STUDIES ON METABOLIC SYNDROME AND ITS MANAGEMENT WITH LIFE STYLE MODIFICATION, IN NON DIABETIC INDIVIDUALS.

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ABSTRACT

The epidemic of diabetes and cardiovascular disease in India is thought to be a presentation of metabolic syndrome. Despite of howling advancements in medical field insulin resistance and metabolic syndrome are still untouched and had already griped the globe. Till date, no medicinal therapy has shown any significant results while treating a patient of Insulin Resistance or Metabolic Syndrome. Number of studies concluded that more or less this Metabolic Syndrome is related with the diet habit of an individual. Acharya Vagbhat in his treaties had very scientifically stated that all diseases have their origin in stomach & in Yogratnakar it is clearly stated that human being should have meals only twice and nothing should be consumed in between two meals. Present research work in taken with an aim to study and assess the effect of the modified diet regime on the metabolic syndrome in non diabetic patients.

KEYWORDS: Metabolic Syndrome, Insulin Resistance.

INTRODUCTION

Metabolic Syndrome(MS) is a condition emerging out of Insulin resistance (IR) which may or may not have any clinical presentation and hence may cause enormous damage leading to conditions like diabetes mellitus, coronary artery disease, cerebro-vascular accidents, renal ischemic disorders, carcinoma of various origins, hypertension, transient ischemic attack, acute metabolic complications including hyperglycemia and hypoglycemia and mainly affects the vasculature resulting into micro and macro angiopathies.[1] Huge number of studies has indicated that insulin resistance and metabolic syndrome are the cause of emerging epidemic of coronary artery disease and type 2 diabetes mellitus.[2] Insulin exerts
number of physiological actions on the body tissue particularly on skeletal tissues, liver cells and adipose tissues. It is responsible for storage of glycogen as fuel and also prevents the lysis or breakdown of stored fuel. Insulin resistance is the condition where this binding of insulin to its receptor and thereby activation of its metabolic actions are either totally absent or are not optimum.

It was Kylin in 1923, who first observed and described the simultaneous presence of hypertension, hyperglycemia and hyperurecimia in huge population.\[^3\] In 1936, Himsworth, was the first to notice the necessity of periodical increase of insulin dose in diabetics, despite of sticking to all do’s and don’ts.\[^4\] With this observation he concluded and reported insulin insensitivity in diabetics. In 1988, Reaven rivetingly addressed the clustering of multiple metabolic irregularities and named it as Syndrome X.\[^5\] Syndrome X, cardiometabolic syndrome, insulin-resistance syndrome, beer belly syndrome, cardio-vascular dysmetabolic syndrome, Reaven’s syndrome are the synonyms that were previously used for metabolic syndrome.\[^6\]

**Epidemiology**

Metabolic syndrome accounts for clustering of numerous risk factors that contributes towards 5 fold increased risk for diabetes mellitus and 2-fold increased risk for coronary artery diseases.\[^7\] Sounjanya et al; studied and concluded that the prevalence of insulin resistance and metabolic syndrome is significantly high in diabetes mellitus than in patients with normal glucose tolerance test.\[^8\] Number of studies had suggested that the prevalence of metabolic syndrome in Indian urban population is as much as 33% with higher incidences in men in their 4\(^{th}\) to 6\(^{th}\) decade of life.\[^9\] The International Diabetes Federation estimated that the number of diabetes patient has doubled from 19 million in 1995 to 40.9 million in 2007 and it is projected to increase to 69.9 million by 2025.\[^10\] Almost 11% of urban population and 3% of rural population above the age of 15 are having diabetes. WHO estimated that diabetes and heart disease tolls India approximately $210 billion and it is suppose to increase up to $335 billion in next ten years.\[^11\]

**Rationale**

This epidemic of diabetes and cardiovascular disease in India is thought to be a presentation of metabolic syndrome. Despite of howling advancements in medical field insulin resistance and metabolic syndrome are still untouched and had already griped the globe. Till date, no medicinal therapy has shown any significant results while treating a patient of IR or MS.
Today, modern medicine has opened up various new vistas for the management of DM and CAD. But still the prevention of IR or MS is neither that intensively studied and nor even practiced. Considering the lacuna and magnitude of the problem, it is the need of the hour to explore a complete curative and preventive strategy that will allow the reversal of IR and thereby MS.

Number of studies concluded that more or less this MS is related with the diet habit of an individual. Acharya Vagbhat in his treaties had very scientifically stated that all diseases have their origin in stomach.\cite{12} He also mentioned the importance of having a healthy diet habit and life style. Acharya Sushruta and Yogratnakar have clearly mentioned that meal should be consumed only twice and nothing should be consumed in between two meals.\cite{13} The said research work is hence taken with following aims and objectives.

**Aims**
To study and assess the effect of the modified diet regime on the metabolic syndrome in non diabetic patients.

**Objectives**
1. To study and assess the effect of modified diet regime on individual parameters of metabolic syndrome i.e. on fasting glucose levels, high density lipoproteins, triglyceride levels and blood pressure in patients of metabolic syndrome.
2. To study the effect of modified diet regime on obesity in patients of metabolic syndrome.
3. To study and discuss the limitations of modified diet regime, if any.

**Criteria for the selection of patient**

**Inclusion Criteria**
(1) Patients were randomly selected irrespective of their sex, religion and ethnicity.
(2) All non diabetic individuals fulfilling the IDF criteria were enrolled for current study.\cite{14}

**Exclusion Criteria**
(1) Patients below 16 yrs. of age and above the age of 60 yrs. were excluded from study.
(2) Severely ill patients were not included in study.
(3) Patients presenting with gross hypertension were not enrolled for the study.
Methodology
The work was carried out in the OPD and IPD of Kayachikitsa Dept. of C.S.M.S.S.Ayurved College, Aurangabad. After obtaining return consent the participants were subjected to following modification in lifestyle. Duration of the trial was for 16 weeks.
1. Subjects were advised to have meals twice daily with an interval of 8-10 hrs.
2. Subjects were instructed to have absolute abstinence from consuming anything in between two meals.
3. Abstinence for any type of special food or food type was not advised.
4. Only sugar free tea/coffee/milk etc. was allowed twice daily.
5. Breakfast and small frequent meals were strictly avoided.
6. Brisk walking for 45 minutes daily was a compulsion.

Criteria for assessment
(1) Each patient was evaluated before and after the treatment for.
   a. Fasting and post meal glucose.
   b. Lipid profile.
(2) Clinically each patient was subjected for estimation of BMI and BP monitoring before and after treatment.
(3) Waist circumference was measured before and after the trials.
(4) For systematic assessment of the patients, the final clinical data collected was statistically analyzed and accordingly conclusions were drawn.

Observations
In this study, in all 53 subjects were scrutinized clinically and pathologically. Out of these 53 subjects, 21 subjects fulfilled the criteria led by IFD for MS. Four subjects dropped out and their observations are not included in the study. Finally conclusions are drawn based on the following observation of 17 subjects.
1. In this study, it was observed that 16 (94.17%) subjects were noted to have obesity, based on their BMI.
2. It was observed that 05 subjects (29.41%) presented with FBS above 100 mg%.
3. All the 17 (100%) subjects were reported to have triglycerides above 150 mg%.
4. 6 subjects (35.29%) presented with HDL levels less than 40 mg%.
5. Systolic blood pressure was found to be above 130 mm of Hg in 8 subjects (47.05%) and diastolic blood pressure was found to be raised above 85 mm of Hg in 5 subjects (29.41%).
6. None of the subjects were having exercise as a ‘routine’ in their daily schedule.
7. All the subjects reported to have a diet habit which included breakfast, lunch, dinner, additional small supper in the evening hours and minimum of 4 to 5 times of tea with sugar.
8. After implementation of the program 16 subjects showed considerable weight reduction.
9. A reduction of minimum of 3 kg to maximum of 6 kg of weight was seen.
10. Reduction in the values of BMI was seen in 16 subjects and shown to be statistically significant by application of paired ‘t’ test.
11. A considerable reduction in the abdominal girth was noted in 94.17% of subject which ranged from 3.5cm to 9 cm. By conventional criteria after application of paired ‘t’ test this difference is proved to be statistically significant.
12. FBS of 3 out of 5 subjects who presented with FBS above 100 mg% but below 126 mg% reported to have the levels reduced below 100 mg% at the completion of the trials. This difference by way of paired ‘t’ test is not statistically significant.
13. Drastic reduction in the levels of triglycerides was seen in all 17 subjects and the differences in the values before and after treatment has proved to be statistically significant.
14. HDL levels were increased in all 6 subjects who previously presented with subnormal levels. Paired ‘t’ test showed this difference to be statistically significant.
15. Changes in the levels of systolic and diastolic blood pressure were statistically significant, but most of the values were either within normal range before and after the course or were out of range before and even after completion of the course.

CONCLUSION
1. From the above observations it can be concluded that the said modified diet plan significantly reduces the weight and thereby helps in reducing the central obesity.
2. It can also be inferred that this lifestyle has a considerable effect on the FBS levels and definitely is useful in maintaining normoglycemic state.
3. This regime had positively affected the fat metabolism and therefore raises the level of HDL and reduces the level of triglycerides.
4. This study notifies that this modified life style have not affected the controlling of blood pressure but still continuing the same practice for longer period may show some encouraging results in maintaining of blood pressure to normalcy.

5. This study also suggests that adopting the said modified lifestyle directly reduces the probability of having DM.

6. The study also indicates that the chances of having CAD can be significantly reduced by adopting the mentioned lifestyle.

This is partial fulfillment of the aims and objectives and further intensified research is necessary in order to evolve an effective strategy for prevention of metabolic syndrome.

REFERENCES


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