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**Article: Prevalence of Dyslipidemia in Apparently Healthy Population of Dera Ismail Khan, Pakistan**

**Author(s):** Shamsher Ullah<sup>1</sup>, Sher Zaman Safi<sup>2</sup>, Muhammad Akbar Shah<sup>3</sup>, Nawshad Muhammad<sup>4</sup>

**Affiliation:** <sup>1</sup>Department of Chemistry, Postgraduate College Bannu, Khyber Pakhtunkhwa, Pakistan  
<sup>2</sup>Interdisciplinary Research Center in Biomedical Materials, COMSATS University Islamabad, Pakistan  
<sup>3</sup>Department of Medicine Unit D, Khyber Teaching Hospital Peshawar, Khyber Pakhtunkhwa, Pakistan.  
<sup>4</sup>Institute of Basic Medical Sciences, Khyber Medical University Peshawar, Pakistan

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## Indexing



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## Prevalence of Dyslipidemia in Apparently Healthy Population of Dera Ismail Khan, Pakistan

Shamsher Ullah<sup>1</sup>, Sher Zaman Saffi<sup>2</sup>, Muhammad Akbar Shah<sup>3</sup>,  
Nawshad Muhammad<sup>4\*</sup>

<sup>1</sup>Department of Chemistry, Postgraduate College Bannu, KP, Pakistan

<sup>2</sup>Interdisciplinary Research Center in Biomedical Materials,  
COMSATS University Islamabad, Lahore Campus, Lahore, Pakistan

<sup>3</sup>Department of Medicine Unit D,  
Khyber Teaching Hospital Peshawar, KP, Pakistan

<sup>4</sup>Institute of Basic Medical Sciences,  
Khyber Medical University Peshawar, Pakistan

\* [nawshadchemist@yahoo.com](mailto:nawshadchemist@yahoo.com)

### Abstract

*Dyslipidemia and its high prevalence in patients with hypertension and other non-communicable diseases is increasing day by day. The current study aimed to highlight the presence of dyslipidemia via lipid profiling in the apparently healthy population of Dera Ismail Khan, Khyber Pakhtunkhwa, Pakistan. This study recruited 150 individuals who were apparently healthy and had no previous records of hyperlipidemia. Blood plasma samples were collected aseptically from healthy individuals to determine their lipid profile. Total cholesterol (TC) level, high density lipoprotein cholesterol (HDL-C) level, triglycerides (TG), and low-density lipoprotein cholesterol (LDL-C) level were determined. The age of the 150 healthy subjects ranged between 20-70 years. Mean plasma level of TC was  $166.4 \pm 28.45$  mg/dl, HDL-C was  $48.34 \pm 8.79$  mg/dl, LDL-C was  $87.42 \pm 29.82$  mg/dl, and TG were  $151 \pm 65.92$  mg/dl. TC and HDL-C levels were in the appropriate range. LDL-C level was below 100 mg/dl. The triglyceride (TG) level was recorded above the upper limit. The alarmingly high prevalence of TC in the healthy population may be an indication of underlying health issues. It also reflects their unhealthy dietary pattern and poor lifestyle. Thus, it is recommended that a community based epidemiological survey should be conducted to identify the causes of high total cholesterol (TC), since the resultant data will help authorities devise future plans to curb dyslipidemia and its related complications.*

**Keywords:** cholesterol, dyslipidemia, lipid profile, lipoproteins

### Introduction

Lipoprotein unbalance is known as dyslipidemia, it causes an increase in total cholesterol (TC) level, increase in low-density lipoprotein cholesterol (LDL-C) or triglycerides (TG) level, or low levels of high-density lipoprotein cholesterol (HDL-C) [1]. Dyslipidemia is reportedly associated with coronary heart disease (CHD) and its pathogenesis [2]. Asians, particularly Indians, have a high prevalence and risk of dyslipidemia. It is reported between 10-70% of the South Asian population [3]. In 19-30 % of the population of Pakistan, dyslipidemia is a major cause of stroke [4]. Ischemic heart disease (IHD), angina pectoris, and myocardial infarction (MI) are also becoming prevalent due to hyperlipidemia [5]. A study reported that 39% of Pakistanis above the age of 18 have dyslipidemia [6]. Dyslipidemia is listed as one of the risk factors for coronary artery disease (CAD) in South Asians. The highest rate of CAD is reported in South Asian countries [7]. Dyslipidemia in women is higher than what is reported in men.

Its related risk factors are increased due to Body Mass Index (BMI), age, and fasting blood sugar. Most dyslipidemia patients are asymptomatic and are unaware of their condition. Where dyslipidemia has a high prevalence, its awareness is very low among the public [8]. HDL-C, which is known as good cholesterol, is the main cause of heart diseases when its level decreases in the blood. Level of HDL-C lower than 25 mg/dl increases the risk of heart attack even if the cholesterol level is normal, that is, 200 mg/dl [9]. The level of HDL-C is alarmingly high in the subcontinent. Its level ranges between 35-38 mg/dl. It increases the risk of heart attack by narrowing and hardening the blood vessels [9]. An unhealthy lifestyle such as fatty food and lack of physical activity contributes to the development of dyslipidemia. The marked difference in diet and lifestyle of urban and rural areas is evidence of how lifestyle affects the lipid profile. Urban citizens are reported to have high serum lipid than rural citizens [10].

In Pakistan during 2016, 58% of deaths occurred due to non-communicable diseases, out of which 25% were premature deaths between the ages of 32-70 years. This decline poses a great socioeconomic burden

and causes a decline in family well-being. The high intake of dietary factors like salt and fat are considered major contributors of these premature deaths [11].

Many studies have reported a higher prevalence of dyslipidemia in the Pakistani population [12, 13]. A study reported that 50.7% of 1000 individuals who were evaluated for a lipid profile showed abnormalities in TG, TC, LDL-C and HDL-C levels [14]. In hypertension patients of Khyber Pakhtunkhwa province of Pakistan, the prevalence of dyslipidemia was 28% [15].

Keeping in view the harmful effects of dyslipidemia and its high prevalence in patients with hypertension and other non-communicable diseases. This study aimed to study via lipid profiling dyslipidemia in the healthy population of Dera Ismail Khan, a city in the province of Khyber Pakhtunkhwa of Pakistan.

## 2. Methodology

### 2.1. Study design

In this cross-sectional study, 150 individuals, who were apparently healthy and had no previous records of hyperlipidemia, were recruited from Dera Ismail Khan City and its adjoining areas in Khyber Pakhtunkhwa, Pakistan. Written consent to participate in this study was obtained from all the individuals. The age, gender, and information about other abnormalities of all the participants were recorded on a proforma. Blood plasma samples were collected aseptically from healthy individuals to determine their lipid profile.

### 2.2. Inclusion and Exclusion Criteria

The participants with regular therapy for the ailments such as diabetes mellitus, heart diseases, hypertension, cancer, and pregnancy were excluded. Patients with renal failure and those patients who were on any steroid therapies or herbal medications were also excluded.

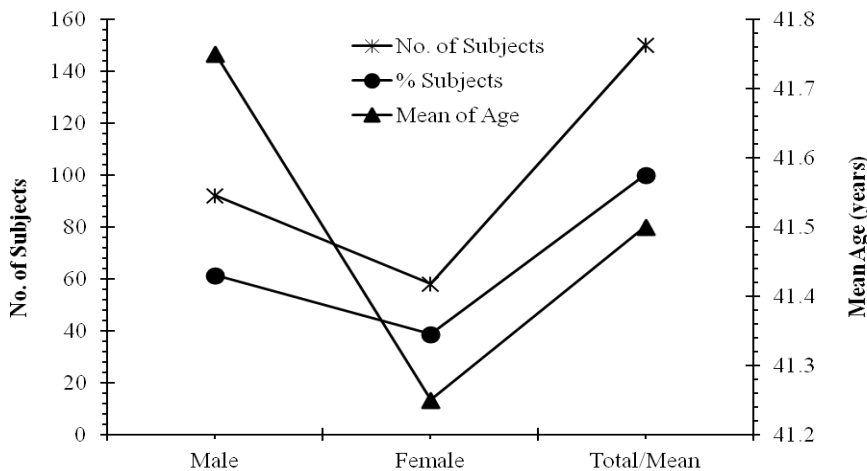
### 2.3. Serum Lipid Profiling

This study carried out lipid profiling by using methodology previously used by Inayat et al. It was applied with slight modification (15. 5cc of blood was

collected aseptically from all patients). To determine plasma lipid profile via RANDOX Kit (RANDOX Laboratories Ltd), a Digital Microlab Photometer (300-Merk) was used. The enzymatic endpoint method utilizing Kit Cat., No., CH 201 was carried out to determine the plasma total cholesterol (TC). The level of HDL-C in plasma was determined using the CHOD-PAP method with Kit Cat, No. CH 203, while Kit Cat., No. TR 212 was used to determine the plasma TG via the GPO-PAP method. The Friedewald equation was used to calculate the plasma LDL-C, where the concentration did not exceed 390 mg/dl, i.e.  $LDL-C = TC - HDL - TG/5$  mg/dl. [16]. All the frequencies were calculated using Microsoft excel.

### 3. Results

A total of 150 healthy individuals were recruited in this study according to the defined inclusion and exclusion criteria. Of the total 150 participants, 92 (61.33%) were males and 58 (38.66%) were females. The mean ages of all participants were 41.5 years. The overall distribution of gender and mean age of the sample population is shown in figure 1.



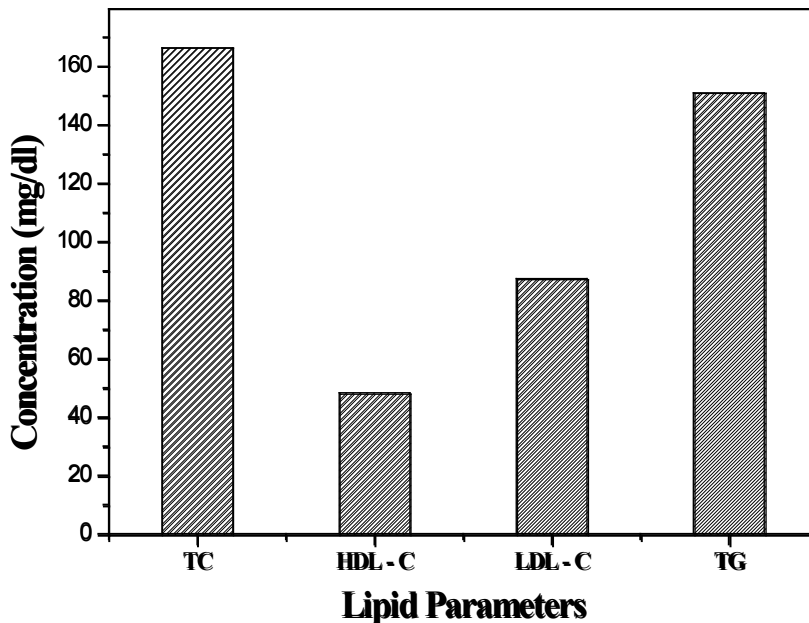
**Figure 1.** The overall distribution of age and gender of 150 participants of the study. The mean age was 41.5 years. (2 participants were male and 52 were female)

The age of participants was between 20 to 70 years. Out of the 150 participants, there were 41 participants whose age ranged between 20-30

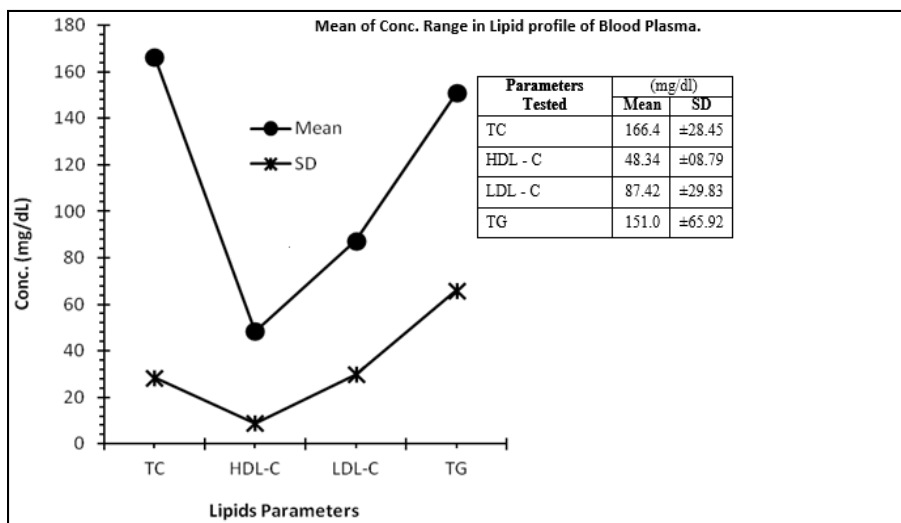
years, 40 participants whose age ranged between 31-40 years, 27 participants whose age ranged between 41-50 years, 21 participants whose age ranged between 51- 60 years, and 21 participants whose age ranged between 61-70 years. Out of all the participants, 58% of the participants' age was ranged between 20 to 50 (Table 1).

**Table 1.** Age Wise Percentage of Sampled Population (n = 150)

Range of Age (Years)	Number of Subjects	Percentage (%)
20-30	41	27.3
31-40	40	26.7
41-50	27	18.0
51-60	21	14.0
61-70	21	14.0
Total	150	-



**Figure 2.** Concentration of TC, HDL-C, LDL-C, and TG in the healthy population of D.I. Khan (n = 150)



**Figure 3.** Lipid profile of the healthy population of D.I. Khan for TC, HDL - C, LDL - C and TG (n = 150)

The mean value and standard deviation of TC was  $166.4 \pm 28.45$  mg/dl. (Figure 2). This is a desirable value (less than 200 mg/dl). TC values for healthy people should not surpass 165-175 mg/dl. The mean value for HDL-C recorded was  $48.34 \pm 8.79$  mg/dl, where normal range is above 40 mg/dl. The LDL-C levels were  $87.42 \pm 29.82$  mg/dl. The TG level was  $151 \pm 65.92$  mg/dl. This level is considered borderline high since it surpasses the upper limit. The concentration of TG found in the participants was significantly high. This is indicative of hypertriglyceridemia. It is also noteworthy that the RANDOX Kit literature and WHO specified normal recommended values for TC, HDL-C, LDL-C and TG were 100-200 mg/dL, 40-60 mg/dL, 100-130 mg/dL and 70-150 mg/dL, respectively (Figure 3).

#### 4. Discussion

In recent years, dyslipidemia has become a major health concern in Pakistan [14, 15]. Dyslipidemia is reported to be a major risk factor for non-communicable diseases such as hypertension [16, 17], myocardial infarction [18], cerebral vascular accidents, diabetic retinopathy [16, 19], chronic renal failure [20], and other diabetes related complications [21, 22, 23]. These conditions are the leading cause of hospitalization and early age

deaths [11]. It is also associated with diabetes related complications. Dyslipidemia associated morbidity and mortality has also increased in the past few years. The prevalence of this disease has increased the burden on hospitals, which, in turn, burdens the economy and the wellbeing of the population [11]. Therefore, it is crucial for health care providers to know the pathogenesis, aetiology, and complications associated with dyslipidemia so they can provide better healthcare facilities.

In this study, the TC, HDL-C and LDL-C levels of the participants were identified to be within the normal range. However, a study reported normal HDL-C level for half of the participants who were dyslipidemia patients, even though the sample population in this study was apparently healthy individuals [24]. The TG levels were above the upper limit (or was suspected). The elevated TG level in the healthy population is indicative of underlying complications and is described as a risk factor [25]. The TC, LDL-C, and TG values found in this study are comparable with the values of another study from Pakistan [26, 27]. The LDL-C value in our study is close to that given in the above-mentioned study but the findings of TC, HDL-C and TG are dissimilar [28]. A study from Port Harcourt, Nigeria reported a high mean total cholesterol and LDL cholesterol level in healthy adults [29]. This study also reported a high prevalence of obesity with high total cholesterol level. This study did not undertake the body mass index or obesity as a risk factor. In the future, such factors should be considered when trying to identify association of obesity with other complications since high serum cholesterol levels are reported to have a direct impact on coronary artery disease [30]. A study from Pakistan conducted on healthy adults reported a high prevalence value of low HDL-C [28, 31]. It was concluded that there is a need to investigate the problem of dyslipidemia at the community level. The total cholesterol (TC) level in healthy population is alarmingly high and can be used to predict future complications associated with it.

## 5. Conclusions

The findings of this study revealed a high plasma value of TG in the healthy population of the area under study. The values of TC, LDL-C and HDL-C were within the normal range. However, high TG value is an indication of dyslipidemia in the local healthy population. There is a need to design



strategies for developing awareness among the general public about dyslipidemia, its risk factors, and prevention strategies.

### **Conflict of Interest**

The authors declare no conflict of interest.

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