SHORT ARTICLE

Prevalence of Metabolic Syndrome in infertile women

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Abstract

Background: Prevalence of Metabolic syndrome is increasing rapidly among the infertile women over the last few years **Objective**: to evaluate the prevalence of metabolic syndrome (MBS) among the infertile women. **Methods**: A prospective cross-sectional study was conducted of all infertile women in a tertiary care centre in southern India. These women underwent screening for MBS according to the modified AHA/NHLBI (ATP III 2005) definition. These women were categorized as PCOS and Non PCOS based on Rotterdam criteria (2003). **Results**: Among 1030 infertile women. The prevalence of MBS among the infertile women was 35.3% and among PCOS and Non PCOS women were 44.7% and 28.9% respectively. **Conclusions**: The prevalence of MBS among infertile women was 35.3%. It is showing an upward trend among infertile PCOS and Non PCOS women. So early screening for MBS can reduce the long term sequale.

Keywords

Metabolic Syndrome; Polycystic Ovary syndrome Body mass index

Introduction

The Metabolic Syndrome (MBS) is a constellation of cardiovascular risk factors, impaired fasting glucose, central obesity, dyslipidemia and raised blood pressure. These individuals are at increased risk for atherosclerosis and type II diabetes. MBS which was a disease of western world is now becoming a global issue.

The prevalence of MBS varies among different countries and ethnicities. It is reported from 1.6% among czech women (1) to 43% in US in previous years. (2) Among the recent studies, prevalence among the Vietnamese women was around 10.4%. (3) In the Indian population (2015), prevalence of MBS was 39.16%. (4) In a recent pilot study (2019), it has been as high as 43% among the young Indian

women. (5) There are many factors involved in the causation of MBS which cannot be changed but many can be curtailed and amenable for correction.

Many studies have measured the prevalence of MBS among PCOS women only and not among non PCOS infertile women. As these women are also at risk for these complications, this study was conducted with the aim to study the prevalence of MBS among the infertile women.

Aims & Objectives

To study the prevalence of MBS among the infertile South Indian women in a tertiary care center.

Material & Methods

Study type: It is a prospective cross-sectional study **Study population**: Infertile women attending the infertility unit of a tertiary care Centre catering the South Indian population. **Study duration**: Six months from September 2017 to February 2018. **Sample size and selection criteria**: A total of 1030 infertile women in the age group of 18 to 40 years were enrolled. **Institutional Ethical committee** approval was obtained (CSP - MED/17/AUG/37/85). **Written consent** was taken from all the participants.

Strategy for collection: A detailed history and clinical examination were performed for all the participants. Blood pressure was recorded in the sitting position in the left arm, height and weight were recorded and BMI was calculated. Waist circumference was measured halfway between the lower ribs and the crest of pelvis. Hip circumference was measured at the widest part of the hips and waist to hip ratio is calculated. The laboratory evidence for MBS was assessed by measuring HDL -C, serum triglycerides, oral glucose tolerance test (OGTT) with 75 grams of glucose.

The MBS was defined according to the modified American Heart Association/ National Heart Lung Blood Institute AHA/NHLBI (ATP III 2005) definition. It was diagnosed if at least three out of five criteria are present (i) waist circumference of $\geq$ 80 cm (ii) blood pressure of $\geq$ 130 /85 mm Hg (iii) fasting blood sugar of $\geq$ 100 mg/dl (iv) triglycerides of $\geq$ 150 mg/dl and (v) HDL - C of $\geq$ 50 mg/dl (6)

Based on Rotterdam's criteria (2003), the entire study population were divided into two groups – PCOS and Non PCOS groups. Then both the groups were compared for the baseline parameters and the components of MBS. The prevalence of MBS is evaluated among the infertile women, among PCOS and non PCOS women.

Data analysis: The collected data was analyzed with IBM.SPSS statistics software 23.0 Version. To describe about the descriptive data, frequency analysis was used, percentage analysis was used for categorical variables and for continuous variables the mean and S.D was used. To find the significant difference between the bivariate samples in independent groups, the unpaired sample – t test was used. To find the significance of association in categorical data, Chi – square test was used. The probability value of 0.05 was considered as significant level.

Results

A total of 1030 patients were analyzed These women were in the age group of 19 to 40 years with the mean age of 28.8 $\pm$4.5 years. The mean BMI was 26.9 $\pm$ 3.7kg/m2. The mean systolic blood pressure was 124.8 $\pm$ 11.3 mm hg, mean diastolic blood pressure was 82 .7 $\pm$ 9.7 mm hg. The metabolic parameters are depicted in (Table 1). Based on the Rotterdam's criteria, 40.8% had PCOS and remaining 59.1% were Non PCOS. The details of comparison of both the groups are depicted in (Table 2).

Majority of women had waist circumference > 80cm and HDL < 50mg/dl more so among the infertile PCOS women. The abnormal GTT was significantly more in PCOS women depicted in (Table 2). The overall prevalence of MBS was 35.3% and was significantly more among the PCOS women (44.7% vs 28.9%)

Discussion

In the modern world, MBS has become a novel non – communicable disease (NCD) in young urban, infertile women. This might be due to acquisition of western lifestyle and consumption of high carbohydrate low fiber fast food. The MBS feeds to other NCD like type II diabetes mellitus, coronary artery disease, stroke as long term sequale.

The present study evaluated the prevalence of MBS in the infertile PCOS and Non PCOS women. This is one of the few studies in south India comparing the prevalence of MBS in both PCOS and Non PCOS women. The prevalence of MBS among the infertile women was 37.3%, with 44.7% and 28.9% among PCOS and Non PCOS women respectively. The prevalence among PCOS women in 2011 was 37.5% (7) which has increased dramatically to 43%. (5) This might be due to life style modification with increase in the incidence of PCOS in the present scenario. This might also be one of the reasons for increase in the incidence of type II DM among the Indian population.

So, screening for MBS should be part of initial evaluation of infertile women so that primary prevention can reduce long term sequalae. As this evaluation involves both the clinical and laboratory parameters, it is cost effective and acceptable to the population. This can be considered an ideal time for counseling as the women will be more receptive when seeking evaluation for infertility.

The prevalence of MBS is found to increase with BMI. In the present study, mean BMI among infertile women, both PCOS and Non PCOS were in the overweight range. So initial counseling about life style modifications in these women adds to the long-term benefits of reducing the complications of type II DM and cardiovascular disease.

The measurement of waist circumference (WC) in the first outpatient visit can be one of the screening methods. Women with WC > 80cms is one of the predictors for MBS unlike previous studies where the cut off was taken as > 88cm. With this reduction in cut off value, there is 3 - 4 fold increase in number of women diagnosed with MBS. This might be suitable as the cut off of BMI is 23kg/m2 for the Asian population when compared to western population. The strength of the study is the prospective study design with a large sample size, study in a tertiary care center catering to population of south India, involving infertile women with both PCOS and Non PCOS. This is one of the few studies estimating the prevalence of MBS in infertile women, PCOS and Non PCOS.

Conclusion

The prevalence of MBS among infertile women was 35.3%. It is showing an upward trend among infertile PCOS and Non PCOS women. So early screening for MBS can reduce the long term sequale.

Recommendation

Even though MBS is common in PCOS women, 28.9% of Non PCOS infertile women had MBS. So, screening all infertile women can identify the vulnerable population at risk for the two most common Non Communicable disease at a later date. This helps in counseling and life style modification.

Limitation of the study

The limitation of the study is it is conducted in a single tertiary care center. So, a community-based study or multi centric study with fertile women as control are required.

Relevance of the study

Till now screening for MBS was done most commonly among the PCOS women. This study highlights the importance of screening all infertile women.

Authors Contribution

We acknowledge all the staff, post graduates and the patients for conducting this study.

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Tables

TABLE 1 METABOLIC PARAMETERS OF STUDY POPULATION WITH PREVALENCE OF MBS

Parameters	Mean ± SD
Waist circumference (cm)	92.2 ± 8.9
FBS (mg/dl)	94.4 ± 13.9
2 hr OGTT (mg/dl)	122.2 ± 31.0
Triglycerides(mg/dl)	124.7 ± 39.3
LDL (mg/dl)	102.3 ± 21.9
HDL	40.4 ± 7.2
Prevalence of MBS	35.3%

TABLE 2 COMPARISON OF THE PARAMETERS BETWEEN PCOS & NON PCOS INFERTILE WOMEN.

Parameters	PCOS N=421)	Non PCOS (N=609)	P VALUE
AGE (years)	27.8 ± 3.8	29.53±4.7	0.0005
BMI(Kg/m2)	27.6 ± 3.8	26.4 ± 3.5	0.0005
WC(cm)	93.8 ± 8.9	91.1 ± 8.8	0.0005
Waist/Hip ratio	0.87 ± 0.05	0.82 ± 0.05	0.001
Systolic BP	126.9 ± 7.3	125.45 ± 7.6	0.274
Diastolic BP	82.0 ± 6.3	81.9 ± 5.8	0.865
FBS	95.43 ± 11.00	93.72 ± 15.5	0.05
2Hrs OGTT	126.6 ± 29.6	119.4 ± 31.6	0.0005
TGL	130.80 ± 42.7	120.9 ± 36.2	0.0005
HDL	39.1± 6.6	41.5 ± 7.3	0.0005
LDL	102.5 ± 20.1	102.1± 22.9	0.806
Prevalence of MBS	44.7% (188/421)	28.9% (176/609)	0.0005