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# Total Cholesterol and Triglycerides in Unmarried Males and Females of Azad Jammu and Kashmir, Pakistan

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***Authors' contributions***

*This work was carried out in collaboration between all authors. Author SQ designed the study, performed the field work and wrote the protocol of the study. Author FA managed the analysis of the study and revised manuscript. Authors JK, AA, DS and MZA managed literature.*

***Original Research Article***

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## ABSTRACT

**Aim:** The current study was conducted to determine the total Cholesterol, Triglyceridesand BMI of unmarried males and females.
**Place and Duration of Study:** The study was conducted in District Bhimber, Azad Kashmir during June 2010 to December 2010.
**Methodology:** The blood samples were collected from the subjects and strip method was used for checking level of cholesterol and triglycerides. There were 300 subjects divided into males (150) and females (150). The subjects were further subdivided into three age groups, 16-25 (n=50), 26-35 (n=50) and 36-45 (n=50).
**Results:** The mean cholesterol level in male subjects of different age groups was 155.8mg/dl, 161.7mg/dl, and 148.9mg/dl, while in females the mean cholesterol level was 154.2mg/dl, 148.9mg/dl, and 155.3mg/dl, respectively. The mean triglyceride level in males was 106.6mg/dl, 113.6 mg/dl, and 167.3 mg/dl, and in females the mean triglyceride

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level was 96.3 mg/dl, 113.7 mg/dl, and 117.1 mg/dl, respectively. The mean blood pressure in male was 120/73mmHg, 122/79mmHg, and 124.5/77.5mmHg, and in females the mean blood pressure was 111/83mmHg, 117/75mmHg, 122/78mmHg, respectively. The mean BMI in males was 22.3kg/$m^2$, 22.6kg/$m^2$, and 20.9kg/$m^2$, and in females mean was 24.5kg/$m^2$, 22.6kg/$m^2$, and 25.6kg/$m^2$, respectively.
**Conclusion:** The current study established levels of SBP, DBP, Cholesterol, Triglycerides levels and BMI of different age groups of unmarried males and females.

*Keywords: Triglyceride; cholesterol; unmarried males and females.*

## 1. INTRODUCTION

The word 'Lipid' comes from the Greek word 'Lipos' which refers to animal fat or vegetable oil. Lipids are oily to touch and together with carbohydrates and proteins constitute the principal structural material of living cell [1,2]. Lipids are able to store more energy per gram of their mass than carbohydrates and proteins [3]. Lipids form membrane of body cell which serve to recognize several enzymes, transport food to cell and contain specific sites for hormones recognition [4]. Lipids hormones play a huge role in regulating metabolism [5]. Lipid profile is used to measure the total cholesterol, triglycerides, low density lipoprotein and high density lipoprotein [6].Cholesterol is a waxy steroid metabolite found in cell membrane and transported in blood plasma of all animals [7]. Cholesterol is building block for cell membrane and for hormones like estrogen and testosterone. About 80 percent of body's cholesterol is produced by the liver while rest comes from our diet. Dietary cholesterol comes from the meat, poultry, fish and dairy products. Organ meat such as liver are especially high in cholesterol content while foods of plant origin contain no cholesterol. After meal dietary cholesterol is absorbed from the intestine and stored in liver. The liver is able to regulate cholesterol level in blood stream and can secrete cholesterol if it is needed by body [8].

Low density lipoprotein (LDL) is called bad cholesterol, because elevated level of LDL cholesterol are associated with an increased risk of coronary heart disease. LDL deposits cholesterol on the artery wall causing the formation of hard, thick substances called cholesterol plaque. Overtime, cholesterol plaque causes thickening of artery walls and narrowing of arteries called atherosclerosis [9]. High density lipoprotein (HDL) is called good cholesterol because HDL cholesterol particles prevent atherosclerosis by extracting cholesterol from the artery walls and disposing off them through the liver. Thus high level of LDL and low level of HDL are risk factor for atherosclerosis [10].

Very low density lipoprotein (VLDL) are lipoprotein that carry cholesterol from liver to the organs and tissues in the body. They are formed by combination of cholesterol and triglycerides. VLDL are heavier than LDL and associated with atherosclerosis and heart disease [11].

Hypercholesterolemia is typically due to a combination of environmental and genetic factors (cite authority). Environmental factors include obesity and dietary choices. Genetic combinations are usually due to additive effects of multiple genes or may be due to a single gene defect as in FHC (Familial Hypertrophic Cardiomyopathy). Secondary causes exist including Diabetes Mellitus Type 2, Obesity, Alcohol, Hypothyroidism, Cushing's syndrome [12]. Abnormally low levels of cholesterol are termed as hypocholesterolemia. Causes of this

state are relatively limited but some studies suggest a link with depression, cancer and cerebral hemorrhage [13].

Triglycerides are chemical compounds digested by the body to provide it with energy for metabolism. Triglycerides are common form of fats that digest and are the main ingredient in vegetable oil and animal fat [14].

There are two sources of triglycerides in the body; dietary source and endogenous source that is manufactured within the body by liver [15]. Triglycerides provide the cells of the body the initial energy to perform the process of cellular respiration [16]. They provide some protection against shock, also provide thermal insulation. In food they provide flavour and are used as source of energy [17]. In human body high levels of triglycerides in the blood stream have been linked to atherosclerosis and by extension the risk of heart disease and stroke [14]. There was paucity of information on level of cholesterol, triglycerides and BMI of people of District Bhimber Azad Jammu and Kashmir therefore, current study was conducted to investigate Cholesterol, Triglycerides and BMI in unmarried males and females of District Bhimber.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

Bhimber is in the south of Azad Jammu and Kashmir. The district is bounded by Mirpur district to the northwest (and is 50 km from Mirpur city), and Punjab province in the west and south. It borders Indian occupied Kashmir in the east. The district is located between latitude: 32º-48º to 33º-34º and longitude: 73º-55º to 74º-45º and has an area of 1516 km². The population is around 350,000, with an annual growth rate of 2.6% and household size of 6.7. The main professions of the residents of Bhimber are agriculture, and large number of people are working abroad.

Summer temperature is often over 45ºC (May to September) and cold winter temperature ranges from 5º to 25ºC (November to February). Rain fall is concentrated in the monsoon from late June to end of August. The main diet includes products made from wheat flour such as bread, Chapatti, and other baked goods.

### 2.2 Study Design and Methodology

Unmarried males and females of District Bhimber Azad Kashmir were the subjects for blood sampling to assess their lipid profile in fasting condition. Two parameters were selected to assess the lipid profile (cholesterol and triglycerides). Both the parameters were analyzed using strip method [18]. A questionnaire regarding their personal information including diet, physically activity, diseases and age was filled by the subjects after convincing them. Before filling the questionnaire, the purpose of study was clearly explained to avoid the misunderstanding among the respondents and the researcher and also for removing the hesitation in giving the personal information about them for this purpose. The height, weight and BP of three hundred people (150 males and 150 females) in different localities age ranging from 16 to 45 years were measured. The blood was taken by pricking the finger with the help of blood lancet and was collected on strips. The blood was collected on soaking part of the strip and the strip was subjected to Glucose, Cholesterol and Triglyceride (GCT) meter and reading was noted. The level of cholesterols and triglycerides was checked in all

individuals using the same method. All the subjects (n=300) were further divided into three age groups (three groups of males and three of females) (group I ranging from 16-25, II ranging from 26-35 and III ranging from 36-45). The group average age, BP, weight, height, cholesterol, and triglycerides were recorded. Body Mass Index (BMI) was also calculated.

## 3. RESULTS

In group 1 of males ranging from age 16-25 (n=50), the mean systolic BP was 120mmHg while the diastolic BP was 80.3mmHg which showed the normal range of BP While mean of cholesterol was 155.8mg/dl and mean triglycerides was 106mg/dl. The mean BMI was 22.32kg/$m^2$ which indicated the normal weight. Similarly in group 2 of males ranging from 26-35 (n=50), the mean systolic and diastolic BP was 122mmHg and 79mmHg respectively. While the mean cholesterol was 161.7mg/dl and triglyceride was 113.6mg/dl. The mean BMI value was 22.62kg/$m^2$ which showed normal weight. Whereas, in group 3 of males ranging from age 36-45 (n=50), the mean systolic B.P is 124.5mmHg while diastolic BP was 77.5 mmHg, which shows the normal BP range. The mean cholesterol was 159.4mg/dl and triglyceride 167.3mg/dl. The triglyceride level was higher from than the normal value while cholesterol was normal. The mean BMI value was 20.88kg/$m^2$ (Table 1).

**Table 1. SBP, DBP, cholesterol, triglycerides levels and BMI of different age groups of males**

| Age group (Males) | AGE (Years) | SBP (mmHg) | DBP (mmHg) | Cholesterol (mg/dl) | Triglycerides (mg/dl) | BMI (Kg/$m^2$) |
|---|---|---|---|---|---|---|
| | Mean | Mean ± SEM | Mean ± SEM | Mean ± SEM | Mean ± SEM | Mean ± SEM |
| 16-25 | 20.5 | 120±8.5 | 80.3±10 | 155.8±13.3 | 106±67.2 | 22.3 ±2.9 |
| 26-35 | 30.5 | 122±6.3 | 79±5.0 | 161.7±18.1 | 113.6±19.8 | 22.62±1 |
| 36-45 | 40.5 | 124.5±8.8 | 77.5±5.4 | 159.4±50.4 | 167.3±56.6 | 20.88 ±1 |

In group 1 of female ranging from 16-25years (n=50), the mean systolic BP was 111mmHg while the mean diastolic BP was 81mmHg. Similarly the mean cholesterol was 154.2mg/dl while the mean triglyceride level was 96.3 mg/dl both values were normal. The mean BMI was 24.47kg/$m^2$. In group 2 of female ranging from 26-35 years (n=50), the mean systolic BP was 117mmHg while the mean diastolic BP was 75mmHg. The mean cholesterol level was 148.9mg/dl and mean triglyceride is 113.7mg/dl. The cholesterol level was below the normal value in this age group. The mean BMI was 22.60kg/$m^2$. Whereas, in female of age group 3 ranging from the 36-45years (n=50), the mean systolic B.P was 122 mmHg and diastolic B.P was 78mmHg. The mean cholesterol was 155.3mg/dl and triglyceride was 117.1 both values were normal. The mean BMI was 27.60kg/$m^2$ which showed that people of this age group were overweight (Table 2).

**Table 2. SBP, DBP, cholesterol, triglycerides levels and BMI of different age groups of females**

| Age group (Females) | AGE (Years) | SBP (mmHg) | DBP (mmHg) | Cholesterol (mg/dl) | Triglycerides (mg/dl) | BMI (Kg/$m^2$) |
|---|---|---|---|---|---|---|
| | Mean | Mean ± SEM | Mean ± SEM | Mean ± SEM | Mean ± SEM | Mean ± SEM |
| 16-25 | 20.5 | 111±3.8 | 81±5.9 | 154.2±3.9 | 96.3±32.0 | 24.47±1.3 |
| 26-35 | 30.5 | 117±7.9 | 75±5.7 | 148.9±4.2 | 113.7±51.3 | 22.60±1.5 |
| 36-45 | 40.5 | 122±8.9 | 78±2.4 | 155.3±9.0 | 117.1±46.4 | 27.66±1.0 |

## 4. DISCUSSION

The lipid profile is a group of tests that are often assessed together to determine risk of coronary heart disease. These are good indicators whether someone is likely to have a heart attack or stroke caused by blockage of blood vessels or hardening of the arteries (atherosclerosis) [19]. There is positive correlation between SBP or DBP and BMI. Mean BP levels increase with increasing BMI categories. The risk of hypertension is higher among population groups with overweight and obesity. It is also possible that populations with very low BMI levels could have an increased risk of hypertension [19]. In Pakistan it is found that housewives are under more stress compared to working women. The main contributory factor is their confinement in the house. In case of serum lipid concentrations, housewives have high level of total cholesterol, LDL - cholesterol and triglycerides compared to working women. The health status of women in Pakistan is directly linked to women's low social status. Poverty has an adverse effect on women's health [20].

Results of current study show that the level of cholesterol in people of District Bhimber Azad Kashmir in different age groups is almost normal. There is difference in levels of cholesterol in different age groups but is high in $2^{nd}$ age group (26-35) of males but the level of cholesterol is normal. There are lesser chances of hypercholesterolemia and Atherosclerosis. Similarly, results of $2^{nd}$ age group (26-35) of females show that the cholesterol level is low as compared to the other age groups. In this age group cholesterol level is significantly lesser than the normal level. There are chances of hypocholesterolemia in this age group. The main reason for the low level of cholesterol is the malnutrition, depression due to inadequate life style and socioeconomic issues.

The increase or decrease in the normal level of triglycerides also cause diseases. Hypertriglyceridemia is caused due to high blood levels of triglycerides, the most abundant fatty molecule in most organisms. It has been associated with atherosclerosis, even in the absence of hypercholesterolemia (high cholesterol levels). It can also lead to pancreatitis in excessive concentrations. Our results showed that the level of triglycerides in people of district Bhimber are normal with the exception of age group (36-45) of males which have the high level of triglyceride as compared to the normal level due to bad dietary habits. It may also be as a result of Diabetes mellitus.

According to study [2] conducted on college male students in Riyadh, Saudi Arabia, mean HDL, LDL and TG did not differ significantly among different groups at 5% level of significance. There is positive, statistically non-significant correlation between age and BMI. The correlation between age and all lipid parameters were statistically non-significant. There is positive correlation between BMI and TC and LDL, while there is a negative correlation between BMI and HDL. There is no correlation between BMI and triglycerides [2].

The results of Body Mass Index (BMI) are normal according to the current study although there is slight difference between age groups. The maximum BMI (25.60kg/$m^2$) measured in age group (36-45) of females and minimum (20.88kg/$m^2$) in age group (36-45) of males indicating that females of District Bhimber Azad Kashmir are healthy as compared to men.

## 5. CONCLUSION

The current study established levels of SBP, DBP, Cholesterol, Triglycerides levels and BMI of different age groups of unmarried males and females of district Bhimber Azad Jammu and Kashmir, Pakistan.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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