“Diet (aahaar vidhi) and physical exercise (vyayaam): cornerstone in the preventive management of obesity (medoroga).”

Manisha Walunj*¹, Supriya P. Tonge², Ankush H Gunjal³

1. Assistant Professor, Department Of Rasashastra and Bhaishajya Kalpana, SST Ayurved College, Sangamner, Dist. Ahamadnagar, Maharashtra
2. Assistant Professor, Department Of Kriyasharir, SST Ayurved College, Sangamner, Dist. Ahamadnagar, Maharashtra
3. Assistant Professor, Department Of Kayachikitsa, SMBTT Ayurveda Medical College, Ghoti, Nashik.

*Author Correspondence: drmanishawalunj@gmail.com

ABSTRACT
Obesity is one of predominant metabolic disorder and leading cause of mortality during current times. It is analogous to Medorogal Sthaulya/Atishthauulya mentioned in Ayurveda treatises. Striking resemblance is observed in both conventional system of medicine and Ayurveda while describing its causative factors, consequences and preventive role of diet and exercise in its management. In this article relative review of literature concerned with Ayurvedic and modern management of obesity from preventive aspect has been carried out to tailor preventive line of treatment of obesity through diet and exercise in more effective manner. Study reveals that it is the need of hour to link the knowledge of diet and proper physical exercise with the science of healing to prevent or manage diseases like obesity. Individualistic approach must be followed for dietary regimen and exercise pattern for management of obesity. Concepts of Prakriti, Agni, method of eating should be paid equal attention while deciding ones dietary and exercise regimen to prevent/control obesity.

Keywords:- Exercise, Diet, Obesity, Medoroga, Agni, Prakriti

INTRODUCTION:-
Obesity is a predominant metabolic disorder. It is increasing at an alarming rate globally and has reached epidemic proportions in almost each country. As per WHO in 2010 one billion adult population were obese. It has been considered a major risk factor for
diabetes, cardiovascular disorder, musculoskeletal disorders, obstructive sleep apnea, several cancers including breast cancer, prostate cancer, endometrial, colorectal carcinoma. On an average obesity reduces life expectancy of a person by 6-7 years. In early progressive stage obesity can be prevented by lifestyle intervention through diet and exercise and its morbid consequences can be arrested without need of medication and invasive surgical procedures. Ayurveda – science of life since ages has measured the fatal outcomes of this particular disorder. Healthy life stands upon three pillars of Ayu(life span) – Ahaar(diet), Vihaar( daily chores) and Aushadhi(medicine). The first two of these pillars Aahaa(diet)and Vihaar( daily chores)are concerned with diet and lifestyle and are fundamentally preventive in nature. When these principles are followed, the seeds of diseases are not sown. Obesity has been described in detailed manner as Sthaulya/Medoroga- Santarpanothavyadhi ( due to excessive nourishment) in our treatises with effective management which principally lay emphasis on prevention aspect and individualistic approach for the treatment.

AIMS AND OBJECTIVES: In this article relative review of literature concerned with Ayurvedic and modern management of obesity from preventive aspect has been carried out to tailor preventive line of treatment of obesity through diet and exercise in more effective manner.

MATERIALS AND METHODS:
Literary review has been carried out concerned with Atisthualyal Medoroga and obesity and preventive measures to be adopted with special reference to diet and exercise through available Ayurvedic texts and published research articles. Results of these data mining has been presented in following manner in purview of conventional medicine and Ayurveda – science of life.

Definition of obesity/ Medoroga: Obesity is defined as abnormal accumulation of fat usually 20% or more over an individual’s ideal body weight. People are generally considered obese when their body mass index (BMI) is 30kg/m², with the range 25-30kg/m² defined as overweight. However as risks of adiposity-related complications occur at lower BMIs in Asians, WHO has recommended that BMI > 27.5 kg/m² should be used as a cutoff for Asians, taking into consideration the increased cardiovascular risk at this BMI. As per Ayurveda, a person having pendulous appearance of Sphika, Udara and Stana due to excess deposition of Meda along with Mamsa Dhatu and also having unequal and abnormal distribution of Meda with reduced zeal towards life is called Obese (Medoroga) /Atisthula.

Causative factors of obesity:
Indulgence in sedentary life style leading to excessive calories consumption rather than its expenditure is the chief cause for obesity. As per Modern sciences, the main etiological factors responsible for Obesity have been enlisted in table no.1. In Ayurveda most of the causes described for Sthaulya / Medoroga comprises of faulty dietary habits. As per Sushrut Samhita treatise, corpulence and leanness (of body) depends upon Aahaar Rasa. When one...
constantly takes diet increasing Kapha humor, indulges in eating when the previous meal is undigested, avoids physical exercise and sleeps in day, the Ahara-Rasa being undigested and more sweet circulating in the body, due to excessive unctuousness, produces fat which causes obesity.\(^6\) Acharya Charaka has categorized causative factors of obesity into eight captions. Along with defective lifestyle patterns Aacharya Charaka has also included gen.etic predisposition and psychic state as a contributory factors for obesity.\(^7\) (table no.2)

**Influential Factors concerned with obesity in context of Ayurveda**

1. **Influence of ‘Ashana’**\(^8\) in obesity:
   Based on the quality of food items consumed and time of consuming food concept of Ashana (process of food consumption) has been described in Ayurveda. It is considerably involved and plays key role in either maintenance of health or causation of disease. Intake of food consisting of wholesome and unwholesome things mixed together is known as 'Samasana' (eating of healthy and unhealthy food together); if food is taken in excess, in small quantity or untimely it is known as 'Visamasana' (irregular eating time); if food is taken during indigestion it is known as 'Adhyasana' (eating one over the other). Person habitual to one of these three pattern is also much prone to Obesity (Medoroga).\(^9\)

2. **Relation of Prakriti(bodily and mental constitution) and obesity**\(^10\)

Prakriti is one of the fundamental principles led by Ayurveda. It plays an imperative role in manifestation of disease, and adopting personalized approach as per Prakriti can help in assessing the susceptible clinical features of each Prakriti type and may prove supportive to take preventive measure in arresting the far-reaching ominous clinical impacts of disease. In a cross-sectional survey study intend to study Pradhana Sharira and Manas Prakriti (dominant bodily and mental constitution) in Sthaulya (obesity) participants, Kapha and Tamas Pradhana participants were found to be more prevalent to Sthaulya as compared to other Prakriti.

**Diet regimen in obesity:**

Modern science has even accepted dietary interventions as the cornerstones in the management of obesity which mainly focus on energy content and macronutrient composition. Obesity treatment guidelines issued by the NIH recommend that persons who are overweight or who have class I obesity and who have two or more risk factors should reduce their energy intake by 500 kcal/day.\(^11\) Current recommendations for weight management emphasize the importance of healthy eating patterns that include a variety of nutrient-dense foods, limit portions of energy-dense foods, and reduce overall energy.\(^12\) Four types of diets are usually recommended in the management of obesity. \(^13\) [14] [15] [16] [17] [18] [19]

1. Low-calorie diet (LCD): 800–1500 kcal/day high in carbohydrate (55–60%), low in fat (less than 30% of energy intake), and high in fiber and have a low glycemicindex.
2. Low-fat diet: 1000–1500 kcal/day daily intake of fat to 20–25% of total energy intake
3. Low-carbohydrate diet: 1000–1500 kcal (60–150 g of carbohydrate/day)
4. Very low-calorie diet (VLCD) 200–800 kcal/day, 55–60% carbohydrate (high in fiber and have low glycemic index)<30% fat. Benefits and disadvantages of these diet patterns have been described in table no.3.

Studies pertaining effect of these diets on obesity revealed that all calorie-restricted diets result in equal weight loss irrespective of the macronutrient composition and dietary adherence was observed to be an important determinant of weight loss. Thus, choosing a diet with a macronutrient composition based on a subject’s taste preference(individualistic approach)can achieve better compliance.

Ayurvedic perspective of diet/ Aahaar in obesity (Medoroga):
Aahaar(diet), the first pillar of Ayu(life span) means intake of food and refers to the knowledge of proper diet. It provides the first approach we can take to maintain ideal health and to alleviate the symptoms of illness. While diet will not cure well-established diseases, most of the illnesses can be controlled solely by adjustment in diet and eating habits. Such diet is a significant aspect of maintaining good health. In addition to proper diet, Aahaara emphasizes the role of three components vital to healthy gastrointestinal functioning – Deepan (the maintenance of strong digestive fire), Paachan (Smooth digestion and assimilation) and Anulomana (proper elimination of waste materials). People become ill and obese because they have problems in one or more of these areas. Agni(digestive fire) regulates the appetite. A strong appetite called Deepan (the maintenance of strong digestive fire) gives the signal that the digestive system is ready for new food intake(hunger). Paachan or healthy digestion assures proper nourishment of the Dhatu (body constituents). When digestion is impaired, we may experience acidity, gas, bloating and nausea as well as a sour or metallic taste on the tongue. These things indicate that digestion is sluggish and Ama (undigested portion)is being produced. If you feel that your digestion is not strong yet you still have some appetite, then eat only a small amount of easily digestible food. Healthy elimination called Anulomana, occurs first thing in the morning so that the system is ready to accept the day’s new food. Improper elimination manifests as irregular bowel movements, consistently loose bowels, constipation, hard or sticky stools. These show that toxins and waste are accumulating and fermenting in the colon, making its pH acidic and disrupting absorption and elimination. If your bowels are not moving, additional food will only increase the burden on an already sluggish colon. When appetite, digestion and elimination are normal, we have abundant energy, strong bodies, good health and clear minds.

Method Of Consuming Food:-
To facilitate proper nourishment from food consumed not only intake of good qualitative food is essential but also method of consuming food is also equally important. Acharya Charaka has described in detail maneuver of eating as Ashtaaharavidhiyatana- Eight factors need to be taken into consideration while deciding diet of person.[21]
Importance of Consumption of Food at Proper time to manage obesity:

In Ayurveda ideal time for having meal has been described based on signs produced in body. The ideal time for taking meals is after the elimination of faeces and urine, when the mind is clean (devoid of emotions), when the Dosha(body Humors) are moving in their natural paths (functioning normally), when belching are pure without and foul smell or taste, when hunger is well manifest, when the flatus is moving downward easily, when the digestive activity is keen, when the sense organs are clear functioning, when the body is light. Food should be consumed observing the rules and procedures of taking food. That is the ideal time. One should take food only when he feels hungry. The best time for lunch is between 12 and 1 p.m. because Pitta Dosha responsible for digestion is at peak in this time interval. The largest meal of the day should be lunch. Dinner should be lighter than the lunch.

As Obesity is a metabolic disorder, therefore main emphasis is to be given to digestive fire– Agni and the diet regimen of an obese person should be planned according to the state of Agni. An Obese person with low digestive power(Mandagni) should avoid Guru Aahaar Dravya (heavy to digest food) and should take Laghu Aahaar Dravya (quickly digestible food) more frequently. But in an Obese person with high digestive power(Teekshanagni), Guru(hard to digest) as well as Aptarpak(low calorie diet) Aahaar should be given. Guru Aaahara(heavy to digest) will produce sense of satiety and will help to retard the frequent intake while its Aptarpaka(catabolic) quality will help to reduce body weight. Food does not get digested properly even if it is suitable, light and taken in time if, there is excessive intake of water with food, irregular eating, suppression of natural urges, disturbance and contrariness of sleep. So these indigestion aggravation factors should be strictly prohibited.

Quantity of food: quantity of food to be taken varies as per individuals based on Agni, Abhyavarana Shakti (ingestion capacity). Generally ⅓ of the capacity of stomach should be filled with solids, ⅓ with liquids and rest ⅓ should be kept empty for the free movements of body humors Vata, Pitta and Kapha. The presumption of capacity of stomach can be done by ingestion capacity of a person.

Considering the significance of all these above mentioned factors in order to be healthy and increase the digestive power(Agni) while losing weight, steps should be followed have been enlisted in table no.4.

Physical Exercise in Obesity:

Weight loss can be achieved in a short time interval by following proper diet regimen but maintaining this weight loss is mostly difficult and often requires physical exercise and a balanced diet to be a permanent part of an individual's lifestyle. Although exercise is not effective for initial weight loss, physical activity is important for maintaining weight loss achieved through dietary intervention. Meta-analyses of 493 studies have shown that people who diet and exercise maintained their weight loss better than those who relied on diet alone.

As per Ayurveda properly performed physical exercise/Vyayama is able to nullify adverse effects of even incompatible food. Physical Exercises, if done properly
stimulates muscle metabolism and increases oxygenation. It also strengthens and improves Mamsa and Meda Dhatu. If done accordingly it brings lightness in the body, increases work power, solidity, tolerance power; decreases Kapha Dosha and increases Jathraggni (digestive power). Aacharya Charaka has mentioned Medadhatu as site of Kapha Dosha. Medadhatu is in excess in an obese person. So as Vyaayam leads to decrease in Kapha Dosha, subsequently Medadhatu is decreased and the person becomes lean and thin. Aacharya Charaka has also mentioned Vyayaam in general treatment of Kaphaj diseases. And then mentioned Atisthaulya (obesity) in 20 Nanatamaj Kapha diseases. So Vyayaam is helpful in treatment of obesity. Several benefits of exercise including maintenance of healthy state have been described in Ayurveda.

**Quantity of Physical Exercise (Vyayaam)**

Conventional system opines that at least 200–300 min/week of moderate-intensity aerobic exercise is required in order to maintain weight loss in consistence with dietary modifications. While determining amount of exercise again individualistic approach has been adopted in Ayurveda. In all seasons daily exercise should be performed by persons desiring their wellbeing by 'Balardha' (half of one’s strength) otherwise it harms. Criteria of half of the individual’s strength has been defined as when (Prana) Vayu situated in heart comes out to mouth while performing exercise, it is the sign of the half of strength. Acharya Sushruta has advised to do exercise after considering age, physique, place, time and diet otherwise one gets afflicted with severe disorder such as wasting, thirst, anorexia, vomiting, intrinsic haemorrhage, giddiness, ex-haustion, fever and dyspnoea.

Physical exercise should be avoided by one suffering from intrinsic haemorrhage, emaciation, dyspnoea, cough and wound, after taking food, wasted due to sex and afflicted with thirst and giddiness.

**CONCLUSION:**

Being obese is worse because of incapability of activities and being mostly affected with several diseases. This study emphasizes the role of diet and physical activity in case of obesity in purview of conventional and Ayurveda line of therapy. Both streams agree that without adjusting the diet regimen and exercise, the treatment of Obesity is difficult. It is the need of hour to link the knowledge of diet and proper physical exercise with the science of healing to prevent or manage diseases like obesity. Individualistic approach must be followed for dietary regimen and exercise pattern for management of obesity. Concepts of Prakriti, Agni, method of eating should be paid equal attention while deciding ones dietary and exercise regimen to prevent/control obesity. In our busy schedule, we have to remember the important instructions laid by Ayurveda for healthy life, so that we can remain disease free. People should be made aware about the importance of Diet and Physical Exercise for prevention and management of obesity (Medoroga).

**REFERENCES:**

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TABLES:

Table no. 1: Enlisting causative factors leading to obesity as per conventional science.

<table>
<thead>
<tr>
<th>Life style related</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sedentary lifestyle with little physical exercise</td>
<td>1. Hereditary</td>
</tr>
<tr>
<td>2. Excessive consumption of junk foods and fat containing foods, due to which more fat gets deposited in body causing obesity.</td>
<td>2. Endocrine disorders such as hypothyroidism, Cushing’s syndrome, growth hormone deficiency, hypogonadism, and polycystic ovary syndrome.</td>
</tr>
<tr>
<td>3. Emotional distress: People tend to eat more when they are upset, anxious, under stress or feeling boredom-binge eating disorders and night eating syndrome</td>
<td>3. Medications: antidepressants, antidiabetic drugs, anticonvulsants, antipsychotic drugs, beta-blockers, and steroid hormones have been considered obesogenic.</td>
</tr>
<tr>
<td>4. Spending more time watching television and playing computer games.</td>
<td></td>
</tr>
<tr>
<td>7. Nutrition and Pregnancy – One theory states that when children are undernourished during their fetal life, when they become adults, they usually develop abdominal fat even with the normal diet. This put them at a greater risk of developing obesity.</td>
<td></td>
</tr>
</tbody>
</table>

Table no. 2: Aggravating factors for obesity as per Charaka Samhita

<table>
<thead>
<tr>
<th>Causes concerned with lifestyle</th>
<th>Causes concerned with mental health</th>
<th>Causes concerned with heredity</th>
</tr>
</thead>
</table>
Excessive intake of food | Being happy always. | Defect in Sperm or Ovum.
---|---|---
Intake of Heavy to digest, Sweet, Cold and Oily foods | Not caring about things | -
Not doing physical exercise. | - | -
Not involving in sexual activity. | - | -
Sleeping during daytime. | - | -

Table no.3: Comparative benefits and disadvantages of these types of diet.[20]

<table>
<thead>
<tr>
<th>Diet</th>
<th>Benefits</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low calorie diet</td>
<td>Mean weight loss of 10% in 3–12 months and Reduction in blood glucose, TG, LDL, BP</td>
<td>obedience difficult in long term</td>
</tr>
<tr>
<td>Low fat</td>
<td>Mean weight loss of ~5% in 2–12 months Reduction in blood glucose, LDL, BP</td>
<td>Less palatable, feel hungry easily Increase TG</td>
</tr>
<tr>
<td>Low-carbohydrate diet:</td>
<td>Mean weight loss of ~5% in 2–12 months, Faster initial weight loss than low-fat diets</td>
<td>Ketosis when carbohydrate intake &lt;50 g/day [Ve]</td>
</tr>
<tr>
<td>Very low-calorie diet</td>
<td>Mean weight loss of &gt;10% in 2–8 weeks Rapid weight loss</td>
<td>Electrolyte imbalance, hypotension, gallstones Needs medical supervision</td>
</tr>
</tbody>
</table>

BP, blood pressure; LDL, serum low-density lipoprotein cholesterol; TG, serum triglyceride.

Table no.4: Guidelines to be followed with the aim to manage obesity:

<table>
<thead>
<tr>
<th>Contraindicated measures</th>
<th>Directed measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overeating and/or eating heavy foods (hard to digest) in large portions</td>
<td>Eat according to your body constitution</td>
</tr>
<tr>
<td>Tamasic (unhealthy) foods: Leftovers, processed, canned foods, fast food</td>
<td>Eat freshly cooked warm food. It will strengthens Agni, digests food better, reduces excess <em>Kapha</em> and <em>Vata</em></td>
</tr>
<tr>
<td>Drinking water after meal, excessive drinking of water irrespective of thirst.</td>
<td>Eat fresh and seasonal vegetables and fruit available in your region.</td>
</tr>
<tr>
<td>Drinking too cold water and beverages and cold food</td>
<td>Eat food, which has enough oil, and is moist enough (not fried). It tastes better, helps Agni (digestion), builds Dhatuṣi (body constituents), and increases strength.</td>
</tr>
<tr>
<td>Cruciferous vegetables, fried foods and heavy to digest foods</td>
<td>Do not eat food with wrong combination. E.g. Honey and ghee (clarified butter) when combined in equal quantities is poisonous. Mixing sour fruits and milk curdles the milk.</td>
</tr>
<tr>
<td>Talking or laughing while eating. Eating too fast or while watching TV</td>
<td>Eat only when you are hungry, when previous meal is digested.</td>
</tr>
<tr>
<td></td>
<td>Eat three meals a day and avoid snacking</td>
</tr>
<tr>
<td></td>
<td>Eat light meals for breakfast and dinner and heavy meal during lunch time, have early dinner between 6:00 p.m. and 7:30 p.m.</td>
</tr>
<tr>
<td></td>
<td>Eat with proper frame of mind – create pleasant environment</td>
</tr>
<tr>
<td></td>
<td>Eating sequence: First eat carbohydrates or sweet taste, next eat salty, sour, pungent and bitter foods. Finally eat astringent food.</td>
</tr>
</tbody>
</table>

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