Analysis of Nidan (Etiological Factors) Of Metabolic Syndrome.

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Abstract

Metabolic syndrome is a clustering of at least three of these-Abdominal (central) obesity, Elevated blood pressure, Elevated fasting plasma glucose, High serum triglycerides and Low high-density lipoprotein (HDL) levels. In recent years, there is an alarming increase in metabolic syndrome. The overall prevalence rate of metabolic syndrome is 33.5%. It is 24.9% in males and 42.3% in females. The terminology 'Metabolic syndrome' represents its relation with metabolism. It can be said that disequilibrium of metabolism causes metabolic syndrome. The word metabolism can be correlated with 'concept of Agni' described in Ayurveda because entire range of digestive and metabolic activities of the body take place with the help of the biological fire of the body called Agni. This study was conducted to explore the *nidan* (Etiological factors) of metabolic syndrome based on basic concepts of *Ayurveda* and it suggest to think about overcoming mental stress (as one of the prominent etiological factor) while managing Metabolic syndrome.

Keywords: *Achar, Agni, Ahar,Metabolic syndrome, Nidan and Vihar.*

Introduction

Metabolic syndrome, is a clustering of at least three of these -Abdominal (central) obesity, Elevated blood pressure, Elevated fasting plasma glucose, High serum triglycerides and Low high-density lipoprotein (HDL) levels. In recent years, there is an alarming increase in metabolic syndrome.[1] The overall prevalence rate of metabolic syndrome is 33.5%. It is 24.9% in males and 42.3% in females. The factors which increase the risk of metabolic syndrome are older age, female gender, general obesity, inadequate fruit intake, hypercholesterolemia, and middle–to-high socioeconomic status. The treatment of it is symptomatic because of unknown aetiology. It is generally accepted that the current food environment contributes to the development of metabolic syndrome.[2,3]

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There is no any resembling term in Ayurveda for metabolic syndrome. But there is a quote related to genesis of any disease is '*loZjksxssssfieansXukS*[4]. The terminology 'Metabolic syndrome' represents its relation with metabolism. It can be said that disequilibrium of metabolism causes metabolic syndrome. The word metabolism can be correlated with 'concept of Agni' described in Ayurveda because entire range of digestive and metabolic activities of the body take place with the help of the biological fire of the body called *Agni.* There are three types of *agni-Jatharagni*, *Bhutagni* and *Dhatvagni*. The *Jatharagni*is the most important *Agni* which digests all types of food and transforms them into *Rasa* and *Mala. Jatharagni* is the master *Agni* which controls and regulates other two types of *Agni* viz. *Bhutagni* and *Dhatvagni.* It is primarily situated in *Mahastrotas* (Gastro intestinal tract). *Acharya Charak*has described that *dirghayu, smruti, medha, arogya, tarunavaya, prabha, Varna, swara, aoudarya, deha-indriyabala* are all dependent on the status of *Agni.* When this *Agni* becomes abnormally weak, it leads to production of improperly processed by-products of digestion and metabolism. It is called as '*Aam*'. This

Aam acts as a toxic material. The presence of *Aamdosha* in the body produces many types of abnormalities in various *Strotas*as (Micro-channels) and pathogenesis of disease process may start[5].

Need of Study: Metabolic syndrome is major lifestyle disorder. Its prevalence has increased drastically over a past few decades. It has no radical cure. So it is an urgent need to discover its etiological factors so that it can be prevented and controlled by using treatment principle of Ayurveda i.e. '*Nidanparivarjan* '[6].

This study was designed to find out the etiological factors of metabolic syndrome based on *ahar*, *vihar* and *achar* described in Ayurveda.

Aim and Objectives:

Aim: Exploration of *Nidan* (Etiological factors) of Metabolic syndrome based on basic concepts of Ayurveda.

Objectives:

- To study the etiological factors related to *Ahar* (diet)
- To study the etiological factors related to *Vihar* (Daily activity).
- To study the etiological factors related to *Achar* (Intuitive behaviour).

Material and Method

Place of Study–OPD of kayachikitsa and peripheral OPDs attached to institute.

Study design-Cross-sectional.

Study type-Analytical case control study.

Sample size-Total 300 (each group 150).

(The sample size was calculated as per the prevalence of metabolic syndrome in India.)

Grouping-Two groups (case and control)

Inclusion Criteria:

1. Age group of 30-50 years irrespective of sex.
2. Known patients of metabolic syndrome for case group.
3. Healthy person from patient's family for control group.

Exclusion Criteria:

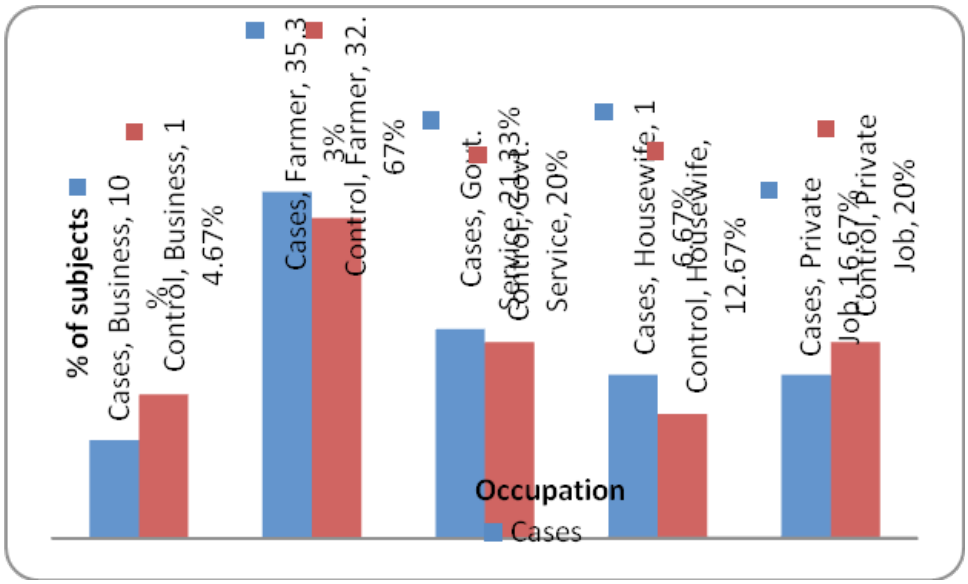
1. Bed ridden patients.
2. Subjects those who are unable to answer the questionnaire.

Selection of subject - Subjects were selected from above said study places by organizing special health check-up camps. Subjects were selected according to above mentioned criteria to case and control group. The approval from Institutional ethics committee was taken before started the study (IEC no. DMIMS(DU)/ IEC/2017-18/6393) (Annexure 1) before commencement of study, consent was taken from each subject. (Annexure 2). All the subjects were exposed to structured proforma prepared to note their *dinacharya*. Case proforma (Annexure 3) was designed in such a way that the factors related to *Ahar*, *Vihar*and*Achar* were covered.

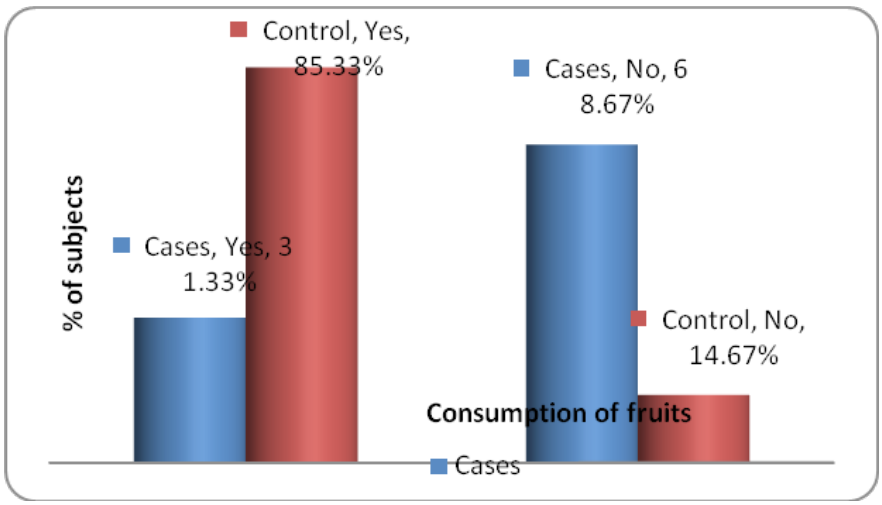
Observation and Results

This study entitled "*Analysis of nidan* (Etiological factors) of metabolic syndrome." was conducted in institute.

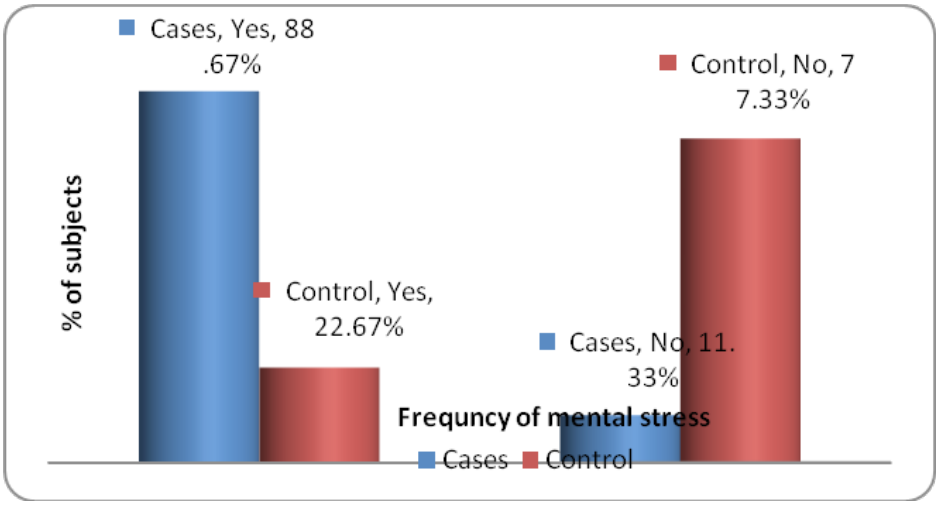
Total 300 volunteers were included in the study. The data obtained was coded and entered into Microsoft Excel Worksheet. Statistical analysis was done by using descriptive and inferential statistical using chi-square test and student's unpaired t test and software used in the analysis were SPSS 22.0 version and Graph Pad Prism 7.0 version and $p<0.05$ is considered as level of significance.



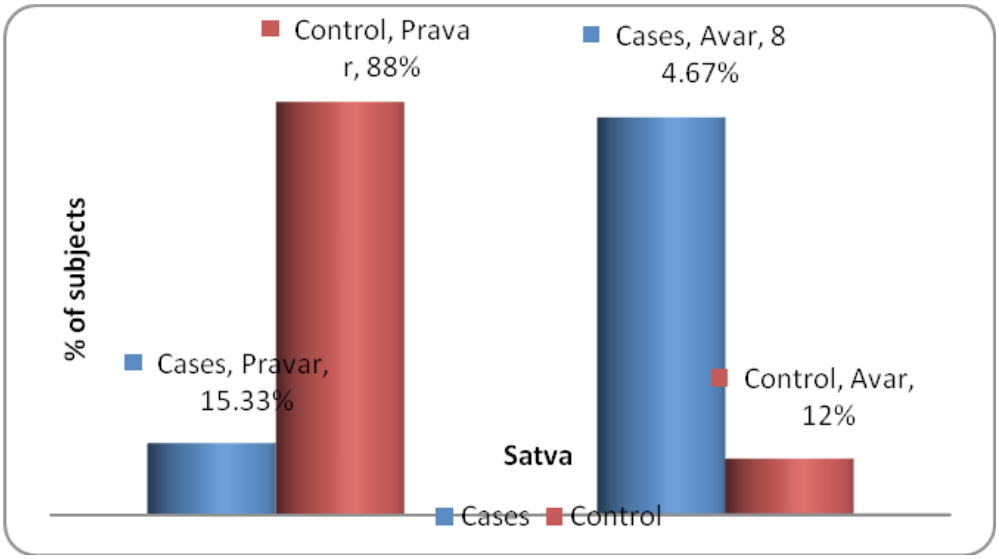
Graph 1: Distribution of subjects in both groups according to their occupation



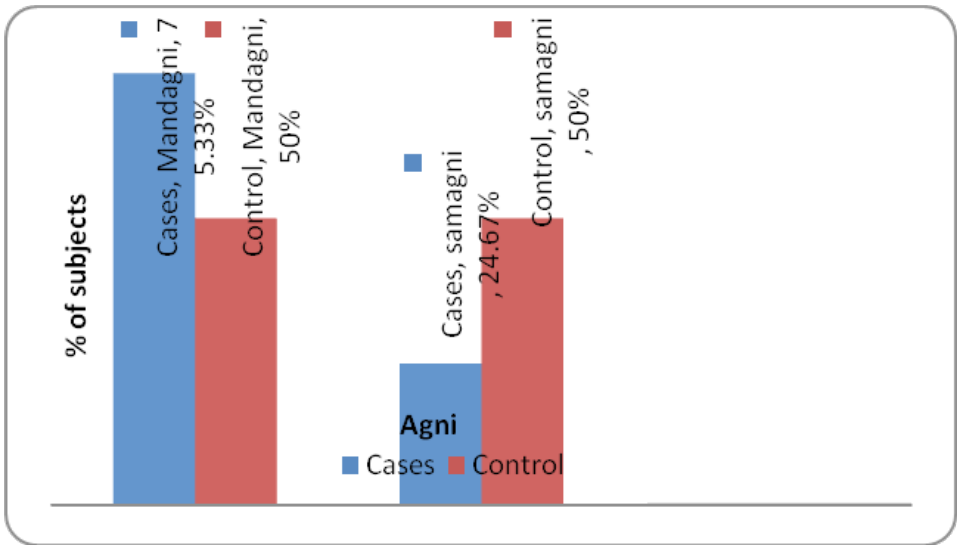
Graph 2: Distribution of subjects in both groups according to consumption of fruits (fruits consumption minimum thrice a week)



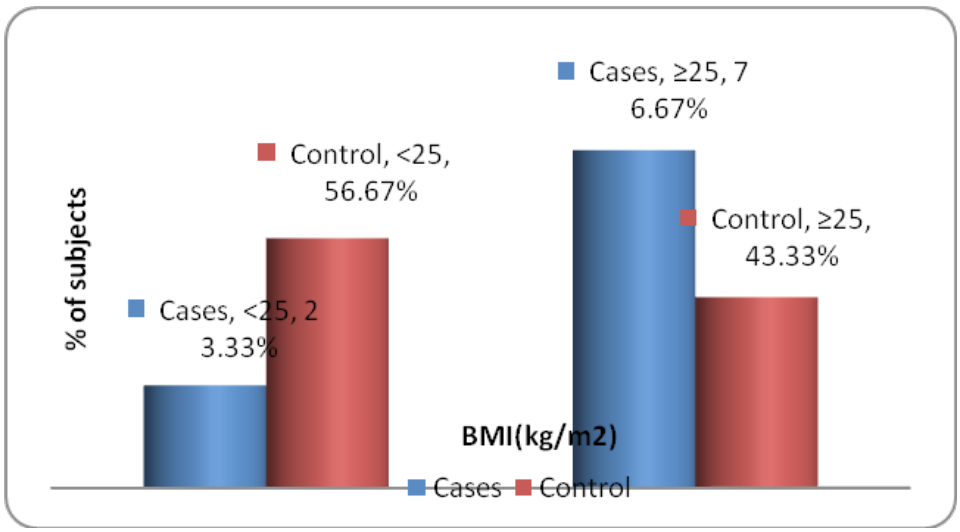
Graph 3: Distribution of subjects in both groups according to frequency of mental stress



Graph 4: Distribution of subjects in both groups according to type of *satva*



Graph 5: Distribution of subjects in both groups according to *Agni*



Graph 6: Distribution of subjects in both groups according to BMI

Discussion

In this study total 300 subjects were included. Out of that 150 were in case group and remaining were in control group. The patients of 30-50 years of age were included in this study because above 50 years of age, most of the components of metabolic syndrome are established due to age related changes. In our study, Most of the patients were in the age group of 41-50 years.

In the study conducted by D.S. Prasad et al. they also found maximum number of patients in above said age group.[7] This study supporting to the findings of our study so it can be said that the prevalence of metabolic syndrome is increasing in middle age also. Our study reveals no specific gender differences. It is supported by NHANES III data. According to their data, the prevalence was differed very little among men (24.0%) and women (23.4%)

However in many worldwide studies and the studies of Indian subcontinent, women had higher prevalence of metabolic syndrome.[8] According to Indian Diabetic Federation (IDF)-defined metabolic syndrome. The prevalence is 29.6% in men and in women it was 30.3%.[9]

It is observed that the patients having various occupations are suffering from metabolic syndrome but the proportion of farmers and government employee were comparatively more as this was a hospital based study and hospital comes under rural area so the proportion of farmers may be more. In detail case history it was found that, though they were farmers by profession their routine was sedentary. The government employees were also having sedentary life style.

In another study by Andrea Bankoski it was found that the proportion of sedentary time was strongly related to metabolic risk.[10]It is observed that most of the patients of metabolic syndrome were having irregular meal while healthy persons were having regularity in meal time.

The study by Justo Sierra-Johnson et.al showed meals regularity is inversely associated with metabolic syndrome.[11] These findings suggest that meal irregularly may be associated with metabolic syndrome. In another study by Wennberg M, it was found that irregular eating of meals at age 16 years is associated with higher prevalence of the metabolic syndrome at age 43.[12]

According to *ayurveda*, *aniyamitahar* (irregularity in meal) disturbs the *agni* leads to low metabolism which may be one of the factors of metabolic syndrome.[13] It is observed that in the group of metabolic syndrome, patients were consuming fewer amounts of fruits in comparison with control group.

In one study it is said that the Fruits are high source of vitamins and minerals along with low calories. Eating lots of fruits and green vegetables control weight and blood pressure. Fibre rich diet is the form of unrefined whole grain, water soluble dietary fibres can be incorporated into diet & result in significant lowering of cholesterol.[14]

It is observed that patient suffering from metabolic syndrome were used to sleep just after meal at day time .Sleep just after meal at day time is given as the one of the causative factor of *sthoulya* and *medadhatuvikruti*[15] In another study by Martica H. Hall, their data suggested that sleep duration has a significant correlation with metabolic syndrome.[16]

This study showed that those who had habit of frequent anger, frequent stress were suffering from metabolic syndrome. They were also not involved in any spiritual activity. The subjects who enjoyed their work are found more in control group and the subjects of *avarsatva* were significant in case group.

In the study by James A. Dunbar, metabolic syndrome was found to be associated with depression. Participants with the metabolic syndrome had higher scores for depression than individuals without the metabolic syndrome.[17]

In another study, it seems that prolonged exposure to work stress may affect the autonomic nervous system and neuro-endocrine activity directly, contributing to the development of metabolic syndrome. Cortisol is an insulin antagonist, and cortisol output is increased in the metabolic syndrome.[18]

According to *Ayurveda*, *satva* plays an important role in maintaining health.[19] In *Charak* and *Shusrutasamhita, krodha* (anger) is described as one of the etiological factors in *paittikaprameha* and *shoka* (grif), *bhaya* (fear), *udvega* (anxiety) and *chinta* (worry) are depicted as the causative factor for the *vatikaprameha*[20]

In this study, significant numbers of patients were having *mandagni*. In *Ashtang Hriday*, *Mandagni* is described as the basic factor for all kind of diseases.[21]. As there is direct correlation of *agni* with metabolism, any disturbance in *agni* causes metabolic dysfunction. In

another study by Sharma arjunkumar et.al. It was found that *agnimandya* is the causative factor of metabolic syndrome.[22] In this study, most of the patients of metabolic syndrome were having BMI more than 25.

The study of G Rodrı´guezet.al. Showed the similar findings of more BMI in patients of metabolic syndrome.[23] In one study it was found that effect of electronic media on diet, exercise, sedentary behavior, and sexual activities has mixed effects on lifestyle and disorders.[24]

Limitations: This study was hospital based so only limited population was covered.

Recommendations:

1. This study can be continued on large population to confirm the etiological factors.
2. Further study can be conducted to assess the effect of mental stress on *agni* and metabolism.
3. In our study, mental stress was found to be significant factor in Metabolic syndrome. So another study can be conducted to evaluate the effect of stress relieving measures on Metabolic syndrome.

Conclusion

This study was conducted to explore the *nidan* (Etiological factors) of metabolic syndrome based on basic concepts of *Ayurveda*. From the study observation, it can be concluded that

- In *Aharaj* factor, irregular timing of meal and stale food were prominently observed in patients of Metabolic syndrome
- In *Viharaj* aspect, sleeping habit (Day sleep just after meal) was significantly found.
- In the view of *Achar*, mental stress related to work, family, financial, personal and unfulfilled expectations were observed as high in metabolic syndrome.
- In comparison with all above factors, *manasnidan* i.e. mental stress (*Achar*) was found to be more significant than other factors.

So this study suggest to think about overcoming mental stress (as one of the prominent etiological factor) while managing Metabolic syndrome.

Ethical Clearance: Taken from institutional ethics committee.

Source of Funding: Self.

Conflict of Interest: Nil.

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