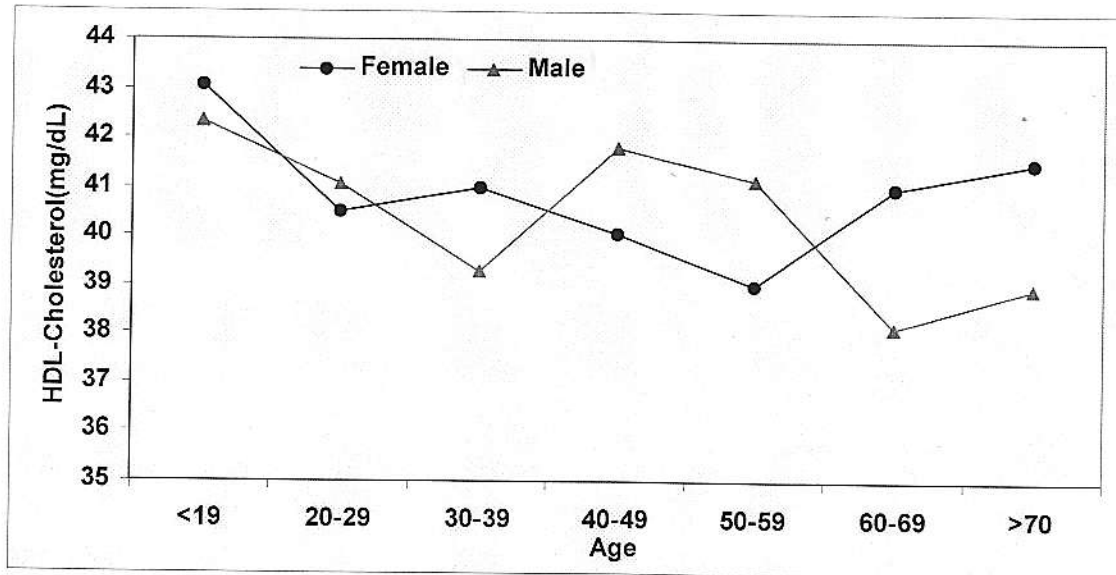
**Figure 3** Prevalence of VLDL -cholesterol concentrations in Aldewaniya city

TG concentrations in sera of participants found to be associated with progressive of age, and higher in females than males, as shown in Figure 4.



**Figure 4** Prevalence of TG concentrations in Aldewaniya city

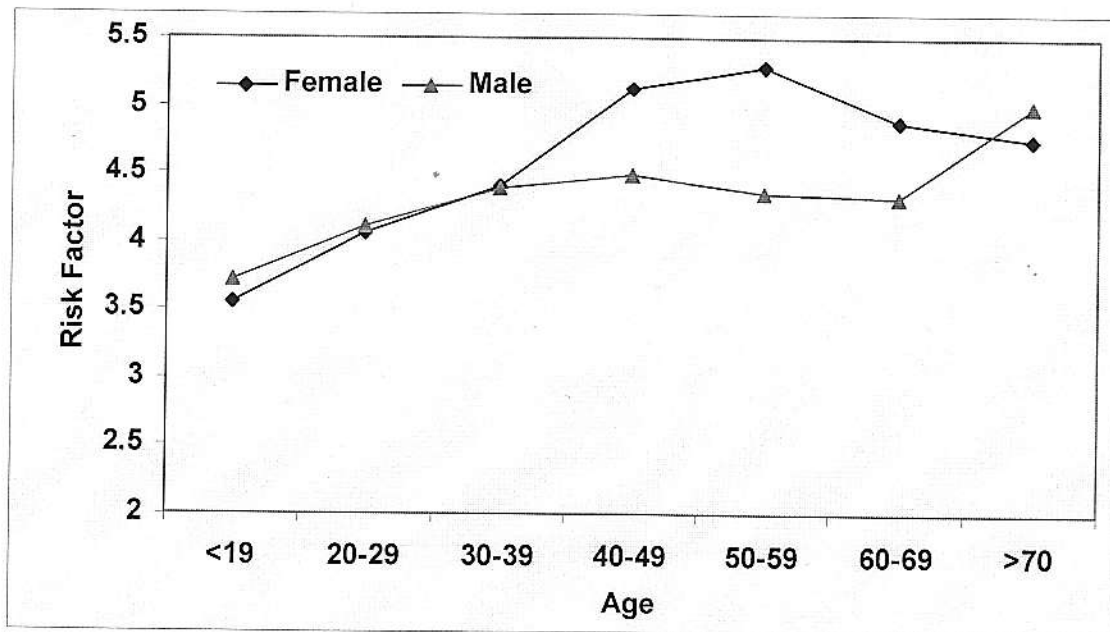
Whereas, HDL-cholesterol concentrations in sera of participants found to be decreased with progressive of age, as shown in Figure 5.



**Figure 5** Prevalence of HDL -cholesterol concentrations in Aldewaniya city

Risk factors that can be modified to reduce the chances of developing cardiovascular disease of participants

found to be associated with progressive of age, and higher in females than males, as shown in Figure 6.



**Figure 6** Prevalence of development of cardiovascular disease risk factor (total-cholesterol / HDL -cholesterol).

**Discussion**

It is estimated that more than 10 million people worldwide have familial hypercholesterolaemia. They constitute a unique population at high risk for the premature development of coronary

heart disease. Studies conducted prior to the availability of effective cholesterol lowering drugs have indicated that without treatment the mean age of onset of coronary heart disease in men with

this genetic disorder is around the age of 40 years, whereas it occurs 10-15 years later in women . The risk of a man with familial hypercholesterolaemia suffering a myocardial infarction is 5% below the age of 30 years, 50% by the age of 50 years and 85% by the age of 60 years. Corresponding values for women are less than 1% before age 30 years, 15% by age 50 years and 50% by the age 60 years.(9)

According to the present study, the mean value of TC increased with age in both sexes, except for females in the age group 60-69 and >70 ( $200 \pm 64.43$ ,  $196.92 \pm 23.33$  mg/dL) respectively and males in the age group 50-59 and 60-69 ( $179 \pm 29.78$ ,  $164.86 \pm 33.92$  mg/dL) respectively, as shown in Table 1 and Figure 1. Higher concentrations of TC can be explained by the higher dietary cholesterol intake in this age group, this results agree with earliest studies (1)

Persons at risk of cardiovascular disease should decrease their plasma concentrations of total and LDL cholesterol. Reducing dietary fat, especially saturated fatty acids\*, is an important recommendation for meeting this goal.(10-13)

The rate of increase in the mean concentration of TC varies considerably between different populations. This variation may depend more upon environmental factors, diet in particular, than on some inherent biological characteristics (14) Similar results have been found to the results of present study in Canadians (15), Iranians (1), Twinians (16), Americans, and in Asian Indians living in the United States.(17).

With few exceptions (30-39,60-69 and >70 age group), HDL-C mean concentrations were higher in males than females but not significantly, as shown in Table 1 and Figure 5 which is similar to those data of Iranians and Americans.(1) This may explain why the incidence of coronary heart disease is

greater in males than females in the age more than 60 year.(18)

In the present study some factors are different than other studies and we thought that the prevalence of different types of hyperlipidaemia was higher in females than males by the association between serum cholesterol and sex hormones like progesterone which have been reported. This issues responsible for the prevalence of different types of hyperlipidaemia. Higher concentrations of TC can be explained by the higher dietary cholesterol intake in this age group,(1) where diet is considered one of the most important environmental variables involved in the shaping of lipid profiles (10).

In contrast, the mean value of HDL- cholesterol concentrations decreased with age in both sexes, except for females in the age group 60-69 and >70 and males in the age groups 40-49 and 50-59 ,as shown in Table 1 and Figure 5.

Understanding the extent of the various risk factors of cardiovascular disease and their identification among different age groups is essential for effective prevention planning.(19) However, excessive high fat and cholesterol intake is associated with increased serum levels of total and LDL-cholesterol (20,21)

The serum TG concentration is affected by diet more than other lipids (22) ,this results may be due to a greater intake of carbohydrate such as bread , rice and sugar of tea in Aldewaniya society.

As shown in Figure 4, TG mean value increased with age. This increase could be a result of the increased prevalence of obesity by age which has been observed in Aldewaniya society. The results of present study is similar to those results obtained in Iranians and Americans (1)

LDL-cholesterol concentrations in sera of participants found to be

associated with progressive of age, and higher in females than males, as shown in Figure 2. Also VLDL-cholesterol concentrations in sera of participants found to be associated with progressive of age, and higher in females than males, as shown in Figure 3. This results is similar to those results obtained in Iranians and Americans (1)

Risk factors that can be modified to reduce the chances of developing cardiovascular disease of participants found to be associated with progressive of age, and higher in females than males, as shown in Figure 6.

The present study calls to attention the alterations of lipid profiles

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