ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
Index Copernicus Value: 68 . 16
PubMed - National Library of Medicine - ID: 101731606

*International Journal of Medical Science and Innovative Research (IJMSIR)*
*IJMSIR : A Medical Publication Hub*
*Available Online at: www.ijmsir.com*
*Volume – 5, Issue –2, April - 2020, Page No. : 61 - 65*

# The prevalence of thyroid dysfunctions in metabolic syndrome, females are more prone than males

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**Citation this Article:** Dr. Sowjanya Reddy B, Dr. Srinivas Aditya S,"The prevalence of thyroid dysfunctions in metabolic syndrome, females are more prone than males", IJMSIR- April - 2020, Vol – 5, Issue -2, P. No. 61 – 65.

**Type of Publication:** Original Research Article

**Conflicts of Interest:** Nil

## Abstract

**Introduction:** Metabolic syndrome or Insulin resistance syndrome is a cluster of metabolic abnormalities, where in people are obese and have hypertension, dyslipidemia, elevated glucose levels and a multifactorial disorder associated with the development of cardiovascular, neurological, immunological, renal and endocrine disease. Metabolic syndrome (MetS) is a condition harboring a group of metabolic abnormalities where insulin resistance (IR) plays a major role. The aim of our study is to evaluate need of thyroid dysfunction and prevalence MetS in males and females.

**Materials and methods:** A total of 60 patients male and females who satisfied the criteria of International diabetic federation of metabolic syndrome were randomly allocated to study. The study was conducted between September 2011 to October 2012. The significance level was tested at $p<0.05$ with a confidence interval of (CI) 95%.

**Results:** The study subjects where aged between 18 to 60 years, males were 24 (40%) and female were 36 (60%) with the 46.66% (mean 45.6) of patients with the age of 41-50 years, 28.33% (mean 56.3) of age**:** of 51-60 years, 16.66% with age of 31-40 years, 6.66% with the age of 21-30 years and least 1.66% with age of less than 20 years. The mean age of patient with metabolic syndrome (MetS) was 41.5±18.5 years in both male and female ($P<0.03$). Its prevalence was 60% among the female population (n=60), and 40% in male counterpart (n=60) ($p>0.05$). Thyroid function test revealed 48 patients were Euthyroid, 3 patients were Hypothyroid, 8 patients were Subclinical Hypothyrpoid and 01 patient is Subclinical Hyperthyroid. There were no overt Hyperthyroid patients in the study. Thyroid dysfunction is 20% prevalent in Metabolic syndrome patients. Among the Thyroid dysfunction, Subclinical Hypothyroidism is highly prevalent 13.33%, Hypothyroidism is 5% prevalent and Subclinical Hyperthyroidism is 1.67% prevalent. There were no overt hyperthyroid patients in the study.

**Conclusions:** The results suggest that patients with metabolic syndrome significantly increased chances of

thyroid dysfunctions and prevalence of thyroid dysfunction is more in female patents when compare to males. Thyroid function test may be added as one of the basic tests for the patients with metabolic syndrome (MetS).

**Keywords:** Body mass index (BMI), Metabolic syndrome, Thyroid dysfunctions, weight, circumference.

**Introduction**

Metabolic syndrome or Insulin resistance syndrome is a cluster of metabolic abnormalities, where in people are obese and have hypertension, dyslipidemia, elevated glucose levels and a multifactorial disorder associated with the development of cardiovascular, neurological, immunological, renal and endocrine disease [1]. Metabolic Syndrome is rapidly becoming the primary cause for morbidity and mortality in the industrialized world surpassing infection, trauma and smoking related disorders. Metabolic Syndrome is a cluster of metabolic abnormalities wherein people are obese and have hypertension, dyslipidaemia, elevated glucose levels [2]. Metabolic syndrome is a multifactorial disorder associated with development of cardiovascular, neurological, immunological, renal and endocrine disease. Metabolic syndrome is also known as Syndrome X or Insulin resistance Syndrome [4]. It consists of a combination of metabolic abnormalities such as Central Obesity, Atherogenic Dyslipidemia (Elevated Triglycerides and Apolipoprotein B, small LDL particles and low HDL Cholesterol [HDL-C] concentrations), Elevated Blood Pressure and Elevated Plasma Glucose levels. According to previous study mortality in metabolic syndrome is thrice that of heart stroke [5]. In thyroid dysfunctions such as hypothyroidism is associated with obesity, hypertension, decreased HDL and elevated triglycerides, it may be associated with metabolic syndrome [5]. Coronary artery atherosclerosis is twice as common in patients with hypothyroidism compared with sex and age-matched controls, and adequate thyroid hormone replacement therapy may protect against the progression [6]. The prevalence of diabetes, premature coronary artery disease and dyslipidemia are higher among the Metabolic Syndrome patients due to rapid changes in lifestyle, food habits, demography, economic development and partly due to genetic predisposition. Thyroid hormones have ubiquitous effects and influence the function of most organs. These hormones appear to serve as a general pacemaker accelerating metabolic process and may be associated with Metabolic Syndrome.

The objective of the current study is to study the prevalence of thyroid dysfunction and its component in metabolic syndrome (MetS).

**Materials and methods**

In the current prospective cohort studies 60 patients from Kameneni Institute of medical sciences, Narkatpally, Telangana who were attending the OPD of General Medicine Department from the year of September 2011 to October 2012, who satisfied the criteria of International diabetic federation of metabolic syndrome were randomly allocated to study. The inclusion criteria of central obesity- waist circumference>=90cm for men and >=80cm for women and any two of the following factors, raised TG level>=150mg/dl, Reduced HDL cholesterol<40mg/dl in males and <50mg/dl in females, Raised BP>=130/85mmHg or medication, Raised fasting glucose >=100mg/dl or previously diagnosed type 2 diabetes and individuals above the age of 18 years were enrolled. Known cases of hypo and hyper thyroid diseases, use of steroids, severely ill, pregnant women

and individuals below 18 years of age were excluded from the studies.

All of the anthropometric measurements of subjects' height, weight, and WC (Wiest Circumference) were recorded. WC was measured with a simple folding tape at the natural waistline (the level of the umbilicus) in a horizontal plane. Body mass index (BMI) was obtained by dividing the body weight (kg) by the square of height (m). Blood pressure of each case was measured with a standard sphygmomanometer.

**Biochemical investigations-** Each venous sample was drawn after a minimum fasting period of 12 hours (h). All samples were collected between 08:00 and 09:00 hours and centrifuged, separated serum was used for investigating Fasting blood glucose, Post-prandial glucose, Serum electrolytes, Fasting lipid profile, Blood urea, Serum creatinine where performed by using turbidimetric based autoanalyzer, Erba 200 (Transasia Bio-Medicals Ltd, Germany) was used. Hematological investigations were performed by cell counter (H360 -3 parts, Transasia Bio-Medicals Ltd, Germany) Complete blood picture. Thyroid profile was done by using CLIA (Chemiluminescence Immunoassay) make Mindray Pvt Ltd. Good clinical laboratory practice (GCLP) was maintained before processing the samples to avoid bias in sample processing and its results.

**Statistical analysis:** Grpahpad Prsim (version7.0, USA) was used to perform Student's *t* test and chi-square test where ever it was applicable the level significance was $p<0.05$, with confidence interval (CI) of 95%.

**Results**: The study subjects where aged between 18 to 60 years, males were 24 (40%) and female were 36 (60%) with the 46.66% (mean 45.6±4.43) of patients with the age of 41-50 years, 28.33% (mean 56.3±3.73) of age of 51-60 years, 16.66% with age of 31-40 years, 6.66% with the age of 21-30 years and least 1.66% with age of less than 20 years. Its prevalence was 60% among the female population (n=60) and 40% in its male counterpart (n=60) ($p>0.05$). The mean age of patient with metabolic syndrome (MetS) was 41.5±18.5 years in both male and female ($P<0.03$), (Figure 1). Thyroid function test revealed, 48 patients were Euthyroid, 3 patients were Hypothyroid, 8 patients were Subclinical Hypothyrpoid and 01 patient is Subclinical Hyperthyroid. There were no overt Hyperthyroid patients in the study. Thyroid dysfunction is 20% prevalent in Metabolic syndrome patients. Among the Thyroid dysfunction, Subclinical Hypothyroidism is highly prevalent 13.33%, Hypothyroidism is 5% prevalent and Subclinical Hyperthyroidism is 1.67% prevalent. There were no overt Hyperthyroid patients in the study (Figure 2).

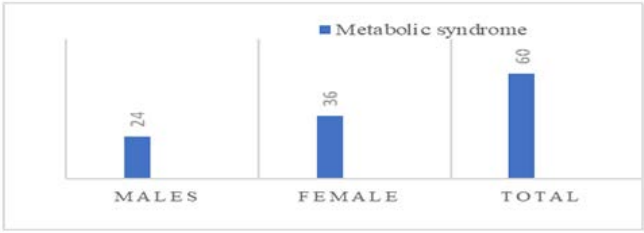


Figure 1: Distribution of sex in metabolic syndrome

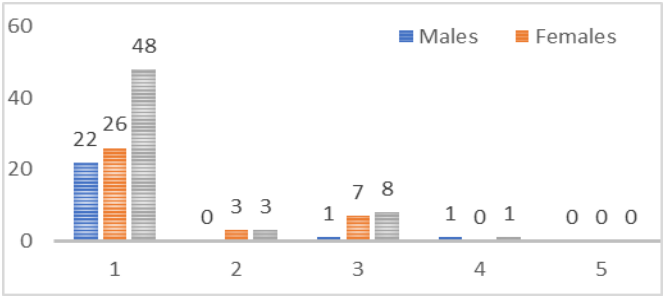


Figure 2:Thyroid dysfunction in patents with metabolic syndrome

**Discussion**

In the current study, we reported the prevalence of thyroid dysfunctions are more in female (60%) than that of males (40%). We determine that the frequency of Metabolic syndrome was much higher than that of

prevalence studies on Turkey [7]. Ozsahin et al. and Kozan et al. have determined the prevalence of metabolic syndrome using the same criteria as 33.4% and 33.9%respectvely. The prevalence of Metabolic syndrome was found to be similar in both sexes (61% in women, 55% in men). Metabolic syndrome as significantly more prevalent in women in the national prevalence studies by Ozsahin et al. 39.1% vs 23.7%) and Kozan et al [7] (39.6% vs 28%). This may potentially be attributable, at least partially to the selected group [8]. That is Metabolic syndrome may be a risk factor for thyroid diseases. In some countries, MetS has been reported to be more prevalent among women, whereas in others, the prevalence of the syndrome was similar in two sexes [11,12]. Conside [9] ring the female dominance of nodular thyroid disorders i.e. 80% of the study group was female), one might expect to see this in MetS prevalence also. Prominently increased frequency of MetS in this special population might have swept away this difference. Thyroid hormones have a potential to act as a general metabolic controller organizing many metabolic processes and, as shown in previous studies, they may be associated with MetS and/or its components [4, 10-11]. Though there is scarce information on the effect of hyperinsulinemia in the development of thyroid nodules or thyroid cancer, recent studies have shown the existence of a relationship between MetS and thyroid functional and morphological abnormalities [4,5]. Rezzonico et al. reported that cases with hyperinsulinemia have larger thyroid glands and a higher prevalence of thyroid diseases [4] all these studies supports our study.

**Limitations:** Small sample size was the limitation of the study, further studies are warranted with large sample size with other cofounding factors.

**Conclusion**

In conclusion, when population data is considered, we clearly demonstrated that the prevalence of thyroid dysfunction is more in females with metabolic syndrome. We further demonstrated that one fifth of metabolic syndrome patients has hypothyroidism either overt or subclinical. These finding indicate the need for investigation of thyroid profile to detect the thyroid dysfunction during management of metabolic syndrome patients.

**References**


1. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive summary of the third report of the national cholesterol education program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults. JAMA 2001;285:2486-2497.
2. Vella V, Sciacca L, Pandini G, et al. The IGF system in thyroid cancer: New concepts. Mol Pathol. 2001;54:121-124.
3. Arcidiacono B, Iiritano S, Nocera A, et al. Insulin resistance and cancer risk: An overview of the pathogenetic mechanisms. Exp Diabetes Res. 2012;2012:789174.
4. Rezzonico J, Rezzonico M, Pusiol E, Pitoia F, Niepomniszcze H. Introducing the thyroid gland as another victim of the insulin resistance syndrome. Thyroid. 2008;18:461-464.
5. Ayturk S, Gursoy A, Kut A, Anil C, Nar A, Tutuncu NB. Metabolic syndrome and its components are associated with increased thyroid volume and nodule prevalence in a mild-to-moderate iodine-deficient area. Eur J Endocrinol 09;161:599-605.

6. Rezzonico JN, Rezzónico M, Pusiol E, Pitoia F, Niepomniszcze H. Increased prevalence of insulin resistance in atients with differentiated thyroid carcinoma. Metab Syndr Relat Disord. 2009;7:375-380.
7. Gursoy A. Rising thyroid cancer incidence in the world might be related to insulin resistance. Med Hypotheses. 2010;74:35-36.
8. Kozan O, Oguz A, Abaci A, et al. Prevalence of the metabolic syndrome among Turkish adults. Eur JClin Nutr 7;61:548-53.
9. Ozsahin AK, Gokcel A, Sezgin N, et al. Prevalence of the metabolic syndrome in a Turkish adult population.Diabet Nutr Metab 2004;17:230-234.
10. Pitoia F, Abelleira E, Bueno F, Urciuoli C, Schmidt A, Niepomniszcze H. Insulin resistance is another factor that increases the risk of recurrence in patients with thyroid cancer. Endocrine 2015;48:894-901.
11. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive summary of the 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). JAMA 2001;285:2486-2497.
12. Vella V, Sciacca L, Pandini G, et al. The IGF system in thyroid cancer: New concepts. Mol Pathol 2001;54:121-124.
13. Arcidiacono B, Iiritano S, Nocera A, et al. Insulin resistance and cancer risk: An overview of the pathogenetic mechanisms. Exp Diabetes Res. 2012;2012:789174.
14. Rezzonico J, Rezzonico M, Pusiol E, Pitoia F, Niepomniszcze H. Introducing the thyroid gland as another victim of the insulin resistance syndrome.Thyroid. 2008;18:461-464.
15. Ayturk S, Gursoy A, Kut A, Anil C, Nar A, Tutuncu NB. Metabolic syndrome and its components are associated with increased thyroid volume and nodule prevalence in a mild-to-moderate iodine-deficient area. Eur J Endocrinol 09;161:599-605.
16. Rezzonico JN, Rezzónico M, Pusiol E, Pitoia F, Niepomniszcze H. Increased prevalence of insulin resistance in patients with differentiated thyroid carcinoma. Metab Syndr Relat Disord 2009;7:375-380.
17. Gursoy A. Rising thyroid cancer incidence in the world might be related to insulin resistance. Med Hypotheses 010; 74:35-36.