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# LIFESTYLE DETERMINANTS OF STHAULYA (OBESITY): A CROSS-SECTIONAL SURVEY ON DIETARY, PHYSICAL ACTIVITY, AND PSYCHOLOGICAL FACTORS

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## ABSTRACT

**Background:** Obesity, or Sthaulya, has reached epidemic proportions globally and is recognized as a significant public health challenge. Modern lifestyle practices, including unhealthy dietary habits, sedentary routines, and stress, have contributed significantly to the rising prevalence of this condition. Ayurveda provides a comprehensive understanding of Sthaulya and offers preventive and therapeutic measures through Ahara (diet), Vihara (lifestyle), and Oushadha (therapies). **Objective:** This cross-sectional survey aimed to explore the lifestyle-related etiological factors contributing to Sthaulya in adults aged 18 to 60 years and to assess the dietary (Aharatmaka), physical activity (Viharatmaka), and psychological (Manasika) influences among the study population. **Methods:** A total of 200 obese patients, identified with a BMI > 25, were surveyed using a validated lifestyle questionnaire. Participants were selected through simple random sampling, and data on dietary habits, physical activity levels, sleep patterns, and psychological stress were collected. Ethical clearance and informed consent were obtained prior to the study.

**Results:** The study revealed significant associations between Sthaulya and various lifestyle factors. Key findings included irregular meal patterns, excessive consumption of high-fat and

sweet foods, frequent intake of dairy products, reduced physical activity, and prolonged sleep duration. Notably, 77.38% of participants had a BMI categorized as Grade 4 obesity. Psychological stress and sedentary work patterns were also identified as prominent contributors. **Conclusion:** The study underscores the multifactorial etiology of Sthaulya, emphasizing the impact of modern dietary patterns, physical inactivity, and stress on obesity. An Ayurvedic approach integrating dietary modifications, regular physical activity, and stress management may offer a sustainable solution for managing obesity and preventing its complications. Future research should focus on longitudinal studies to assess the efficacy of integrative strategies in combating obesity.

**KEYWORDS**: Obesity, Aetiological Factors, Sthaulya, Lifestyle Disorder.

## INTRODUCTION

Lifestyle diseases are our own creation. With the evolution of civilization man has became more and more physically inactive. Modernization, affluence, science and technological development lead to sedentary life styles. Such behaviours are trending across the countries and are transferable from one population to another like an infectious disease, affecting disease patterns globally. By exposing oneself to all these factors human beings unknowingly invited a number of diseases, out of which Sthaulya (obesity) is one which disturbs physical, mental and social health of an individual. It has reached epidemic proportions globally.

### The Global Burden of Obesity

According to WHO report, there are more than 250 million obese adults and about 1.1 billion overweight people worldwide.[1] According to the recent report of National Family Health Survey (NFHS-4, 2015-16), prevalence of obesity in India was 18.6% and 20.7% among men and women aged 15–49 years respectively. Particularly in Gujarat, the percentage of female and male who are overweight or obese is 23.7 and 19.7 respectively.[2] Obesity can be seen as the first wave of a defined cluster of communicable diseases called “New World Syndrome,” creating an enormous socioeconomic and public health of 21st century in both developed and developing countries.[3] Obesity is associated with an increased risk of morbidity and mortality as well as reduced life expectancy and contributes to 2.6 million deaths worldwide every year.[4] These figures highlight a troubling trajectory, with lifestyle disorders increasingly impacting younger populations. In India, obesity has surged, with urban prevalence rates reaching up to 40%.

Obesity is more than a cosmetic concern—it is a severe threat to health and longevity. Ayurvedic texts describe Sthaulya (obesity) as a Santarpanjanya Vyadhi, a condition caused by over-nourishment and characterized by excessive accumulation of Meda (fat). Contributing factors include unhealthy dietary habits, sedentary lifestyles, stress, and technological dependence.

**The Need for a Holistic Approach**

Modern medicine offers various therapeutic interventions for obesity, but these often come with adverse effects, prompting a global shift towards natural remedies. Ayurveda, with its holistic approach, offers effective solutions for managing lifestyle disorders through dietary regulations, lifestyle modifications, and therapies.

Acharya Charaka recommends the use of Ruksha (drying), Ushna (hot), and Kapha-Vata shamana (balancing Kapha and Vata) therapies, along with Madhu Udaka (honey water), for managing Sthaulya. The Ayurvedic emphasis on prevention through Ahara (diet), Vihara (lifestyle), and Oushadha (medications and therapies) provides a sustainable model for health.

**AIM AND OBJECTIVES:-** In this study, the focus is to conduct survey study of Sthaulya (obesity) for exploring the etiological factors associated with lifestyle and to identify the main lifestyle related Aharaja (Dietary factors), Viharaja (Physical movements) and Manasika (Psychological) etiological factors associated with Sthaulya (Obesity) in patients aged in between 18 to 60 years.

## MATERIAL AND METHODS

**Participants and study design:**

Cross-sectional survey study was conducted among 200 Sthaulya (obese) patients visiting the outpatient department of the Institute. The patients were selected using simple random sampling method. Ethical clearance was obtained for this study from the Institutional ethics committee and the study was also registered prospectively in Clinical Trial Registry of India To fulfill the aims and objectives, Lifestyle related questionnaire was used for survey which was based on the etiological factors mentioned in the Ayurvedic classics that comprise – Aharatmaka, Viharatmaka and Manasika Nidana. The questionnaire was developed under expert guidance and validated by three subject matter experts.

All participants were interviewed in the local language. Each lifestyle related questions were explained properly to the patient and the response was noted in the Survey Questionnaire by a single person. Written informed consent was taken from patients as per the Helsinki declaration after explaining the details of the study and its aims.

**Eligibility Criteria**

**Inclusion criteria**

- Participants diagnosed with Sthaulya (obesity, BMI > 25).
- Individuals aged 18 to 60 years.
- Participants were selected without discrimination based on sex, caste, religion, occupation, or economic status.

**Exclusion Criteria**

- Pregnant and lactating women.
- Individuals with lifestyle disorders under medication, cardiovascular diseases, hemiplegia, chronic obstructive pulmonary disease (COPD), malignancies, tuberculosis, or psychiatric conditions.
- Patients with obesity due to hormonal imbalances.
- Individuals unwilling to provide written informed consent.

**OBSERVATIONS**

Observations related to principle variables viz: age, gender, education, occupation, socio‑economic status, family history, chronicity of disease, body mass index (BMI), Aharatmaka Nidana which includes food intake pattern, timing, quantity, heavy food intake in evening, heavy breakfast, fatty food intake, intake of more sweets, water consumption in relation to food, frequency of taking food items weekly like ghee and ghee based sweets, milk products, bakery products, fatty food, non-veg etc., Viharatmaka Nidana includes involvement in physical activities, sleep pattern, day sleep, duration of sleep in 24 hours, waking up time in morning and Manasika Nidana includes distribution of patients based on psychological factors. All these are depicted in Tables 1 and 2.

**Table 1: Baseline characteristics of patients along with BMI, chronicity and family history.**

| Character | Categories | Number of patients | Percentage |
|---|---|---|---|
| Age | 18-30 years | 110 | 55.27638 |
| | 30-40 years | 58 | 29.14573 |
| | 40-50 years | 20 | 10.05025 |
| | 50-60 years | 11 | 5.527638 |
| Gender | Male | 94 | 47.23618 |
| | Female | 105 | 52.76382 |
| BMI (kg/m2) | Grade 3 | 45 | 22.61307 |
| | Grade 4 | 154 | 77.38693 |

**Table 2: Observations of lifestyle related factor.**

| Question | Options | Number of patients | % |
|---|---|---|---|
| 1. Meals per day | a) 1 time lunch 1 time snack | 11 | 5.527638 |
| | b) 2 meals a day without breakfast | 4 | 2.01005 |
| | c) Breakfast, with 2 meals a day | 129 | 64.82412 |
| | d) Nyahari with 3-time meal with evening snacks | 55 | 27.63819 |
| 2. Lunch timing | a) Regular on time | 7 | 3.517588 |
| | b) Irregular in time | 9 | 4.522613 |
| | c) Changes frequently/occasionally | 98 | 49.24623 |
| | d) I can't tell | 85 | 42.71357 |
| 3. Food quantity per meal | a) Rice, dal, vegetables/food | 14 | 7.035176 |
| | b) 2 chapatis, rice, dal, vegetables | 7 | 3.517588 |
| | c) 3 chapatis, chicken/mutton, rice, koshimbir | 104 | 52.26131 |
| | d) 4 chapatis, dal, rice, koshimbir, dessert | 74 | 37.18593 |
| 4. Hunger tolerance | a) Can bear for 1-2 days | 14 | 7.035176 |
| | b) Can bear for 4-6 hours | 7 | 3.517588 |
| | c) Can bear for 15-20 minutes | 104 | 0 |
| | d) I can't control my appetite | 74 | 52.26131 |
| 5. Daily sweet consumption | a) No, not necessary | 14 | 37.18593 |
| | b) Once a month | 12 | 7.035176 |
| | c) Once/twice every week | 93 | 6.030151 |
| | d) Daily consumption of sweets | 80 | 46.73367 |
| 6. Use of dairy products | a) Never | 14 | 40.20101 |
| | b) Once a month | 20 | 7.035176 |
| | c) Occasionally | 98 | 10.05025 |
| | d) Frequently/everyday | 67 | 49.24623 |
| 7. Bakery product consumption | a) Never | 25 | 33.66834 |
| | b) Sometimes (monthly) | 18 | 12.56281 |
| | c) Weekly | 95 | 9.045226 |
| | d) Frequent/daily | 60 | 47.73869 |
| 8. Cold food | a) Never | 22 | 30.15075 |

| | | | |
|---|---|---|---|
| consumption | b) Occasionally | 30 | 11.05528 |
| | c) Once a month/week | 83 | 15.07538 |
| | d) Frequently | 64 | 41.70854 |
| 9. Non-vegetarian food consumption | a) Never | 14 | 32.1608 |
| | b) Occasionally | 25 | 7.035176 |
| | c) Weekly | 112 | 12.56281 |
| | d) Frequently | 48 | 56.28141 |
| 10. Daily working methods between office jobs/duties | a) Rigorous physical exertion | 19 | 24.1206 |
| | b) Mild to moderate physical work | 27 | 0 |
| | c) Moderate, seated physical work | 90 | 9.547739 |
| | d) Seated work | 63 | 13.56784 |
| 11. Do you feel lethargic/physically weak (general weakness) for daily work? | a) Satisfactory work in due pace and time | 14 | 45.22613 |
| | b) Unsatisfactory work, late initiation, likes to sit compared to walking | 24 | 31.65829 |
| | c) Late initiation and satisfactory work, preferring to stand compared to sitting | 102 | 7.035176 |
| | d)initiate too late and do unsatisfactory work prefer sleeping compared to sitting | 59 | 12.0603 |
| 12. Select the option for your current sleep quality level? | a) Normal and good sleep for 6 to 8 hours. /24 hours with feelings of lightness and refreshment | 19 | 0 |
| | b) Sleep > 8 -9 hours. /24 hours with slight dullness in body | 20 | 51.25628 |
| | c) Sleep > 9- 10 hours. /24 hours burn-like numbness in the body | 93 | 0 |
| | Sleep > 10 hours. /24 hours body weakness related to jrimbha and drowsiness | 67 | 29.64824 |
| 13. Physical activity level | a) Vigorous activity (trouble breathing, heavy lifting, aerobics, etc.) | 20 | 9.547739 |
| | b) Normal activities (e.g., playing sports, carrying weights) | 16 | 10.05025 |
| | c) Normal daily gait without dyspnea | 105 | 46.73367 |
| | d) Decreased activity with dyspnea | 58 | 0 |
| 14. Yoga/exercise frequency | a) Every day | 19 | 33.66834 |
| | b) 3-4 days a week | 15 | 0 |
| | c) 1-2 days a week | 98 | 0 |
| | d) Never | 67 | 0 |
| 15. Daily use of air conditioner/fan | a) Not at all | 11 | 10.05025 |
| | b) 1-2 days a week (7-8 hours) | 13 | 0 |
| | c) 3-4 days a week (10-12 hours) | 103 | 0 |
| | d) Every day (24 hours) | 72 | 8.040201 |
| 16. Daytime sleep (Diwaswap) | a) Not at all | 21 | 52.76382 |
| | b) Occasionally | 17 | 29.14573 |
| | c) Yes, 10-minute naps | 97 | 9.547739 |
| | d) Yes, more than 1-hour sleep | 63 | 7.537688 |
| 17. Sweating after exertion | a) Does not sweat | 18 | 49.24623 |
| | b) Occasionally | 15 | 33.66834 |

| | | | |
|---|---|---|---|
| | c) Excessive sweating (no odor) | 97 | 5.527638 |
| | d) Excessive sweating with odor | 69 | 6.532663 |
| 18. Stress/anxiety in daily life | a) Yes | 13 | 51.75879 |
| | b) I can't tell | 11 | 36.1809 |
| | c) Sometimes | 106 | 10.55276 |
| | d) Not at all | 69 | 8.542714 |
| 19. Satisfaction with sex life | a) Good | 13 | 48.74372 |
| | b) Sometimes satisfactory | 11 | 31.65829 |
| | c) Do not wish to disclose | 106 | 9.045226 |
| | d) Not satisfactory | 69 | 7.537688 |
| 20. Family history of diabetes | a) Yes (Single parent) | 5 | 48.74372 |
| | b) No | 177 | 34.67337 |
| | c) Yes (Both parents) | 2 | 6.532663 |
| | d) Not known | 15 | 5.527638 |

**Discussion on baseline characteristics**

**Age and gender**

In present survey study, it was observed maximum volunteers belong to age group 18-30 years, 58 volunteers were in age group of 30-40 years, 20 volunteers were in age group of 40-50 years and 11 volunteers were in age group of 50-60 years. It is due to the increasing trend of sedentary lifestyle among new generation which contributes to increase in incidence of Sthaulya. According to Ayurveda Madhyama Awastha (middle age) is the stage of life when absolute development of Dhatu (fundamental tissue) takes place. Modern evidences also supports the same observations i.e., excess weight gain usually achieved during middle age.[5] Out of 200 patients surveyed, 105 (52%) were female. A number of physiological processes are believed to contribute to an increased storage of fat in females. Such fat deposits are believed to be essential in ensuring female reproductive capacity. Females have a tendency to channel extra energy into fat storage while males use more of this energy for protein synthesis. This pattern of energy usage or ‘nutrition partitioning’, in females contributes to further positive energy balance and fat deposition.[6] According to the data gathered from National Family Health Survey (NFHS) in Gujarat State, the percentage of females who are overweight or obese is more than male [Table 1].[7]

**BMI**

In present survey study, it showed that 154 volunteers had BMI of Grade 4 and 45 volunteers had BMI of Grade 3. In this study the factors found to be influencing higher BMI were their eating habits, which include consumption of high fatty diet, use of more milk products and sweet items, long sleep duration and physical inactivity.

**Discussion on lifestyle related factors**

Dietary intake contributes directly to the energy consumed. Dietary intake of people have changed over time, possibly contributing to the rise in over weight and obesity in India. The modern food environment provides a wide range of opportunities to consume food and drink products. Body weight depends upon the balance between calories consumed and calories used. This balance depends largely on genetic make-up, level of physical activity and resting energy expenditure. If more calories are consumed than expended, the excess calories are stored as fat adipocytes. Overweight and obese people eat much and engage in little physical activity. This is also a fact that few person in spite of taking high fatty, carbohydrate rich food items, do not suffer from weight gain or obesity. The daily energy expenditure involves basal expenses, thermed effect of food and physical activity expenses.[8] The basal metabolic rate (BMR) is the largest contributor to energy expenditure and it is defined as the energy required for performing vital body functions at rest.[9] Even if two individuals consume more or less the same amount of calories, the one with the higher metabolic rate will surely burn fast and more calories from the food intake. The one whose metabolism is slower, will eventually not burn all the calories. Instead, the excess calories would be converted into fats resulting to an increase in body weight.[10]

**Food intake pattern**

In the present study, it was found that maximum patients (60%) take food when feel good hunger. Maharshi Charaka has mentioned that Sthaulya patients have good appetite and they take food in large quantity to satisfy their hunger but due to pathology of disease, only the Medo Dhatu gets nourished and other Dhatus undergo diminution. It is also found that 44.4% patients, 1-2 days in a week, take food just because it is the time to have food and it may be due to their daily schedule without paying attention to their appetite. This kind of eating behaviour may lead to Mandagni and production of Ama which further leads to Medo Dhatvagnimandya and Medo Dhatu Vriddhi.

**Quantity of food intake**

In this study, 129 volunteers had Breakfast, with 2 meals a day, 55 volunteers had Breakfast with 3 time meal with evening snacks, 11 volunteers had 1 time lunch 1 time snack and 4 volunteers had 2 meals a day withut breakfast. Excess quantity of food intake without considering the status of Agni (digestive fire) is one of the important causes of Sthaulya. Maharshi Charaka has mentioned Atisampurana as the cause of Sthaulya.[11]

**Intake of Non-Veg food**

In this study it was found that 112 volunteers had non - vegetarian food 2 times a week, 48 volunteers had non - vegetarian food 4 times a week, 25 volunteers recently had non – vegetarian food and 14 volunteers never had non - vegetarian food. Intake of Madhura (sweet), Snigdha (unctuous) Ahara (food) increases Medo Dhatu in body.[12]

**Fatty food intake**

95 volunteers consumed dairy products weekly (biscuits/bread/pizza/weekly), 60 volunteers consumed dairy products frequently/daily(biscuits/bread/pizza), 25 volunteers never used bakery products and 18 volunteers consumed dairy products sometimes (biscuits/bread/pizza/month. Intake of Snigdha (unctuous) Ahara is mentioned as a cause of Sthaulya.[13] Consumption of high-fat foods is thought to be a particularly powerful predictor of weight gain because of the efficiency with which fat is metabolized and its high caloric density and palatability.[14] Furthermore, fat intake produces weak satiety signals relative to other macronutrients, which results in greater overall intake.[15]

**Liking for sweet taste food**

93 volunteers eat sweets one/twice every week, 80 volunteers eat sweets daily, 14 volunteers sweets were not necessary for them and 12 volunteers eat sweets once a month. Intake of Madhura Ahara (sweet food) is mentioned as cause of Sthaulya.[16]

**Frequency of taking dairy foods items weekly**

In the study it was found that 98 volunteers eat dairy products recently, 67 volunteers eat dairy products frequently/everyday/regularly, 20 volunteers eat dairy products once a month and 14 volunteers never eat dairy products. Intake of milk and milk products causes Kapha and Medo Vriddhi which is an important cause of Sthaulya.

**Involvement in physical activity**

Involvement in physical activities has decreased overtime due to technological advancement. Lack of physical activity and sedentary life style is mentioned as the cause of Sthaulya.[17,18] In this study, 105 volunteers had normal daily gait or function without dyspnea, 58 volunteers had decreased physical activity dyspnea, 20 volunteers had vigorous physical activity (having trouble breathing more than normal) such as heavy lifting, aerobics, fast cycling. In the present study, 98 volunteers practice everyday yoga posture/exercise/brisk walk for 30 minutes in morning/evening for 1 – 2 days a week, 67 volunteers never had yoga

posture/exercise/brisk walk for 30 minutes in morning/evening for, 19 volunteers everyday had yoga posture/exercise/brisk walk for 30 minutes in morning/evening and 15 volunteers yoga posture/exercise/brisk walk for 30 minutes in morning/evening for 3-4 days a week.

Maximum patients rarely or never do exercise or brisk walk or Yoga, Asana etc., Even to cover the short distance they prefer vehicles instead of walking. To maintain the perfect healthy state of body, our energy expenditure should be in accordance to our food intake but here, most of the patients were found to be involved in fatty food intake, that also in excess quantity but their involvement in physical activity is very less and that was found to be the strong etiological factor for Sthaulya.

**Sleep pattern**

Like proper diet, proper sleep is also essential for the maintenance of the body. Corpulence and emaciation are specially conditioned by proper and improper sleep and diet.[19] Excess sleep and day sleep are mentioned as the causes of Sthaulya.[20] In present study it was found that 93 volunteers had sleep > 9- 10 hours. /24 hours burn-like numbness in the body, 67 volunteers had sleep > 10 hours. /24 hours body weakness related to jrimbha and drowsiness, 20 volunteers had sleep > 8 -9 hours. /24 hours with slight dullness in body and 19 volunteers had Normal and good sleep for 6 to 8 hours. /24 hours with feelings of lightness and refreshment normal and good sleep for 6 to 8 hours. /24 hours with feelings of lightness and refreshment. Such sleeping habit is very unhealthy and found as a strong cause of Sthaulya.

The study shows that that 97 volunteers sleep for 10 minutes after lunch, 63 volunteers sleep more than one hour after lunch, 21 volunteers do not sleep at all and 17 volunteers sleep occasionally.

Normally for a healthy adult 6-8 hours of night sleep is recommended and that is enough to get good rest. Waking up early in the morning is also mentioned as a good practice for maintaining good health and longevity. Sleeping for more than 8 hours is not good for health as it leads to weight gain and Sthaulya. Many of these patients sleep in a very comfortable thick soft bed. Sleeping in Sukha Shayya (comfortable soft bed) is also an etiological factor for Sthaulya.[21]

**Manasika nidana**

The rapid increase in the prevalence of obesity suggests that psychological and behavioural factors, rather than biological factors, are primarily responsible for this trend.[22] Obesity is a psychological as well as physical problem. Individuals who suffer from psychological disorders (e.g., depression, anxiety, and eating disorders) feel more difficult in controlling their consumption of food, exercising an adequate amount and maintaining a healthy weight. Food is often used as a coping mechanism by those with weight problems, particularly when they are sad, anxious, stressed, lonely and frustrated.[23]

In present study it was found that 106 volunteers said that they feel stress in their daily life, 69 volunteers said that they do not feel stress at all, 13 volunteers said that they feel stress in their daily life and 11 volunteers said that they cannot tell. Though the patients are economically not very much distressed and they have sufficient physical comforts but psychologically they are not very happy.

Though the awareness about obesity is increasing but despite this rise in awareness and willingness to accept obesity as a chronic condition of clinical significance, obese individuals are subjected to a high level of stigmatization resulting in discrimination.[24]

## CONCLUSION

This cross-sectional survey study highlights the multifactorial etiology of Sthaulya (obesity) and underscores the significant role of dietary, physical, and psychological factors in its manifestation. The findings reveal alarming trends in sedentary behavior, unhealthy dietary patterns, and insufficient physical activity among the participants, contributing to the prevalence and progression of obesity. Key observations, such as high consumption of calorie-dense foods, frequent intake of sweets, irregular meal timings, and a preference for sedentary lifestyles, align with classical Ayurvedic texts that identify over-nourishment (Santarpana) and lack of physical activity (Avyayama) as causative factors. Additionally, the predominance of obesity among younger populations emphasizes the urgent need for early preventive measures.

The study reinforces the relevance of Ayurvedic principles in managing Sthaulya through a holistic approach that includes dietary moderation, regular physical activity, and mental well-being. Interventions rooted in Ayurveda, such as the adoption of Ruksha (dry) and Laghu (light) Ahara, Ushna (warm) therapies, and daily exercise routines, offer promising avenues

for addressing this global epidemic. By integrating traditional wisdom with modern evidence-based practices, we can develop comprehensive strategies to mitigate the rising burden of obesity. Public health policies promoting lifestyle modifications, awareness programs, and the incorporation of preventive healthcare measures are essential to curb this growing menace effectively.

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