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**RISK OF CARDIOVASCULAR DISEASES: EVALUATION OF SERUM LIPID
PROFILES IN URBAN AND RURAL POPULATION OF SINDH**

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ABSTRACT

The aim of this study was to evaluate the levels of serum lipid profiles in Urban and Rural Population of Sindh, to indicate the existing risk of cardiovascular diseases. Study was conducted at Liaquat University of Medical & Health Sciences, in the cities of Jamshoro and Hyderabad of Sindh. Blood samples from 300 healthy individuals were collected in fasting condition, out them 100 were from rural population, 100 were urban while 100 were used as control group. The biochemistry of these samples was obtained by the analysis of total Cholesterol, high density lipoprotein Cholesterol (HDL), low density lipoprotein Cholesterol (LDL) and Triglycerides using kit method on Analyzer Clinical Chemistry. Serum levels of total cholesterol, Triglycerides, and LDL cholesterol were significantly raised in the rural and urban males, whereas HDL cholesterol was decreases as compared to the Healthy controls that indicated significant risk of CVD. Urban population was with more risk of CVD and male gender in both groups was at more risk. The worst lipid profile in gender wise distribution was

observed in male gender of urban population with highest Total Cholesterol/HDL Ratio while female gender also shown moderate risk of CVD with highest LDL/HDL Ratio.

Key words: Cardiovascular Diseases, Lipid Profiles, Urban and Rural Population

INTRODUCTION

The association of cardiovascular disease (CVD) with hypertension [1] increased serum levels of total cholesterol, low-density lipoprotein (LDL) and triglycerides is universally accepted, while on the other hand a decreased level of high density lipoprotein (HDL) is a well known risk factor for cardiovascular disease [2]. The American Heart Association, prescribed following values as risk factors for cardiovascular disease: total cholesterol:<200 mg/dl; blood pressure:<130/85 mm Hg; triglycerides:<200 mg/dl; LDL:<130 mg/dl and HDL:>40 mg/dl. Furthermore, the LDL/HDL ratio and the total cholesterol/HDL ratio also associated with cardiovascular diseases. The recommended levels for the LDL/HDL ratio and the total cholesterol/HDL ratio are either equal to or less than 3.5 [3, 4, 5]. Furthermore, other than blood lipids, physical activity level, age, body composition, body-fat distribution, tobacco use, alcohol intake, and genetics have significant part to risk of cardiovascular disease. As other studies have reported that, Pakistani population has high rate of coronary artery diseases. Hypertension is universally known as a main etiology of cardiovascular

diseases in Pakistani population. In addition, older studies have shown that urban male compared to rural males living in Sindh have a higher prevalence of hypertension. Over the 67 years of Independence of Pakistan, here has been a 10% decrease in communicable diseases, on the other hand increase in non-communicable diseases, especially cardiovascular disease [6, 7]. A recent report regarding serum lipid levels of adult men and women in Pakistani population, that they utilize a food that contain mainly beef products, highly rich in cholesterol. In spite of their higher utilization of fats in meals, LDL, HDL, triglyceride and the total cholesterol levels in the serum of Pakistani population the fell within the normal reference range values. We reported the cardiovascular disease risk factors in the population of Hyderabad and Jamshoro, we analyzed the lipid levels in blood of rural and urban adult population of Sindh and compared them. The Jamshoro's rural population has a very dynamic lifestyle, remains physically lean and active during their lives but tobacco use is common among them [8]. On the other hand, urban adult population of Hyderabad city remain engaged

commonly in less energy demanding professions and utilize more lipids in their meals. Urban population of Hyderabad is similar to urban population of Karachi, the provincial capital of Sindh, in respect of culture, diet, and lifestyle with exception that the latter group is sounder on economical ground and utilizes more meat than urban population in Hyderabad. This study reported the evaluation of the cardiovascular diseases risk factors in adult populations in two different populations locating in Sindh: adult population residing in the Hyderabad compared with population in Jamshoro and surrounding areas. We particularly evaluated the serum of these populations for LDL, HDL, total cholesterol and triglycerides and measured the LDL/HDL ratio and the total cholesterol/HDL ratios.

MATERIALS AND METHODS

Study Population

This study was conducted at Liaquat University of Medical & Health Sciences, in the cities of Jamshoro and Hyderabad of Sindh. The sample size was 300 individuals, out of them 100 were belong rural population and remaining 100 were from urban population. According to gender 176 were males and 124 were females (**Figure1**). The rural population was selected from among the attendants of patients at Liaquat University

Hospital, Jamshoro, which belong mainly from the lower socioeconomic status. The urban males were selected from among the attendants of patients at Civil Hospital, Hyderabad that belong a population of broad range of socioeconomic status. However, most subjects form Civil Hospital; Hyderabad is from the middle class socioeconomic status. All of the subjects were healthy.

Biochemical Analysis

Ten (10 ml) of blood samples were taken from 300 healthy individuals by venipuncture by disposable syringe during fasting condition. Collected blood made to clot at by centrifuging 5000 r.p.m for 20 min to separate serum. These separated serum sample were stored in test tubes and at -40° C. The samples were biochemically analyzed for total Cholesterol, low density lipoprotein Cholesterol (LDL), high density lipoprotein Cholesterol (HDL) and Triglycerides using kit method on Analyzer Clinical Chemistry.

RESULTS

Analysis of Serum total cholesterol, Triglycerides, LDL and cholesterol showed there levels were significantly increased in the rural and urban males, whereas HDL cholesterol was decreases as compared to the Healthy controls (**Table 1 and Figure 1**) indicated significant risk of CVD. Urban

population was with more risk of CVD and male gender in both groups was at more risk.

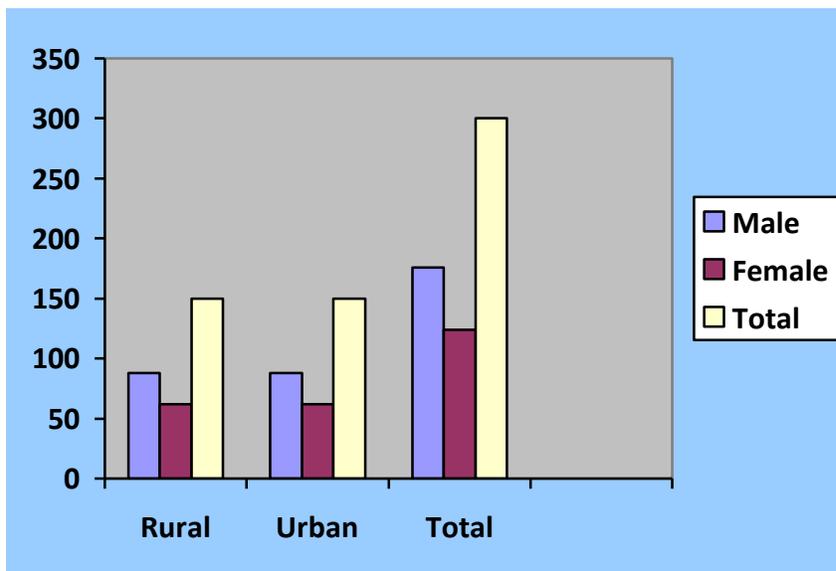


Figure 1: Showing Population Distribution

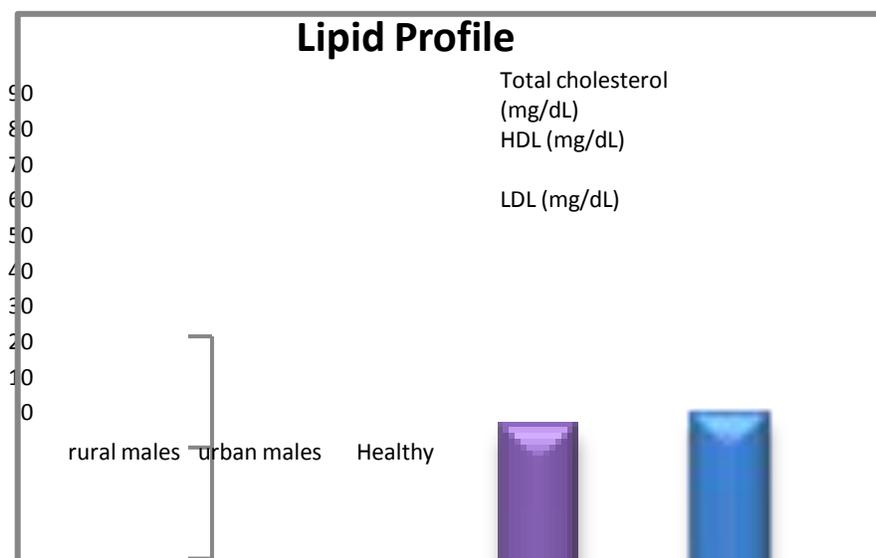


Figure 2: Shown Serum lipid profiles in rural and urban males compared with the healthy controls

Table1: Shown Serum lipid profiles in rural and urban males compared with the healthy controls

Lipid Profile	Rural males	Urban males	Healthy
Total cholesterol (mg/dL)	51±11.2	83±31.3	39±10.1
HDL (mg/dL)	52±0.1	61±.12	37±6.7
LDL (mg/dL)	62±1.2	51±3.4	27±12.0
Triglycerides (mg/dL)	82±21.2	71±7.2	46±13.3

Table 2: Shown Total Cholesterol/HDL Ratio and LDL/HDL Ratios

Lipid Profile	Total Cholesterol / HDL Ratio	LDL/HDL
Rural	3.19	4.19
Urban	5.36	5.83
Healthy	1.69	1.2

Table 3: Shown gender wise distribution of lipid profile

Lipid Profile	Rural Population		Urban Population	
	Male	Female	Male	Female
	53.01	49.93	85.3	79.20
	54.2	51.01	62.67	58.90
	63.2	62.11	51.12	49.98
	89.01	76.78	78.23	69.95
	4.12	3.84	5.71	4.58
	4.23	4.01	5.32	5.56

DISCUSSION

This study reported serum lipid profile in Pakistani populations in both rural and urban subgroups. There is a wide spread prevalence of hyperlipidaemia and hypertension as a risk factors for cardiovascular pathologies, and the higher rate of mortality due to these cardiovascular diseases [9-11]. These facts insinuate us to conduct this study in our surrounding areas of Sindh, to investigate the growing risk of cardiovascular diseases.

This study reported a general unfavorable health profile of serum lipid in Pakistani population. Specific correlations were observed in both sub-groups [9-11]. In addition, total cholesterol level were higher in both the sub-groups, indicate a higher risk for cardiovascular diseases. Furthermore, HDL levels were lower and LDL levels were higher

than the healthy individual. Higher triglyceride levels were reported in both the subgroups.

The rural sub group showed a higher LDL and triglyceride levels than urban sub-groups while urban sub-groups were with higher HDL and total cholesterol than rural population in Hyderabad. The rural population consumes a diet with low saturated fatty acid and total fats while urban population have more junk food tradition with higher fats contents. Because of demanding life style of both sub-groups have intense physical activity. There must be other factors i.e. genetic makeup, un-availability or un-affordability of good quality of cooking oil to produce such lipid profile.

This comparative study of two subgroups, namely urban population of Hyderabad and

rural population of Jamshoro reported three significant conclusions. Urban population of Hyderabad is more susceptible for cardiovascular diseases as compare to rural population of Jamshoro. The urban population has very high total cholesterol levels besides higher triglyceride level as compare to healthy individuals but they have high level of HDL as well. The rural population have low serum low of HDL as compared to recommended value (mean <40mg/dl) by American Heart Association. In addition, rural group had higher total cholesterol level as compare to healthy individual as well as they have higher triglyceride level compare to both urban subgroup and healthy individual [12].

According to Total Cholesterol/HDL Ratio, Urban population shown moderate risk of CVD especially the male gender as compare to rural population, which shown an low risk. LDL/HDL Ratio shown an average risk again in urban population especially in female gender as compare to rural population, which shown an average to moderate risk.

The worst lipid profile in gender wise distribution was observed in male gender of urban population with highest Total Cholesterol/HDL Ratio while female gender also shown moderate risk of CVD with highest LDL/HDL Ratio [13].

This study contrary to other studies reported that, urban class or better socioeconomic class have more worse lipid profile as compared to rural or less privileged class perhaps because of sedentary life style even with affordability of better quality of cooking oil. Further, intense physical activity as compare to sedentary urban subgroup makes the rural population's body consumes fats rapidly making them less susceptible to cardiovascular diseases [14, 15].

Many shortcomings in this study like small number of subject, no detail information regarding diet, quality of fats in consumption and socioeconomic status was based on location of residence and site of hospital. Further studies are required to address the more detail gender specificity, age changes, nutritional status, blood pressure, folate level to use more reliable predictors of cardiovascular diseases and other associated risk factors i.e. alcohol consumption and smoking.

REFERENCES

- [1] Olatunbosun ST, Kaufman JS, Cooper RS, Bella AF. Hypertension in a black population: prevalence and biosocial determinants of high blood pressure in a group of urban Nigerians. *J Hum Hypertens* 2000;14:249-57.

- [2] Criqui MH, Heiss G, Cohn R, Cowan LD, Suchindran CM, Bangdiwala S et al. Plasma triglyceride level and mortality from coronary heart disease. *N Engl J Med* 1993; 328: 1220-5.
- [3] American Heart Association. What do my cholesterol levels mean? (<http://www.americanheart.org>).
- [4] Columbia University's health question and answer internet service. (<http://www.goaskalice.columbia.edu/1072.html>). Altruis biomedical network. (<http://www.lipoproteins.net>).
- [5] Glew RH, Williams M, Conn CA, Cadena SM, Crossey M, Okolo SN et al. Cardiovascular disease risk factors and diet of Fulani pastoralists of northern Nigeria. *Am J Clin Nutr* 2001; 74: 730-6.
- [6] Brochu M, Poehlman ET, Savage P, Ross S, Ades PA. Coronary risk profiles in men with coronary artery disease: effects of body composition, fat distribution, age and fitness. *Coron Artery Dis* 2000; 11: 137-44.
- [7] Kountz DS, Levine SL. Cardiovascular risk profiling in blacks: don't forget the lipids. *Am Fam Physician* 1998; 58: 1541-2.
- [8] Samad A. Coronary artery disease in Pakistan; preventive aspects. *Pakistan J Cardiol* 2003; 14: 59-60.
- [9] K. Ahmad and T. H. Jafar, "Prevalence and determinants of blood pressure screening in Pakistan," *Journal of Hypertension*, vol. 23, no. 11, pp. 1979-1984, 2005.
- [10] T. H. Jafar, A. S. Levey, F. H. Jafary et al., "Ethnic subgroup differences in hypertension in Pakistan," *Journal of Hypertension*, vol. 21, no. 5, pp. 905-912, 2003.
- [11] Metwalli O, Al-Okbi S, Motawi T, et al. Study of serum metals and lipid profile in patients with acute myocardial infarction. *J Islamic Acad Sci* 1998; 11: 1-8 [www.medicaljournal-ias.org/11_1/Metwalli.htm].
- [12] Jafar, T.H., Levey, A.S., Jafary, F.H, White, F., Gul, A., Rahbar, M.H., Khan, A.Q., Hattersley, A., Schmid, C.H., Chaturvedi, N. Ethnic subgroup differences in hypertension in Pakistan. *Journal of Hypertension* Volume 21, Issue 5, 1 May 2003, Pages 905-912.
- [13] Austin MA, Hokanson JE, Edwards KL. Hypertriglyceridemia as a cardiovascular risk factor. *Am J Cardiol* 1998; 81: 7B-12B.

- [14] Blair SN, Kohl HW, Paffenbarger RS Jr, Clark DG, Cooper KH, Gibbons LW: Physical fitness and all-cause mortality. *Jama* 1989, 262(17):2395-401.
- [15] Gupta R, Kaul V, Prakash H, et al. Lipid abnormalities in coronary heart disease: a population-based case-control study. *Indian Heart J* 2001;53:332-6.