Original article

Prevalence of Hypertriglyceridemia in Patients Attending Primary Heath Care Centers in, Majmaah, Saudi Arabia

Fahad Alfhaid

Department of Family Medicine, College of Medicine, Majmaah University, Majmaah 11952 ,Saudi Arabia
Correspondence author: Fahad Alfhaid, Email: f.alfhaid@mu.edu.sa,
Tel. 00966 562632662
Received on 18.9.2017; accepted on 3.3.2018

Abstract

Background: Hypertriglyceridemia (HTG) is a characteristic of several metabolic disorders like dyslipidemias, diabetes mellitus and metabolic syndrome.
Objectives: The study aimed to determine the prevalence of HTG among adult patients attending Primary Heath Care Centers in, Majmaah, Saudi Arabia and to determine its association with diabetes mellitus, obesity, physical activity and high-density lipoprotein (HDL).
Methods: The study was a descriptive cross–sectional. The participants were chosen from five primary health care centers in Majmaah, Saudi Arabia by systematic random sampling. The sample size was 353 participants. The data were collected by a structured and pre-tested questionnaire.
Results: The prevalence of HTG was 33.7%. There was a significant association between HTG and diabetes mellitus. The study showed a significant inverse association between HDL cholesterol and HTG, 46.8% of the participants had hypertriglyceridemia with low level of HDL. There was a significant association between hypertriglyceridemia and smoking, 22.9% of smokers had high level of Triglycerides.
Conclusion: The prevalence of HTG in patients attending Primary Heath Care Centers in, Majmaah was high (33.7%).

Keywords: Hypertriglyceridemia, smoking, high density lipoprotein, diabetes mellitus, Majmaah, Saudi Arabia

الملخص:

خلفية: ترتفع الدهون الثلاثية في عدد من الامراض اهما متلازمة الايض ومرض السكري وارتفاع الكولسترول

تهدف هذه الدراسة لمعرفة مدى انتشار ارتفاع الدهون الثلاثية لدى مراجعي مراكز الرعاية الصحية الأولية بمحافظة المجمعة وتحديد العلاقة بين الدهون الثلاثية من جهة ومرض السكري والسمنة والنشاط البدني والدهون عالية الكثافة من جهة أخرى

منهجية الدراسة: هذه دراسة مقطعية أجريت في مدينة المجمعة بالمملكة العربية السعودية. تم حساب عينة البحث لتبلغ ثلاثمائة وثلاثة وخمسون. تم جمع البيانات عن طريق الاستبيان وقياس الوزن والطول لتحديد معدل كتلة الجسم كما تم قياس نسبة الدهون الثلاثية والدهون عالية الكثافة بالدم.

النتائج: معدل انتشار ارتفاع الدهون الثلاثية بين البالغين الذين يترددون على مركز الرعاية الأولية بمحافظة المجمعة هو 33.7%. وجدت الدراسة ان هناك علاقة بين الإصابة بمرض السكري وارتفاع الدهون الثلاثية. وجدت علاقة عكسية بين ارتفاع الدهون الثلاثية والكوليسترول عال الكثافة حيث أن 46% ممن لديهم ارتفاع في الدهون الثلاثية ينخفض لديهم الكوليسترول عال الكثافة. وجدت الدراسة أيضا ان أكثر من 22% من المدخنين لديهم ارتفاع في الدهون الثلاثية.

الخلاصة: خلصت الدراسة ان نسبة انتشار ارتفاع الدهون الثلاثية لدى مراجعي مراكز الرعاية الصحية الأولية بمحافظة المجمعة 33.7.

Introduction

Hypertriglyceridemia (HTG) is defined as: "an increased level of plasma triglyceride above the ninety fifth percentile for age and sex "[1-2]. It is referred to as an abnormal concentration of triglyceride in the blood according to the National Cholesterol Education Program Adult Treatment Panel (NCEP ATP III) guidelines. A normal triglyceride level is 150 mg/dL [3]. HTG, which may be primary or secondary in nature, could occur by primary or secondary causes. The primary HTG is the result of genetic defects. Secondary HTG is caused by hypothyroidism, some medications, obesity and diabetes mellitus. HTG is associate with pancreatitis; up to 1 to 4% of acute pancreatitis is caused by HTG [4].

HTG is a characteristic of several metabolic disorders together with dyslipidemias, diabetes mellitus and metabolic syndrome, it is also a general risk for cardiovascular disorders (CVD) and increasingly important in the setting of current insulin resistance and obesity epidemics [5]. Postprandial hypertriglyceridemia can be crucial element for causing atherosclerosis [5]. Meta-analyses of hundreds of sufferers observed up for more than 10 years confirmed that a triglyceride elevation of 1 mmol/L increased threat of cardiovascular sickness by means of 32% in men and 76% in women [6]. This is because hypertriglyceridemia is suggested to lower the serum degree of excessive-density lipoprotein (HDL), at the same time as it will increase the remnant lipoproteins and small dense LDL (low density lipoprotein), these could result in thrombogenesis and promote atherosclerosis [7].

Hypertriglyceridemia is the most common lipid abnormalities among patients with chronic kidney disease(CKD). The concentration of triglyceride-lipoproteins begins to rise in early stages of CKD despite normal level of creatinine [8, 9]. HTG prevalence varies in different population, surveys conducted in the United States of America (USA) showed a prevalence of HTG as 33% and 30% respectively [10 - 12].

According to national health survey conducted in Saudi Arabia in 2008 to study coronary artery disease risk factors found HTG constituted 40.3% [13]. A study done in KSA found that HTG as a risk factor for coronary artery diseases was 49.6% and 65.4% in AL Qassim and Riyadh respectively. Another study found 39% among those patients [14,15]. Significant association between diabetes mellitus (DM) and HTG was shown in a study done in KSA [16]. According to an epidemiological study in KSA, serum triglyceride was higher among male obese patients [17]. The current study aimed to determine the prevalence of HTG among patients attending Primary Heath Care Centers in, Majmaah, Saudi Arabia and to study the association of HTG with diabetes mellitus, obesity, physical activity and high-density lipoprotein (HDL).

Materials and methods

This study is a descriptive cross–sectional, to determine the prevalence of HTG in patients attending Primary Heath Care Centers in Majmaah, Saudi Arabia. Five primary health centers (Al Majmaah, Hai Al-

matar, Alfaiha, Al Yarmok and Alfaisalya) were chosen randomly for the study. The Study population was male and female Saudi adults, between 20-70 years of age attending the selected primary health care Centers in Majmaah. The participants were chosen from the selected primary health care centers by systematic random sampling. The sample size was calculated as 353. The data were collected by a pre-tested questionnaire. A written informed consent was obtained from each respondent after obtaining the ethics approval.

The height and weight were measured to calculate the body mass index according to the formula {BMI = weight (kg)/height $(m)^2$}. The subject is considered overweight if it was between 25 to 29.9 and obese it was above 30. The serum triglyceride and HDL level were measured in the laboratory of King Khalid Hospital, Majmaah. The reference range for HTG is considered high if the serum triglyceride level is above 150 mg/dl (> 1.7 mmol/l).

The data were analyzed using SPSS 22.0. Mean ± SD was given for quantitative variables. Frequencies and percentages were done for qualitative variables. Pearson Chi-Square was applied to determine the associations between qualitative variables. A p-value of <0.05 was considered as statistically significant.

Results:

A total of 353 participants (46.5%) were males and (53.5%) were females, aged between 20-70 years, most of them (57.2%) were between 40-59 years of age as shown in table 1. Most of the participants (62.9%) were obese and 24.4% had history of dyslipidemia. The prevalence of HTG was 33.7%. Forty-six (41.4%) of participants who had high HTG had low level of HDL (P <0.001%). The study showed that there is a significant association between HTG and diabetes mellitus (P=0.001). Most participants with high TG had a long duration of tobacco smoking (p<0.001). The results showed no significant association between HTG and physical activity (p=.942). The results showed that 34.3% of participants with HTG consume fatty food and 33.8% were obese.

Table 1: Socio – demographic characteristics of patients

	n (%)		n (%)
PHC's		**Monthly Income**	
Alfasaliya	66 (18.7)	< 5000	165 (46.7)
Alfiha	25 (7.10)	5000 - 10,000	100 (28.3)
Alyarmook	67 (19.0)	10,001 - 15,000	80 (22.7)
Almajmaah	94 (26.6)	> 15,000	08 (2.30)
Almataar	101 (28.6)		
Age/ years		**Occupation**	
20 – 29	55 (15.6)	Government employee	121 (34.3)
30 – 39	54 (15.3)	Private employee	12 (12.4)
40 – 49	102 (28.9)	Business	10 (2.80)
50 – 59	100 (28.3)	Military	07 (2.00)
60 – 69	24 (6.80)	House wife	148 (41.9)
≥=70	18 (5.10)	Student	29 (8.20)
		Others	26 (7.40)
Gender		**Regular physical activity**	
Male	164 (46.5)	Yes	90 (25.5)
Female	189 (53.5)	No	263 (74.5)
Education Level		**Marital Status**	
Illiterate	93 (26.3)	Single	48 (13.6)
Primary	64 (18.1)	Married	273 (77.3)
Intermediate	53 (15.0)	Divorced	09 (2.50)
Secondary	56 (15.9)	Widow	23 (6.5)
University and Above	87 (24.6)		

Table 2: Risk Factors

Variables	n = 353	Percent
Smoking		
Yes	35	9.9
No	318	90.1
Diabetes		
Yes	122	34.6
No	231	65.4
Hypertension		
Yes	72	20.4
No	281	79.6
Dyslipidemia		
Yes	85	24.1
No	268	75.9
Coronary Artery Disease		
Yes	12	3.4
No	341	96.6
Metabolic Syndrome		
Yes	157	55.5
No	196	44.5

Table 3: Lipid Profile of patients

	n (%)		n (%)
BMI		Monthly Income	
Underweight	09 (2.50)	< 5000	165 (46.7)
Normal	44 (12.5)	5000 - 10,000	100 (28.3)
Over weight	78 (22.1)	10,001 - 15,000	80 (22.7)
Obese	222 (62.9)	> 15,000	08 (2.30)
LDL		Triglycerides	
Optimal	109 (30.9)	Desirable	162 (45.9)
Near optimal	105 (29.7)	Borderline high	72 (20.4)
Borderline	59 (16.7)	High	81 (22.9)
high			38 (10.8)
High	21 (5.9)	Very high	
Very high	59 (16.7)		
Cholesterol		HDL	
Desirable	315 (89.2)	Low	111 (31.4)
High	38 (10.8)	Average	160 (45.3)
		High	82 (23.2)

Discussion

The increasing prevalence of dyslipidemia has emerged as a global public fitness hassle, and the prevalence varies extensively according to the ethnic traits, socioeconomic status and cultural characteristics. In our study, the reported prevalence of HTG (≥150 mg/dl) was 33.7%. This prevalence shows that the prevalence of hypertriglyceridemia in patients attending Primary Heath Care Centers in Majmaah, Saudi Arabia is high comparing to international studies, but lower relative to most other local studies. The corresponding figure is 40.3% in Saudi Arabia [18-19]. This may be due to different life style and socioeconomic status in this city. In USA the prevalence is around 25% [20]. In Asia, the prevalence of HTG is reported to be 26.35% in Taiwanese aged 40-65 years of age and 29.3% in Malaysia [21,22]. Report from the Middle Eastern countries vary: 41.6% in Iraq, 35.3% in Lebanon, 30.4% in Turkey and 20.7% in Oman [23-26].

In our research, the gender -adjusted occurrence of HTG was higher for male (54.3%) than for female (45.7%), which may be related to the differences in the body mass index. Our results became in conformity with different studies, which additionally confirmed the prevalence of HTG is more in diabetic and smoker participants and inversely associated with HDL. Furthermore, a significant influence of these risk factors for coronary heart disease showed how importance the detection of HTG. This finding indicated that effective screen-

ing program for blood lipid levels should be implemented effectively in high risk group. Although our study shows no significant relation between physical activity and HTG, it is still important to encourage the physical activity as it shows positive effect in cardiovascular risk prevention [27]. The study recommends an urgent need for health educations program for promoting awareness of health care providers and public about HTG and to implement an appropriate community-based prevention strategy emphasizing the risks of HTG with behavioral changes, especially promoting physical activity

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