Original Article

Metabolic Syndrome among Urban and Rural Women Population – A Cross Sectional Study

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ABSTRACT

Introduction: There is increased incidence of Metabolic Syndrome across the globe. Metabolic Syndrome a strong predictor of coronary vascular disorder and Diabetes Mellitus is not highlighted enough especially in women. This study was undertaken to learn the prevalence of Metabolic Syndrome among urban and rural women.

Material and Methods: A detailed history, clinical examination along with mini glucose tolerance test, FBS and PPBS in a known diabetic and fasting lipid profile were done in 590 urban and 433 rural women. Metabolic Syndrome was defined using Modified NCEP ATP III Criteria.

Results: Metabolic Syndrome was detected in 342 (57.96%) urban and 239 (55.19%) rural women. Individual components of Metabolic Syndrome like Waist circumference of > 80 cm was found in 283 (82.74%) urban and 171 (71.54 %) rural women, Systolic blood pressure > 130 mm Hg was found in 261 (76.31%) urban and 187 (78.24 %) rural women, Diastolic blood pressure of > 85 mm Hg was found in 201 (58.77%) urban and 143 (59.83 %) rural women, Triglycerides of > 150 mg/dl was found in 187 (43.85%) urban and 159 (66.52 %) rural women, High density lipoprotein of < 50 mg/dl was found in 309 (90.35%) urban and 224 (93.72 %) rural women and Fasting blood sugars of > 110 mg/dl was found in 93 (27.19%) urban and 44 (18.41 %) rural women.

Conclusion: Our study showed increased prevalence of Metabolic Syndrome in urban women however there is also increasing prevalence in rural women due to changing life style pattern.

INTRODUCTION

The Metabolic Syndrome (Syndrome X, Insulin resistance syndrome) consists of a constellation of metabolic abnormalities that confer increased risk of cardio vascular disease and diabetes mellitus. The criteria for the metabolic syndrome have evolved since the original definition by the World Health Organization in 1998, reflecting growing clinical evidence and analysis by a variety of consensus, conferences and by professional organizations [1]. Prevalence of metabolic syndrome in India is varying between 10% to 50% depending on age and sex. Prevalence of diabetes, obesity, dyslipidemia and central obesity has been significantly increased among Indian population, especially in women [2]. Presence of Metabolic Syndrome has a greater impact on the incidence of coronary heart disease in women than men [3]. This study was undertaken to learn the prevalence of Metabolic Syndrome in urban and rural women, whose health is neglected by both family and by herself. We intend to create awareness among women regarding their health focuss on nutrition, physical exercise, maintaining ideal lipid profile, waist circumference and weight.

Hypothesis
Metabolic syndrome is common among urban woman.

AIMS AND OBJECTIVES
To study the prevalence of Metabolic Syndrome among urban and rural women.

MATERIAL AND METHODS
Study population
A cross sectional study of urban and rural women of Tumkur district in Karnataka state. Women of 18 years and above were included in the study.

Study period
Study was conducted over a period of three months.

Study design
Population based cross sectional study.

Sample size
1023 people were included in the study.

Sampling technique
Simple random sampling.

Study tools
Pilot tested questionnaires was used for collecting information regarding the economic status, occupation, family history, obstetric history, physical activity along with the routine data. A detailed clinical examination along with anthropometric measurements were also taken. Standing body height (to the nearest 0.5 cm) was measured with a commercial stadiometer. A digital scale, with an accuracy of ± 100 g, was used to measure the body weight. The waist circumference was measured in a horizontal plane, midway between the inferior margin of the ribs and the superior border of the iliac crest. The measurements were taken thrice and the mean was taken in all cases. Every subject underwent following bio chemical tests - Mini glucose tolerance test, FBS or PPBS (if known diabetic) and Fasting lipid profile. All biochemical parameters were analyzed by automated analyzer using kits provided by Transasia Biochemicals.

STATISTICAL ANALYSIS
Was done by using Epi Info 7.1 and Microsoft Excel 2007. Results were expressed in proportions and presented in the form of tables and graphs. Data was entered in Microsoft Excel 2007 and used for further analysis. Chi–square test was applied as a test of significance.

Ethical clearance
The clearance for the study was obtained from the ethical committee of Sree Siddhartha Medical College and Hospital.

Consent

An informed consent was taken from every participant.

A diagnosis of Metabolic Syndrome was made by using Modified NCEP- ATP III Criteria [4].

Presence of ≥ three of the following:

1. Waist circumference (> 90cm in men, > 80cm in women)
2. Systolic BP ≥ 130 mmHg and/or Diastolic BP ≥ 85 mmHg or on medical treatment of previously diagnosed hypertension
3. Triglycerides ≥ 150 mg/dl
4. HDL- Cholesterol < 40 mg/dl in men, < 50 mg/dl in women
5. Fasting glucose > 110 mg/dl or a known diabetic on treatment.
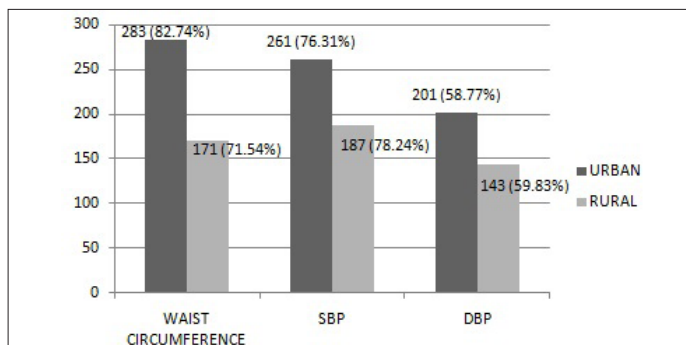
RESULTS

Out of the total 1023 women studied, 590 (57.67%) were urban and 433 (42.32%) were rural. All women were in the age group of 18 years and above that included child bearing age and later stages in life [Table/Fig-1].

In the urban group of 590 (57.67%) women, Metabolic Syndrome was found to be in 342 (57.96 %) [Table/Fig-2], socio–economic status was lower middle among 228 (60.31%), vegetarians were 111 (32.45%), non vegetarians were 231 (67.54%). Those who were literate were 132 (38.59%), employed were 128 (37.42%) and married were 306 (89.47%).
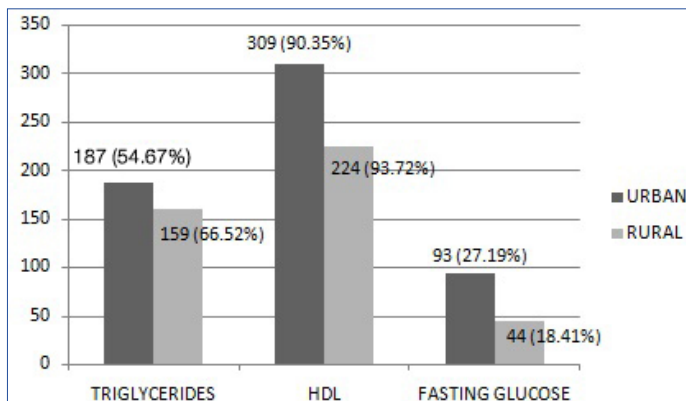
In the rural group of 433 (42.32%) women, Metabolic Syndrome was found to be in 239 (55.19%) [Table/Fig-2], socio–economic status was lower middle among 170 (68.54%), vegetarians were 103 (43.09%), non vegetarians were 136 (56.90%). Those who were literate were 53 (22.17%), employed were 84 (35.14%) and married were 209 (87.44%).

There is higher prevalence of clinical components [Table/Fig-3] and laboratory components [Table/Fig-4] of metabolic syndrome in the Urban group.

The prevalence of Metabolic syndrome is more in the urban group as compared to the rural group [Table/Fig-5] (chi–square value- 0.7808, p value – 0.3769) which is not statistically significant. Whereas prevalence of waist circumference (chi–square value- 7.265, p value- 0.007031) and Fasting blood sugars (chi–square value- 6.755, p value- 0.009351) are statistically significant.
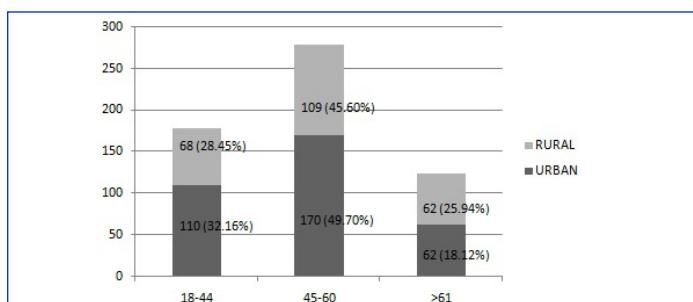

[Table/Fig-1]: Age wise distribution of Metabolic Syndrome among Urban and Rural women

[Table/Fig-2]: Urban and Rural wise distribution of population and Prevalence of Metabolic Syndrome in the study group

[Table/Fig-3]: Urban and Rural wise distribution of components of Metabolic Syndrome pertaining to clinical examination
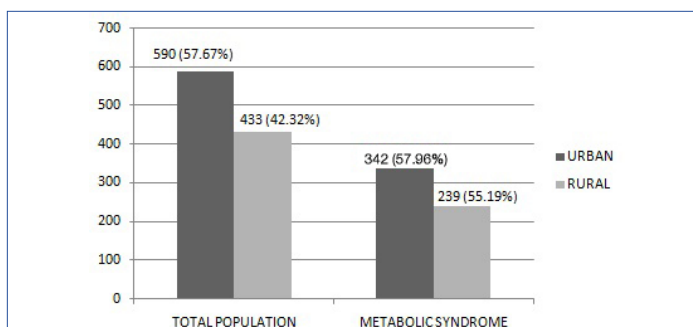

[Table/Fig-4]: Urban and Rural wise distribution of components of Metabolic Syndrome pertaining to Laboratory findings

		URBAN	%	RURAL	%
1	Metabolic Syndrome	342	57.96	239	55.19
2	Waist circumference of ≥ 80 cm	283	82.74	171	71.54
3	Systolic BP of ≥ 130 mm Hg	261	76.31	187	78.24
4	Diastolic BP of ≥ 85 mm Hg	201	58.77	143	59.83
5	Triglycerides ≥ 150 mg/dl	187	43.85	159	66.52
6	HDL ≤ 50 mg/dl	309	90.35	224	93.72
7	Fasting blood sugar ≥ 110 mg/dl	93	27.19	44	17.74

[Table/Fig-5]: Urban and Rural wise prevalence of Metabolic syndrome and its components

DISCUSSION

The prevalence of Metabolic syndrome varies across the world. Due to the demographic and economic changes occurring in the South Asia the life expectancy has increased. Population migration to urban cities, mechanisation have brought life style changes such as nutritional imbalance, physical inactivity, stress, increased consumption of tobacco and alcohol. Life style changes cause increased occurrence of Metabolic Syndrome. The prevalence of Metabolic Syndrome is increasing exponentially in India, both in the urban and in rural areas. The differences in the prevalence of Metabolic Syndrome between studies from Indian continent may be attributed to different criteria employed, different age groups included and different rates of prevalence of individual components of Metabolic Syndrome.

Most of the studies done to know the occurrence of Metabolic Syndrome in Indian population included either urban or rural population. Ours is a unique study which targeted both the urban and the rural women of the same area simultaneously. We have compared our study with different studies done on Metabolic Syndrome from different regions of India.

Metabolic syndrome in urban eastern Indian women in Prasad et al., studies have found to be 33.5% overall, 24.9% in males and 42.3% in females [5]. Prasad et al., followed unified definition of

Metabolic syndrome by the joint interim statement of five major scientific organisations whereas our study considered NCEP ATP III guidelines for Asian Indians.

In a study conducted by Dhanraj et al., in North Indians prevalence of Metabolic Syndrome was found to be 57% [6]. In their study Metabolic syndrome was studied in Asian Indians with newly detected Type 2 diabetes.

In a study conducted in urban women of Western India by Pandey S et al., the prevalence was found to be 55% [7]. In their study the prevalence of MS was made out using two criteria–International Diabetes Federation criteria (IDF) and Harmonization (H_MS) criteria. However, our study correlates with their findings.

In a study conducted in rural women of Tamil Nadu of South Indian population by Selvaraj et al., the prevalence was found to be 37% [8]. This differed from our study as their participants strength was very low compared to our study.

Various criteria have been followed for the diagnosis of Metabolic syndrome which makes it difficult to arrive at a particular statistics. A consensus is to be arrived in making a diagnosis.

CONCLUSION

Occurrence of Metabolic Syndrome is high among Urban women population. However there is a increasing prevalence of Metabolic Syndrome in the rural women due to changes in their life style. Their significant increase in the prevalence of Metabolic Syndrome is the major risk factor for mainly coronary heart disease and Diabetes mellitus. Health education and awareness among women about nutrition, physical exercise and maintenance of waist circumference from the younger age group is required to prevent major non–communicable health disorders in the era of increasing life expectancy. Detection of one component of the Metabolic Syndrome should lead to the search for the other components and its management.

REFERENCES

[1] Eckel RH. The Metabolic Syndrome. In: Longo DL et al. Harrison's Principles of Internal Medicine, 18th ed: Mc Graw Hill; 2012:1992. Definition from the textbook.

[2] National Cardiovascular Disease available from: http://whoindia.org/LinkFiles?NMH_Resources_National_CVD_diabetes-Final_Report.pdf.

[3] Hunt KJ, Williams K, Hazuda HP,Stern MP, Haffner SM. The Metabolic Syndrome and the impact of Diabetes on Coronary Heart Disease Mortality in women and men: The San Antonio Heart Study. *Annals of Epidemiology.* 2007 Nov. 17(11):870-77.

[4] Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. *Circulation.* 2002;106:3143-421.

[5] Prasad DS, Kabir Z, Dash AK, Das BC. Prevalence and risk factor for MS in Asian Indians: A Community study from urban eastern Indian. *Journal of Cardiovascular Disease Research.* 2012 Jul;3(3):204-11

[6] Dhanaraj et al. Predictors of metabolic syndrome in Asian north Indians with newly detected type 2 diabetes. *Indian Journal of Medical Research.* 129. 2009 May;129: 506-14.

[7] Pandey S, Srinivas M, Agashe S, Joshi J, Galvankar P, Prakasam CP. et al. Menopause and metab olic syndrome: A study of 498 urban women from western India. *Journal of Midlife Health.* 2010 Jul-Dec;1(2):63-69.

[8] Selvaraj I, Gopalakrishnan S, Logaraj M. Prevalence of metabolic syndrome among rural women in a primary health centre area in Tamil Nadu. *Indian Journal of Public Health.* 2012 Oct-Dec. 56(4): 314-7.

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