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## Review Article

### ANALOGIZING OF METABOLIC SYNDROME IN SIDDHA SYSTEM OF MEDICINE-A LITERATURE REVIEW

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#### ABSTRACT

**Background:** In worldwide, 20-25% of the population have the Metabolic Syndrome (MetS). The highest prevalence rate reported in South Asia of MetS in the Punjabi community in India by Adult Treatment Panel III criteria. The metabolic syndrome (MetS) is a major and escalating public-health and clinical challenge worldwide in the wake of rapid urbanization, surplus energy intake, increasing obesity, and sedentary life habits. Nowadays, the use of Complementary and Alternative Medicine (CAM) is increasing rapidly due to the inadequate solution for the newly developed health issues. **Method:** In this study, the International Diabetic Federation (IDF) criteria were used as a standard tool for comparison. A total of 9 sources (4 Siddha classical textbooks, e-data such as pub-med, Google scholar, AYUSH research portal, NAMSTP) were searched to identify the appropriate analog for MetS. **Results:** 13 Terms related to MetS were identified from the 4 Siddha classical literature, whereas the e-data did not provide any term related to MetS. In those 13 terms, 3 terms which were closely relevant to MetS signs and symptoms were *Aiya Migu Kunam*, *Paci Aiya Noi*, and *Megam*. As a final point, this paper identified the Siddha analog for MetS as *Aiya Migu Kunam*. **Conclusion:** This paper ended up with analog to MetS as *Aiya Migu Kunam* and made a comparison with the standard IDF criteria for MetS.

**KEYWORDS:** Metabolic Syndrome, Siddha, *Aiya Migu Kunam*, *Megam*, *Paci Aiya Noi*.

#### INTRODUCTION

In worldwide, 20-25% of population have the Metabolic syndrome (MetS)<sup>[1]</sup>. According to the recent published criteria of International Diabetes Foundation (IDF) in 2005 for Metabolic Syndrome is the Central obesity measured by Waist Circumference (South Asian Men  $\geq$  90 cm, Women  $\geq$  80 cm) in the basis of Ethnicity specific with any two of the criteria Raised arterial pressure (Systole  $\geq$ 130 mm of Hg, Diastole  $\geq$ 85 mm of Hg), Raised plasma triglyceride ( $>$ 150 mg/dl), Reduced HDL ( $<$  40 mg/dl for men,  $<$ 50 mg/dl) for women<sup>[2]</sup>. The metabolic syndrome ties together insulin resistance, visceral adiposity, dyslipidemia and hypertension, which are known to for the metabolic syndrome <sup>[1,2,3]</sup>. Except insulin resistance the criteria by IDF for Metabolic syndrome invariably fits into the criteria mentioned by others<sup>[4]</sup>. The highest prevalence rate reported in South Asia of MetS in the Punjabi community in India by Adult Treatment Panel III criteria<sup>[5,6]</sup>. The weighted mean prevalence of MetS was higher in

females than that in males. It was highest in the age group above 50 years<sup>[7]</sup>. However, an Indian study demonstrated equal prevalence in the age group 20-40 and 41-60 years and decrement in the subjects older than 61 years<sup>[6]</sup>. A version of MetS has a WHO International Classification of Disease (ICD-10) code (E88.81) which permits healthcare reimbursement<sup>[8]</sup>. Nowadays, the use of Complimentary and Alternate Medicine (CAM) is increasing rapidly due to the inadequate solution for the newly developed health issues<sup>[9]</sup>. The metabolic syndrome (MetS) is a major and escalating public-health and clinical challenge worldwide in the wake of rapid urbanization, surplus energy intake, increasing obesity, and sedentary life habits<sup>[10]</sup>.

This narrative review explicates the analogize of Metabolic Syndrome diagnosis in Indian traditional Siddha system of medicine. Traditional Siddha Medicine is one of the ancient Indian Medical System<sup>[11]</sup>. This system of medicine follows the

holistic approach of healthcare and is based on the concept of five proto-elements and three *Dosham*. *Vali*, *Azhal*, *Aiyam* are the three humours of Siddha system of medicine<sup>[12]</sup>. MetS will be intricately compared for the comparison based on IDF.

## METHODOLOGY

The analysis of literature is carried out by the methodical quantitative review of Siddha literature using Whittemore and Knafl's five stage approach Problem Identification, Literature search, Quality appraisal, Data analysis and Presentation of findings<sup>[13]</sup>. This method was preferred for its suitability in organizing large volumes of raw information from various sources into an organized format and ensures that the integrative literature review is done in a systematic manner. The extracted data can be compared item by item so that similar data can be categorized and grouped.

For the analogising, understanding and validation of the collected information, reputed journals and databases like PubMed, Google Scholar, AYUSH Research Portal<sup>[14]</sup>, National AYUSH Morbidity and Standardized Terminologies Portal (NAMSTP)<sup>[15]</sup> were denoted. After the methodological collection of the above information, it was compared with the current scenario and parallels were drawn leading to a specific conclusion. Then a concise, but comprehensive review was made.

## Data sources

The traditional Siddha books including works of Yugimuni, Agathiyar were searched at Siddha Clinical Research Unit (SCRU) Library, Tirupati. The books included were *Aathma Rakshamirtham Ennum Vaithiya Sarasangiraham*<sup>[16]</sup>, *Yugivaithya Chinthamani -800*<sup>[17]</sup>, *Noinaadal Noimuthal Naadal Thirattu* and *Siddha Marthuvanga churukkam*<sup>[18]</sup>. And e-data sources like PubMed, Google Scholar, AYUSH Research Portal, National AYUSH Morbidity and Standardized Terminologies Portal (NAMSTP) were included.

## RESULT

IDF criterion of Metabolic syndrome (MetS) was used in the intense focusing of analogizing with Siddha diagnosis quoted in the Siddha literatures. According to IDF, most of the symptoms are described through lab values. But Traditional Siddha system describes the disease symptomatically. It is an unpredictable one to compare the both, but most of the laboratory investigations are reciprocal relations between symptoms of the disease. This paper reveals the similarity analysis between the Metabolic Syndrome and Siddha diagnosis of *Aiya Migu Kunam*, *Megam* and *Paci Aiya Noi*<sup>[17]</sup>.

## Analogy Metabolic syndrome with Siddha diagnosis

The keywords are the conditions quoted in the Siddha System of medicines that could be closely correlated with Metabolic Syndrome. *Aiya Migu Kunam*, *Paci Aiya Noi* and *Megam* are methodically reviewed for the meticulous analogy<sup>[11-13]</sup>(Table-1).

### *Aiya Migu Kunam*

According to the text of '*Aathma Rakshamirtham Ennum Vaithiya Sarasangiraham*, the symptoms of '*Aiya Migu Kunam*' are

- *Agni manthapadal* (Lack of appetite)
- *Vaineerooral* (Nausea)
- *Ookkam Kuraitthal* (lack of psycho-physical activity)
- *Odal Kanamaaga Thondruthal* (Increased Body weight/BMI)
- *Udal muttrum ulla kattugal thalaral* (Weakness of body constituents).<sup>[11]</sup>

### *Aiyam* affect associated with other elements<sup>[12]</sup>

- Profuse sweating and heart disease – Increased *Aiyam* along with *Ushnam*.
- Giddiness dizziness- Increased *Aiyam* along with *Vayu*.

### Aetiology<sup>[13]</sup>

- Fond of sweet and sour taste
- Intake of more tubers
- Always living in cold environment and taking more amount of cold water and food items
- Intake of old foods for long period
- Having sexual activity beyond the capable stamina
- Intoxication pollutant air like dead bodies incineration intoxication

With the above reasons *Aiya* diseases are produced in the body

### *Megam*

According to the "*Yugi Vaidya Chindamani-800*" the common symptoms of *Mega Noi* or *Megam* and its 21 types are<sup>[13]</sup>

- *Neervetkai* (Thirsty)
- *Adikkadi Neerizhithal* (Frequent Micturition/polyuria)
- *Adikkadi Neerum Sorum Kettal* (Increases Appetite / Polyphagia)
- *Udal Melithal* (Loss of Weight)
- *Thookkaminmai* (Insomnia)
- *Manakalakkam* (Depression)

### Aetiology<sup>[13]</sup>

- Intake more amount of meat and fish

- Intake more amount of Ghee and Milk
- Having sexual activity beyond the capable stamina
- Fond of sweet and sour taste

**Aetiology:**

- Fond of sweet and sour taste
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**Paci Aiya Noi**<sup>[13]</sup>

*Paci Aiya Noi* is one of the 21 types of *Aiya Noigal* and it is described in the “*Yugi-Vaidya Chindamani-800*”, the symptoms of *Paci Aiya Noi* are

- *Athiga Paci* (Increases appetite)
- *Nenjadaiththu Vali* (Angina)
- *Udal Kanaththu Kaanal* (Increased body weight)

S.No.	Metabolic Syndrome <sup>[2]</sup>	<i>Aiya Migukunam</i> <sup>[16,18]</sup>	<i>Megam</i> <sup>[17]</sup>	<i>Paci Aiya Noi</i> <sup>[17]</sup>
1	<b>Central obesity</b> If BMI is >30kg/m <sup>2</sup> , central obesity can be assumed, and waist circumference does not need to be measured. >90 Male >80 Female	<ul style="list-style-type: none"> <li>• <i>Udal KanamaagaThondruthal</i> (Increased Body weight/BMI)</li> <li>• <i>Ookkam Kuraithal</i> (lack of psycho-physical activity)</li> <li>• <i>Agni manthapadal</i> (Lack of appetite)</li> </ul>		<ul style="list-style-type: none"> <li>• <i>Udal Kanaththu Kaanal</i> (Increased body weight)</li> </ul>
2	<b>Raised triglycerides</b> ≥150mg/dL (1.7mmol/L)			<ul style="list-style-type: none"> <li>• <i>Nenjadaiththu Vali</i> (Angina)</li> </ul>
3	<b>Reduced HDL cholesterol</b> < 40 mg/dL (1.03 mmol/L) in males < 50 mg/dL (1.29 mmol/L) in females			
4	<b>Raised blood pressure</b> systolic BP ≥ 130 or diastolic BP ≥ 85 mm Hg or treatment of previously diagnosed hypertension	<ul style="list-style-type: none"> <li>• <i>Udal muttrum ulla kattugal thalaral</i> (Weakness of body constituents)</li> <li>• Profuse sweating and heart disease- Increased <i>Aiyam</i> along with <i>Ushnam</i></li> <li>• Giddiness dizziness- Increased <i>Aiyam</i> along with <i>Vayu</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Thookkaminmai</i> (Insomnia)</li> <li>• <i>Manakalakkam</i> (Depression)</li> </ul>	
5	<b>Raised fasting plasma glucose</b>	<ul style="list-style-type: none"> <li>• <i>Udal muttrum ulla kattugal thalaral</i> (Weakness of body constituents)</li> <li>• <i>Ookkam Kuraithal</i> (lack of psycho-physical activity)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Neervetkai</i> (Thirsty)</li> <li>• <i>Adikkadi Neerizhithal</i> (Frequent Micturition/ polyurea)</li> <li>• <i>Adikkadi Neerum Sorum Kettal</i> (Increases Appetite / Polyphagia)</li> <li>• <i>Udal Melithal</i> (Loss of Weight)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Athiga Paci</i> (Increased appetite)</li> </ul>

## DISCUSSION

On summarizing it has been found that the systems mentioned under effect of *Aiyam* associated with other elements only explains about the profuse sweating and cardiac complications which is relevant to be correlated with variation in blood pressure and glycemic levels.

The clinical condition of *Megam* represents some of the criteria of MetS but primarily focused on to the symptoms and complications of Diabetes Mellitus.

A study conducted earlier on this same context correlates MetS with *Paci Aiya Noi*<sup>[19]</sup> which doesn't match perfectly with the NHLBI criteria as it mainly holds its support only on the deterioration of seven *Udal Thathu* which usually occurs in Diabetes Mellitus but missed to explain the other features of MetS. Also, the study tried to equate things with the songs and matters from Ayurveda. No were in Siddha Science *Srothas* are mentioned. *Amam* or *Amavata* which may be exact in rheumatoid arthritis not for MetS<sup>[20]</sup>.

While in this, the characteristic features of *Aiya Migu Kunam* have highly resemblance with MetS. *Udal Kanamaaga Thondruthal* (Increased Body weight/BMI), *Agni manthapadal* (Lack of appetite), *Vaineerooral* (Nausea), *Ookkam Kuraithal* (lack of psycho-physical activity), *Udalmuttrumullakattugal-thalaral* (Weakness of body constituents), Profuse sweating and heart disease due to increased *Aiyam* along with *Ushnam* (heat), Giddiness, dizziness due to increased *Aiyam* along with *Vayu*. These are all the major criteria of the insulin resistance, visceral adiposity, dyslipidemia and hypertension.

### **Lack of appetite (*Agni Manthapadal*)**

*Agni Manthapadal* (*Agni*- Digestive fire: *Manthabadal*-Reduce) means reduced digestive process, it results in lack of appetite<sup>[17]</sup>. Habitual intake of more quantity of food in an obese person, leads to suppression of appetite, delayed gastric emptying and diminished gallbladder contraction. The local gut hormones involved in the termination process of food too gets deranged, affecting the gut brain axis and disturbing the satiety centre stimulation. Lack of appetite is the physiological mechanisms regulating the body weight and energy expenditure<sup>[21]</sup>.

### **Nausea (*Vai Neerooral*)**

*Vai Neer Ooral* (*Vaineer*-Saliva: *Ooral*-Secretion) means excessive saliva production in mouth, it may occur in nausea, an association with lack of appetite. Nausea is a feeling in the mouth,

back of the throat, its leads to vomiting, dizziness, difficulty swallowing and excessive saliva production<sup>[22]</sup>. Nausea can often lead to a lack of appetite, and a person may feel nauseated if they have not eaten enough. These two symptoms can relate to a range of conditions<sup>[23]</sup>.

### **Lack of psycho-physical activity (*Ookkam Kuraithal*)**

***Ookkam Kuraithal* (*Ookkam*-Physical and Mental activity: *Kuraithal*-lacking)** means lack of Psycho-Physical activity. Obese people have more difficulties in finding a job, have a lower income, and are less often seen in leadership positions. In society, responsibility for the weight situation in seen as lying by the individuals affected altogether, leading to chronic stress, problems with self-esteem and perception of loss of control<sup>[24]</sup>.

From a psycho-physiological theoretical perspective, depression or anxiety are believed to impact insulin sensitivity through physiological mechanisms such as altered insulin signaling in the brain, pro-inflammatory activation, and distress-induced up regulation of counter regulatory hormone systems. In addition, from a behavioral psychology perspective, depression and stress may affect insulin sensitivity, in theory, through their impact on lifestyle factors such as physical inactivity. Depressive symptoms were associated with higher fasting blood sugar, decreased insulin sensitivity, type 2 diabetes, and other aspects of the metabolic syndrome<sup>[25]</sup>. These are all indicators of lack of physical and mental activity in obese and in person with decreased insulin sensitivity.

### **Increased Body Weight/BMI (*Udal Kanamagathondral*)**

*Udal Knamaga Thondral* (*Udal*-Body: *Kanamagathondral*- Weight) means, increased body weight. The World Health Organization's (WHO) recommendations for obesity diagnosis are based on BMI (Body Mass Index) cut-offs, established from the observations in developed countries. However, distribution of fat is also an important determinant of morbidity and mortality, and "central obesity" may be more pathological than generalized obesity (measured as BMI)<sup>[26]</sup>.

Obesity is a significant cause of morbidity and mortality in the US and worldwide. Obesity in adults and children increases the risk of type 2 diabetes mellitus, cardiovascular disease, and non-alcoholic fatty liver disease, as well as psychosocial and social disturbances<sup>[27,28]</sup>.



**Weakness of Body Constituents (*Udalmuttrumullakattugalthalalar*):**

Physical inactivity is proven to be one among the factors for abdominal obesity<sup>[29]</sup>. According to the Siddha system, the body fat is categorized under the *Aiyam*. *Udalkattugal* represent the seven physical constituents of the body namely *Saram* (Digestive juice), *Chenneer* (Blood and Body fluids), *Oon* (Muscle), *Kozhuppu* (Fat), *Enbu* (Bone), *Moolai* (Bone Marrow) and *Sukkilam* (Sperm)<sup>[18]</sup>. Thus, the basic physical constituents are believed to develop from the extract of food. When there is derangement in any one of these constituents all the other too gets affected<sup>[18]</sup>. In MetS, the complete metabolism was affected, it may result weakness of the body constituents.

It is evident from the non-systematic literature review that most of the criteria for Metabolic syndrome resemble the clinical condition known as *Aiya Migu Kunam* and could be analogized with the same.

**CONCLUSION**

This meticulous Siddha analogizing for Metabolic Syndrome revealed *Aiya Migu Kunam* quoted in the Siddha literature was paralleled to MetS in Western Medicine. This study may support to find the appropriate treatment recommendation for the same and further clinical research in MetS with Siddha management.

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