

Cardiovascular Disease Risk Factors Assessment in Urban Versus Rural Women of Same Ethnicity

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Abstract

Objectives: The difference between modern lifestyle in urban areas and the traditional way of life in rural areas may be a reason for increased prevalence of cardiovascular disorders in urban population. The aim of the study was to assess the risk factors for cardiovascular disease such as obesity, blood pressure and lipid profile in rural women as compared to urban women of same ethnic groups.

Methods: 180 female subjects (age group 30-40 years) were studied, out of which 90 were from rural areas and 90 from urban areas. The estimation of obesity was done by measuring waist hip ratio (WHR) and body mass index (BMI). Systolic and diastolic blood pressure (BP) was recorded. Lipid profile (Total cholesterol, triglycerides, low density lipoprotein cholesterol, very low density lipoprotein cholesterol and high density lipoprotein cholesterol) was done in both the groups.

Results: Significant increase in BMI ($p < 0.001$), WHR ($p < 0.001$), systolic blood pressure ($p < 0.01$), total cholesterol ($p < 0.01$), triglycerides ($p < 0.01$), low density lipoprotein cholesterol ($p < 0.01$) and very low density lipoprotein cholesterol ($p < 0.01$) was found in urban women as compared to rural women. No significant difference was observed in diastolic blood pressure and high density lipoprotein cholesterol.

Conclusion: This study shows that the urban women are more obese, have higher blood pressure and adverse plasma lipid profile thereby making them more vulnerable to cardiovascular diseases as compared to rural women.

Keywords: Urban women, rural women, cardiovascular diseases.

1.Introduction

Cardiovascular disease is the leading cause of death worldwide including India. About two-thirds of the global estimated 14.3 million annual cardiovascular disease deaths occur in the developing world[1].

Cardiovascular disease is associated with hypertension and elevated blood levels of low-density lipoprotein (LDL), total cholesterol (TC), and triglycerides (TGs) while a low level of high density lipoprotein (HDL) is a risk factor for mortality from cardiovascular disease. Other factors, such as age, genetics, body composition, and body fat distribution also contribute significantly to risk of cardiovascular disease[2].

Unadjusted Coronary heart disease rates have ranged from 1.6% to 7.4% in rural populations and 1% to 13.2% in urban populations[1]. Studies from rural areas have demonstrated a lower prevalence compared to studies from urban areas. Differences in the prevalence of coronary artery disease indicate that differences in diet, lifestyle characteristics and conventional risk factors may be important[3]. Certain lifestyle factors, associated with urbanization, as stress, addiction, lacking of physical activities, food habits and environmental contaminants can increase the risk of coronary artery disease.

The transition from a rural to an urban lifestyle is associated with deterioration in the cardiovascular disease risk profile because of adverse changes in dietary habits and physical activity pattern[4]. Increased obesity, especially abdominal obesity is associated with changes from rural to urban lifestyles. An elevated waist-hip ratio is associated with higher triglyceride and total cholesterol concentrations and lower HDL cholesterol levels[5]. Abdominal obesity has also been associated with higher systolic and diastolic blood pressures[6].

Risk of coronary artery disease in hypertension increases in presence of dyslipidemia[7]. Both hypertension and dyslipidemia coexist more often than by a chance alone[8].

Women's lifetime risk of cardiovascular disease is higher than in men. Risk of hypertension in women increases with age and becomes more prevalent than that in men due to changes associated with menopause[9]. Assessment of cardiovascular disease risk factors, such as blood pressure, lipids, obesity and fitness, in midlife and older women is required to modify risk associated with cardiovascular diseases.

The aim of our work was to compare the incidence of cardiovascular disease (CVD) risk factors among rural and urban women and to test whether CVD risk factors differ between rural and urban Indian women.

2. Materials and Methods

The present study was conducted on 180 healthy women (comprising of 90 rural and 90 urban women) in the age group of 30-40 years, randomly selected from general population of Punjab. An informed consent was taken from all the subjects. The procedures which were followed were in accordance with the ethical standards of the committee which was responsible for human experimentation. A detailed reproductive history was taken to exclude any hormonal imbalance. Their general physical and systemic examination was done to exclude any disease such as hepatic, cardiac or renal disorder. Care was also taken that none of them was smoker, alcoholic or on medications as antihypertensives, hypolipidemics, oral contraceptives, hormone replacement therapy or any other drug known to affect this study. All of them were on mixed diet.

For BMI, weight in kg on standard weighing machine and height in cm with steel anthropometric rod were measured. BMI was calculated as weight in kg/height in m². BMI > 25 kg/m² was taken as overweight.

For WHR, waist circumference in cm at the level of umbilicus and hip circumference in cm at maximum prominence of buttocks were measured with a non-stretchable steel tape. WHR > 0.85 was taken as obese.

Blood pressure in mmHg was measured with mercury sphygmomanometer at 5 minute intervals for 3 readings and the lowest value was considered. BP >140/90 mm Hg was classified as hypertension.

For lipid profile, 10 ml venous blood after overnight fasting was collected. Levels of serum total cholesterol [10], TGs [11] and HDL [12] were assessed using enzymatic methods and the levels of serum VLDL cholesterol and LDL cholesterol were calculated using Friedwald's formula [13].

The statistical analysis was carried out by using the Student's paired 't'-test. The data was expressed as mean ± SD and the p values which were <0.05 were taken as significant.

3. Results

Table -1 shows the mean ± SD of the various parameters studied in rural and urban women. There was statistically significant increase in BMI, WHR and Systolic blood pressure (SBP) in urban women when compared to rural women while Diastolic blood pressure (DBP) was not increased significantly. Dyslipidemia as suggested by significant increase in serum total cholesterol, LDL cholesterol, VLDL cholesterol and triglycerides was also found in urban women. However, decrease in HDL cholesterol was not statistically significant in urban women.

Table 1: Comparison of serum BMI, WHR, Systolic blood pressure (SBP), Diastolic blood pressure (DBP) and lipid profile in rural and urban women

| Parameters | Rural women (n=90) (Mean ± SD) | Urban women (n=90) (Mean ± SD) |
|-------------------------------|--------------------------------|--------------------------------|
| BMI (Kg/m) | 22.90 ± 2.164 | 24.11 ± 2.473** |
| WHR | 0.822 ± 0.073 | 0.877 ± 0.088** |
| SBP (mmHg) | 126.33 ± 14.70 | 133.18 ± 18.98* |
| DBP (mmHg) | 78.13 ± 7.08 | 78.56 ± 7.80*** |
| Total serum cholesterol (mg%) | 180.87 ± 36.03 | 200.60 ± 54.10* |
| HDL cholesterol (mg%) | 47.11 ± 6.74 | 44.76 ± 8.51*** |
| Triglycerides (mg%) | 116.54 ± 26.85 | 129.17 ± 37.12* |
| VLDL cholesterol (mg%) | 23.31 ± 5.37 | 25.83 ± 7.42* |
| LDL cholesterol (mg%) | 110.45 ± 38.23 | 130.01 ± 55.35* |

*, p<0.01, **, p<0.001, ***, p>0.05 when compared with rural Women

4. Discussion

Cardiovascular diseases have been a significant public health problem not only for urban but also for rural areas of India. Cardiovascular diseases are found to be associated with increasing urbanization with improved purchasing power of people and with the availability of transnational food items and technologies that lead to development of lifestyle-related risk factors like physical inactivity, unhealthy diet, stress, alcohol, and tobacco abuse.

Urban areas of India adopted modern lifestyle and use of technologies leading to a rise in prevalence of overweight, obesity, and hypertension and lipid abnormalities. As in urban areas, there is an emergence of lifestyle-related and CVDs risk factors in rural areas too depending upon availability and use of technologies in these areas[14]. Consumption expenditure has improved from 70.7 to 579.2 and from 53.0 to 579.2 in year 1973-74 to 2004-05 in urban as well as in rural part of the country respectively[15]. Rural areas across the country are not an exception for CVDs risk factors with urgency to intervene with early lifestyle modification and to carry out the surveillance for CVDs with the treatment.

In Indian population, risk factors of coronary heart disease such as obesity, hypertension, and lipid profile are more prevalent in urban than in rural areas[3]. Similar findings have been presented by other authors also. A higher incidence of metabolic syndrome was observed among studied women from India over 30 years of age in cities (56.2%) compared with a rural population (36.4%)[16].

Sedentary life style of urban women contributes to obesity, hypertension and dyslipidemia. Many studies have also confirmed that obesity, hypertension, increased intake of energy rich foods and saturated fats, relatively sedentary lifestyle, high level of LDL cholesterol are more prevalent in urban areas than in rural areas[17]. More air pollution in urban areas may also be a contributing factor. The toxic compounds in air pollution e.g. oxides of nitrogen, sulphur dioxide and suspended particles are powerful pro-oxidants that enhance oxidation of lipoproteins. Oxidized lipoproteins are powerful inducers of atherosclerosis[18].

In North Indian population, it was seen that prevalence of coronary artery disease (CAD) is 9% in urban population and 3.3% in rural population[19]. Another study in a similar ethnic group also showed that CAD is about 2.5 times commoner in urban than rural areas[3]. A study done in urban population of Chennai in South India has shown the prevalence rate of coronary artery disease was 11%[20]. In another

study, family history of coronary artery disease was found to be very common in urban population (57.64%)[21]. Stressful lives, unhealthy diet, lack of sufficient physical activities, pollution are direct consequences of urban life. In rural area, most of men and women use to work in the agricultural and farming activities, whereas urban men and women live a sedentary life. Environmental and genetic factors influence a person's blood lipid levels which are risk factors for Coronary Heart disease. Subjects residing in more polluted cities suffer early death from pulmonary and heart diseases[22].

Nutritionally, urban dietary lifestyles favours shift from traditional, naturally occurring diets to packaged and processed foods rich in animal-source, fat, salt and sugar since the latter are readily available and affordable while rural residents eat local food rather than processed food. Another influence of westernization is the reduction of physical activities among urban dwellers due to presence of available and affordable transportation systems, sedentary jobs, remote-controlled and automatic appliances while rural residents walk long distances, carry out vigorous manual activities[23].

Rural residents eat the traditional high carbohydrate, low protein and low fat diet while urban residents consume unhealthy food containing more saturated fat and high calorie diet. Urbanization is also associated with psychological stress[24].

Higher prevalence of hypertension in this study may be attributable to changes in dietary habits, socioeconomic status, sedentary lifestyle, and obesity.

For prevention of cardiovascular diseases, weight control is most important in both rural and urban women. Excess weight, particularly central obesity, blood pressure and lipid profile, which are important CVD risk factors, need to be addressed. Strategies should focus on a healthy diet, increased physical activity, and weight reduction and maintenance.

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