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Current Scenario of CVD, Urban and Semi Urban Area in and Around Kumbakonam, Tamilnadu

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Abstract: ***Cardiovascular disease (CVD) is a major health problem among people worldwide. About 48 blood and urine samples were collected from two different areas such as housing unit, Thiruvisanallur area Kumbakonam, Tamilnadu, India. The ages of people ranged between 25-65 years, both male and female genders were taken in fasting, postprandial and random sample also taken for biochemical investigation and morphometric measurements are examined. The present study represents urban people have higher level of risk than semi urban people due to inadequate physical activity, food, life style, smoking and alcohol habitation. To avoid these risk factors patient can do regular exercises getting awareness about natural food and medicines. Hence they can lead healthy life and live their life successfully.***

Keywords: CHD, T2DM, HDL-c-high density lipoprotein cholesterol, LDL-c-low density lipoprotein cholesterol, EDTA

1. Introduction

Cardiovascular diseases (CVD), comprising coronary heart (CHD) and cerebro-vascular diseases are currently the leading cause of death globally, accounting for 21.9 % of total deaths, and are projected to increase to 26.3% by 2030[1]. The factors that coalesce to increase the risk of developing atherosclerotic CHD were demonstrated in Framingham in the mid-20th century[2] and have subsequently been shown to be pervasive across ethnicities and regions of the world[3]. CVD predominantly affects people older than 50 and age is the main determinant of risk. Apart from the age and sex, three modifiable risk factors - smoking raised blood pressure and raised cholesterol - make a major contribution to CVD risk, particularly in combination. These account for 80% of all cases of premature coronary heart disease (CHD) [4]. The risk of a future CVD can be calculated from these risk factors and people at highest risk can be identified. There are also major identifiable population groups at particular risk. CVD is strongly associated with low income and social deprivation, the lifetime burden is greater in women because of their longevity and their increased risk of stroke over the age of 75[5].

Type 2 diabetes mellitus (T2DM), has a distinctive association with CHD, those with diabetes have two- to four-fold higher risk of developing coronary disease than people without diabetes[6] and CVD accounts for an overwhelming 65-75 % of deaths in people with diabetes[7,8]. Diabetes mellitus, a well recognized independent traditional risk factor for cardiovascular disease is characterized by absolute or relative deficiency of Insulin leading to progressive worsening of glycemic control. This explosive rise in the prevalence of T2DM and its complications represent the greatest health care challenge facing the world today[9].

Overweight and obese children are at an increased risk of developing bone and joint problems, sleep apnea, psychosocial problems and cardiovascular disease. Obese children are more likely to become overweight or obese as adults compared to children of normal weight. This results in an increased risk of developing adult health problems including type 2 Diabetes, heart disease, stroke, and cancer[10].

Physical Activity

People at high risk of or with CVD should be advised to take 30 minutes of physical activity a day of at least moderate intensity, at least 5 days a week, in line with national guidance for the general population. Recommended types of physical activity includes that can be incorporated into everyday life, such as brisk walking, using stairs and cycling. People should be advised that bouts of physical activity of 10 minutes or more accumulated throughout the day are as effective as longer sessions[11]. Regular physical activity reduces CVD risk in its own right, reduces CVD risk factors such as obesity and elevated blood pressure, improves the levels of HDL-C and helps protect against type 2 diabetes[12]. In general, these studies confirm an inverse relationship between physical activity and the risk of a cardiovascular event or all-cause mortality. Effect sizes for specific activities range from 30% to 40% relative risk reductions for CVD[13,14]**.** Blood flow the pattern of blood flow changes dramatically when a person goes from resting to exercising at rest, the skin and skeletal muscles receive about 20 percent of the cardiac output. During exercise, more blood is sent to the active skeletal muscles and as body temperature increases, more blood is sent to the skin. This process is accomplished both by the increase in cardiac output and by the redistribution of blood flow away from areas of low demand, such as the splanchnic organs. This process allows about 80 % of the cardiac output to go to active skeletal muscles and skin at maximal rates of work[15].

Lifestyle

Lifestyle changes in nutrition, physical activity and smoking status typically show excellent cost-effectiveness in lowering the burden of disease, especially with respect to obesity, future diabetes and heart disease. However, there is

an inherent difficulty in undertaking randomized controlled trials of lifestyle factors. For example, the diet of any individual is related to other lifestyle factors (e.g. smoking, exercise, etc.), although randomized controlled trials are able to eliminate such bias, they are more difficult to conduct lifestyle factors than those for pharmacotherapy[16]. Dietary advice appears to be effective in bringing about modest beneficial changes in diet and CVD risk factors. In a recent review of 38 trials with a minimum follow up period of three months, dietary advice (e.g. advice to decrease consumption of fat, saturated fatty acids, cholesterol, salt and/or increase consumption of fruit, vegetables, polyunsaturated fatty acids, monounsaturated fatty acids, fish, fiber and potassium) reduced total serum cholesterol by 0.16 mmol/L (95% CI 0.06–0.25) and LDL-C by 0.18 mmol/L (95% CI 0.1–0.27)[17]

2. Materials and Methods

About 48 blood and urine samples were collected from two different areas. Samples were collected from housing unit Kumbakonam, Rural area of Thiruvisanallur. The ages of people ranged between 25-65 years, both males and females were taken Fasting, Postprandial and random sample also taken for biochemical tests. Morphometric measurements such as Weight (kg), Height (cm) and Body Mass Index (BMI) were identified. Blood was drawn from the brachial vein in 5 cc disposable syringe of which 2.0 ml was dispensed in a 5 ml sterile glass test tube containing 3.75 mg of dipotassium salt of Ethylene diamine tetra-acetic acid (EDTA) as an anti-coagulant, for the analysis of different hematological parameters. The remaining 3.0 ml blood was used for the biochemical analysis, like sugar, lipid profile test, and liver function test were analyzed using semi-auto analyzer, MICROLAB-300 (Elitech).

Table 1: Physical parameters of semi urban, urban male and female

S.No	Physical Parameters	No. of people	Gender	Area	Statistical Value		
					Mean	SD	ANOVA
1.	Blood pressure (80/ 120 mm/Hg)	24	F	SEMI URBAN	125.5/89.4	15.80 / 12.87	1.5 / 2.81
				URBAN	118.2/81.5	10.7/ 7.01	
			M	SEMI URBAN	127.9/88.5	14.92 / 12.73	0.19 / 0.01
				URBAN	130.5/89.1	10.72 / 8.73	
2.	Height (Cm)		F	SEMI URBAN	153.4	6.57	0.08
				URBAN	154.1	3.66	
			M	SEMI URBAN	163	4.02	2.6
				URBAN	166	4.22	
3.	Weight (Kg)		F	SEMI URBAN	48.8	5.82	6.2
				URBAN	56.8	6.79	
			M	SEMI URBAN	55.0	4.53	6.59
				URBAN	61.3	4.95	

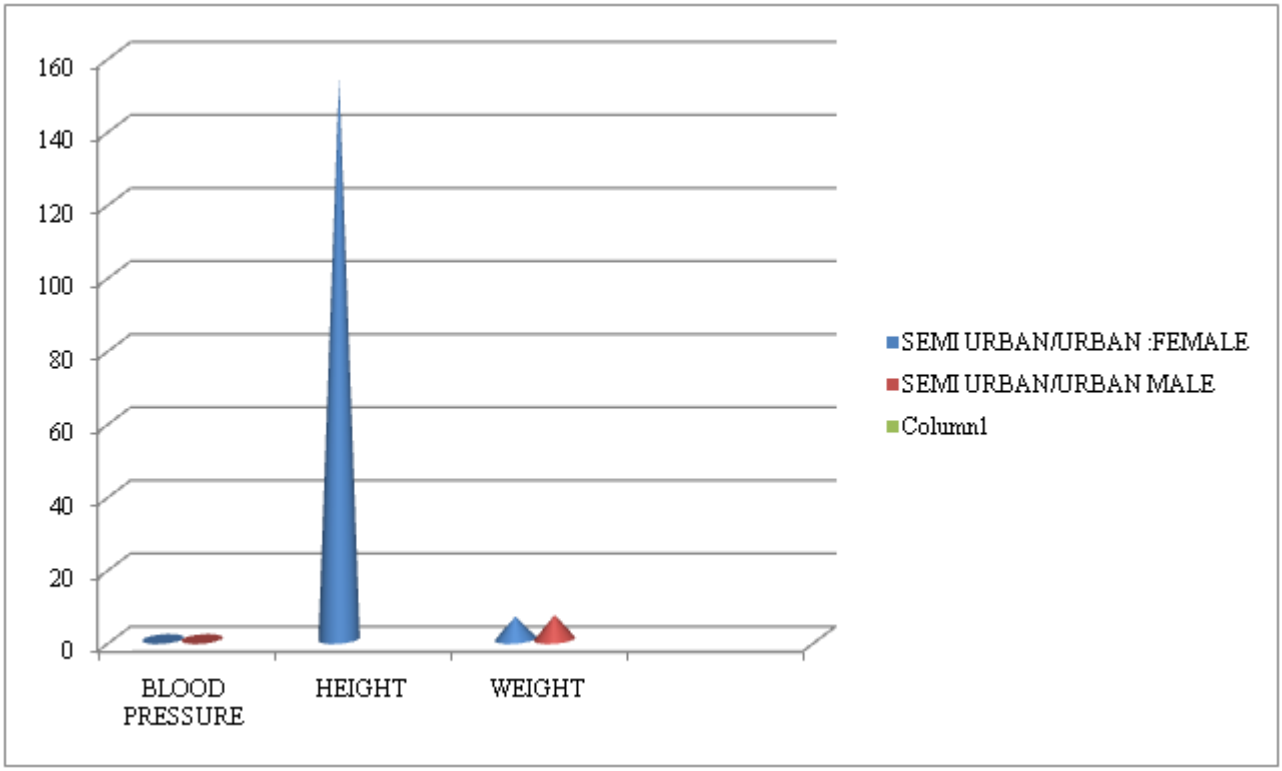

Figure 1: Physical parameters of semi urban, urban male and female

Table 2: Hematology and biochemical parameters of semi urban, urban male and female

Parameters			Normal values/unit	No. of People	Area	Mean		SD		ANOVA
					Semi urban / Urban					
Hematology	Total count		4000-10,000 Cells/cu.mm	24	F	7366	7716	1430	2097	0.25
					M	7158	7891	1344.9	1588.2	1.2
	DC	NE	60-70 %		F	57.7	57.5	7.90	8.55	0.0035
					M	55.9	54.5	10.12	10.82	0.07
		LY	20-25 %		F	36.75	36.9	7.64	8.29	0.0019
					M	38.5	39.9	8.93	10.5	0.12
		EO	0-5 %		F	5.0	5.0	2.32	2.14	2.20
					M	5.5	5.0	1.89	2.1	0.35
Biochemistry	Sugar		80-120 mg/dl		F	166.25	148.9	36.69	39.65	1.05
					M	126.25	154.1	34.71	46.59	1.24
	Cholesterol		170-240mg/dl		F	186.9	199.6	12.24	32.55	1.42
					M	190.0	206.2	9.26	33.4	2.11
	Triglycerides		80-150mg/dl		F	154.9	146.9	17.09	24.17	0.75
					M	157.4	156.2	5.83	22.6	0.023
	HDL		30-40mg/dl		F	53.0	45.25	4.0	3.8	10.71
					M	53.33	44.75	3.24	4.6	1.15
	LDL		Up to 160mg/dl		F	94.33	124.3	14.9	32.8	7.69
					M	105.3	130.3	9.7	32.3	4.67
	VLDL		Up to 130mg/dl		F	30.9	29.3	3.53	4.98	0.74
					M	31.48	31.23	1.17	3.98	0.035
	Urea		17 – 40 mg/dl		F	21.8	22.1	2.4	2.1	1.66
					M	20.1	19.7	1.8	1.5	0.014
	Creatinine		0.7 -1.2 mg/dl		F	0.25	0.82	0.27	0.21	0.0554
					M	0.64	0.8	0.15	0.21	6.2
	Uric acid		**Female** : 2.5-7.5mg/dl **Male** :2 - 6.5 mg/dl		F	4.6	4.9	0.7	0.9	0.55
					M	4.2	4.2	0.62	0.83	0.0095

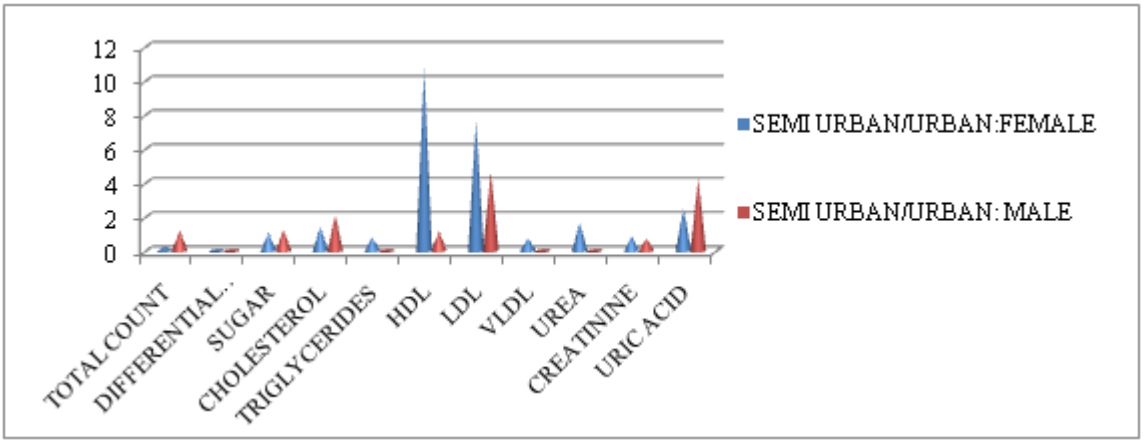

Figure 2: Hematology and biochemical parameters of semi urban, urban area male and female

Table 3: Liver Function Test for semi urban and Urban Area People

Parameters		Normal values/Unit	No. of people	Area	Mean		SD		ANOVA
				Semi urban / Urban					
Liver Function	SGOT	5 - 35 IU/L	24	F	43.6	29.5	11.48	9.8	6.63
				M	33	39.8	5.21	13.5	2.24
	SGPT	5 – 40 IU/L		F	35.4	33.5	14.3	7.40	0.15
				M	33	34	5.32	13.3	0.061
	Bilirubin	0.3 – 1.0 mg/dl		F	0.76	0.73	0.18	0.17	0.22
				M	0.7	0.66	0.25	0.06	3.89
	ALP	65 -170 IU/L		F	71.33	72.5	6.48	6.02	0.19
				M	70.5	73.3	5.22	6.54	1.74

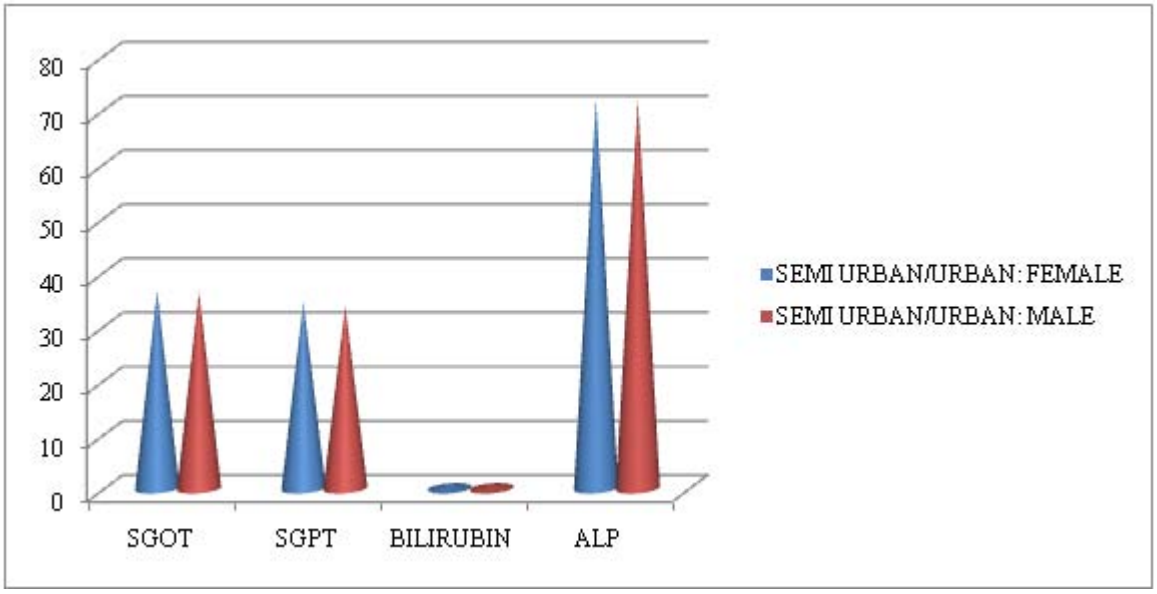

Figure 3: Liver Function Test for semi urban and Urban Area Peoples

3. Result and Discussion

Total 48 peoples were selected for the analysis of urban and semi urban out of them 24 are male and 24 are female with the age group of 25- 65 years. The physical parameters of height, weight, gender, blood pressure and BMI are representing in Table 1, and Figure 1. The hematological and biochemical parameters of total cell count, differential count like neutrophils, lymphocytes, eosinophils, blood sugar, lipid profile like cholesterol, triglycerides, HDL, LDL, VLDL, urea, creatinine and uric acid are represented in Table 2 and Figure 2. The liver function test of SGOT, SGPT, Bilirubin, and ALP are represented in Table 3 and Figure 3.

As „Rural are the backbone of our nation"-Mahatma Gandhi. This statement should be promoted or developed by means of amenities like urban. This project concentrates the healthy status and awareness of rural. The health status was compared to urban, samples was collected from the medical camp via the questioner method. The random blood sample were collected two different area out of them life style, transport facilities, education and all modern life. The semi urban area Thiruvisanallur, urban area is housing unit in successive days on the same season at kumbakonan. Those two areas were differing from work nature, food style, awareness, physical work, sports activity, education and work nature.

The semi urban and urban female mean and SD value of physical parameters like Height, Weight, Blood pressure and BMI are 125.5 ± 15.80 of systolic pressure and 89.4 ± 12.87 of diastolic pressure urban values are 118.2 ± 10.7 of systolic pressure and 81.5 ± 7.01. The semi urban and urban male mean and SD value of 127.9 ± 14.92 of systolic pressure and 88.5 ± 12.73 of diastolic pressure urban values are 130.5 ± 10.72 of systolic pressure and 89.1 ± 8.73. Hypertension, also termed high blood pressure, causes the heart to work harder than necessary to pump blood through the body. During this process, the increased workload of the heart can cause the heart to become stiffer and thicken[18]. The height of semi urban and urban female mean and SD 153 ± 6.57 urban values 154.1 ± 3.66 and semi urban male values 163 ± 4.02 and urban values 166 ± 4.22. The weight of mean and SD values is 48.8 ±5.82 and 56.8 ± 6.79 and male values is 55.0 ± 4.53 and 61.3 ± 4.95. Even a moderate degree of exercise appears to have a protective effect against CHD and all-cause mortality[19]. In one study middle-aged men, participation in moderately vigorous physical activity was associated with a 23% lower risk of death than that associated with a less active lifestyle and this improvement in survival was equivalent and additive to other lifestyle measures such as smoking cessation, hypertension control and weight control[20]. The hematology and biochemical parameters of semi urban and urban female and male like Total cell count, Differential count of Neutrophil, Lymphocytes, Eosinophil, Blood sugar, Lipid profile of Cholesterol, Triglycerides, HDL, LDL, VLDL, Urea, Creatinine and Uric acid. The mean values of total cell count are 7366±1430, 7716±2097 and 7158±1344, 7891±1588. Differential count NE is 57.7±7.90, 57.5±8.55 and LY is 36.75±7.64, 36.9±8.29 and 38.5±8.93, 39.9±10.5, EO value is 5.0±2.32, 5.0±2.14 and 5.5±1.89, 5.5±2.1. The random blood sugar level of semi urban and urban female and male value is 166.2±36.69, 148.9±39.65 and 126.2±34.71, 154.1±46.59. According to this survey, rural female people represents 20.76 of BMI values, semi urban male people represents 20.70 BMI values. The urban male, female values were represents 23.8, 22.39. The respondents were in the normal category of BMI.

The lipid profile cholesterol semi urban values are 186.9±12.24, 199.6±32.55, the male values are 190.0±9.26, 206±9.26. The triglycerides values are 154.9±17.09, 146.9±24.17 and 157.4±5.83, 156.2±22.6. The HDL mean and SD values are both semi urban and urban people are 53.0±4.0, 45.2±3.8 and 53.33±3.24, 44.75±4.6. The LDL mean and SD values followed 94.3±14.9 for semi urban female, 124.3±32.8 for urban female the male values are 105.3±9.7 for semi urban male, 130.3±32.8 for urban male. The VLDL mean SD values for semi urban and urban peoples are followed by 30.9±3.53, 29.3±4.98 and 31.4±1.17 and 31.23±3.98. The urea mean and SD values are 21.8±2.4, 22.1±2.1 and 20.1±1.8, 19.7±1.5. Creatinine values are

0.25±0.27, 0.82±0.21 for female values 0.6±0.15 and 0.8±0.21 for male peoples. The semi urban and urban uric acid values are 4.6±0.7, 4.9±0.9 and 4.2±0.62, 4.2±0.83. Dietary factors such as a high-calorie, High-fat and high-cholesterol diet contribute to the development of other risk factors, such as obesity, Hyperlipidemia, and diabetes that predispose to CHD. Conversely, a diet that emphasizes fruit and vegetables as well as one associated with an increased intake of dietary fiber, is associated with a decreased risk of CAD[21]. The liver function parameters like SGOT, SGPT, Bilirubin and ALP. The male and female The SGOT values are 43.6±11.48, 29.5±9.8 and 33±5.21, 39.8±13.5. The SGPT values are 35.4±14.3, 33.5±7.40 and 33±5.32, 34±13.3. The jaundice represents bilirubin values are 0.76±0.18, 0.73±0.17 and 0.7±0.25, 0.66±0.06. The ALP of semi urban and urban values are 71.33±6.48, 72.5±6.02 and 70.5±5.22, 73.3±6.54, urine sugar and protein were also determined.

The ANOVA values of all parameters were lower than some parameters like semi urban HDL values significant of 5% than urban peoples. The urban LDL values are significant 5% than semi urban peoples. The semi urban SGOT level was increased higher than urban and urban Height, Weight, Creatinine were significant than semi urban area people. In Indian populations, dyslipidemia as a risk factor for cardiovascular disease and increasing incidents of death due to cardiovascular disease in both urbanized and under developed semi urban countries have been reported[22].

In the present study various parameters are used, among that some values are significant and other values are not significant. The mean and SD values are increased in urban female and male than semi urban areas. The individual questionnaire method was used to collect the information from the selected individuals (men and women) in the age group between 25-65. The individual questionnaire covered information on demographic, behavioral and physical measurements, age, sex and occupation. The behavioral information section included questions on tobacco use, alcohol consumption, diet, physical activity and history of raised blood pressure and history of diabetes.

4. Conclusion

The present study suggests that the lead exposed persons having altered lipid profile and risk of obesity, increased total cholesterol and LDL level and decreased HDL cholesterol level. It suggests that the average risk of semi urban people and high risk of urban people of cardiovascular diseases, cause lack or inadequate physical activity, food style, life style, smoking and laziness. These people must avoid fast food, highly fat content food; deep fry food and involving sports activity, meditation, exercise and cycling people can avoid such kind of risk and maintain a healthy life. “Prevention is better than cure” according to this the society can adopt good life style and protect themselves from various diseases.

References

[1] World Health Organization (2008) World Health Statistics. *Department of Measurement & Health Information Systems of the Information, Evidence and Research Cluster*. Geneva: WHO Press. p. 29-31.
[2] Kannel WB. (1976) Some lessons in cardiovascular epidemiology from Framingham. *Am J Cardiol . 37:* 269-82.
[3] Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, *et al*. (2004) Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet. 364:* 937-52.
[4] Emberson JR, Whincup PH, Morris RW et al. (2003) Re-assessing the contribution of serum total cholesterol, blood pressure and cigarette smoking to the aetiology of coronary heart disease: impact of regression dilution bias. European Heart Journal 24: 1719–26.
[5] Seshadri S, Beiser A, Kelly-Hayes M et al. (2006) the lifetime risk of stroke: estimates from the Framingham Study. Stroke 37: 345–50.
[6] Kannel WB, McGee DL. (1979) Diabetes and cardiovascular disease. The Framingham study. *JAMA. 241:* 2035-8.
[7] Moss SE, Klein R, Klein BE. Cause-specific mortality in a population-based study of diabetes. *Am J Public Health*; *81:* 1158-62.
[8] Geiss LS, Herman WM, Smith PJ. (1995) Mortality in non-insulin-dependent diabetes. In: National Diabetes Data Group, editor. *Diabetes in America,* 2nd ed. Bethesda, MD: NIH & NIDDK: National Diabetes Information Clearing house;. p. 233-55
[9] Zimmet P. (2003) The burden of type 2 diabetes: are we doing enough? *Diabetes Metabolism.* 29 (6) S9- 18.
[10] Van Lenthe FJ, van Mechelen W, Kemper HC, Twisk JW. (1998) Association of a central pattern of body fat with blood pressure and lipoproteins from adolescence into adulthood: the Amsterdam Growth and Health Study. *A m J Epidemiol.* 147: 686–93.
[11] Department of Health (2004) At least five a week: evidence on the impact of physical activity and its relationship to health. A report from the Chief Medical Officer. London: Department of Health. Available from www.dh.gov.uk
[12] Australian Institute of Health and Welfare (2008). Australia‟s health. Cat. no. AUS 99. Canberra: AIHW
[13] Lollgen H, Bockenhoff A, Knapp G (2009). Physical activity and all-cause mortality: an updated meta-analysis with different intensity categories. Int J Sports Med. 30 (3):213-24.
[14] Nocon M, Hiemann T, Muller-Riemenschneider F, Thalau F, Roll S, Willich SN (2008). Association of physical activity with all-cause and cardiovascular mortality: a systematic review and meta-analysis. Eur J Cardiovasc Prev Rehabil. Jun;15(3):239-46.
[15] Rowell LB (1986). Human circulation regulation during physical stress. New York: Oxford University Press.
[16] Russell LB (2009). Preventing chronic disease: an important investment, but don‟t count on cost savings. Health Aff (Millwood). Jan- Feb;28(1):42-5.
[17] Brunner EJ, Rees K, Ward K, Burke M, Thorogood M (2007). Dietary advice for reducing cardiovascular risk. Cochrane Database Syst Rev. 7(4):CD002128
[18] North American Association for the Study of Obesity (2005.). “Obesity Statitics.” Available at http://www.naaso.org/statistics/. Accessed July.

[19] US Department of Health and Human Services (1996). Physical activity and health: a report of the Surgeon General. Atlanta (GA): Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Disease Prevention and Health Promotion.
[20] Sandvik L, Erikssen J, Thaulow E, et al (1993). Physical fitness as a predictor of mortality among healthy, middle-aged Norwegian men. N Engl J Med. 328:533.
[21] Wolk A, Manson JE, Stampfer MJ, et al (1999). Long-term intake of dietary fiber and decreased risk of coronary heart disease among women. JAMA. 281:1998.
[22] Aguilar-Salinas CA, Olaiz G, Valles V, Torres JMR, Pérez FJG, Rull JA, Rojas R, Franco A, Sepulveda J **(**2001**).** High prevalence of low HDL cholesterol concentrations and mixed hyperlipidemia in a Mexican nationwide survey. J Lipid Res. 42:1298-1307.