

OBSERVATIONAL STUDY ON MEDA SARA SARATA VIS-À-VIS BODY ADIPOSITY INDEX

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Published online: September, 2019

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ABSTRACT

Introduction: *Sarata* is the quality assessment of *dhatu*. Importance of *Sara* determination lies in exploring *Bala* of an individual *Dhatu*. *Meda dhatu* can be considered as lipids and Adipose tissue in modern physiology. Hence, the present study is done to establish the relationship between the *Medadhatu sarata* and Body adiposity index. **AIM:** Relative study of *Medasarata* in context of Body Adiposity index **Methods:** For this observational study, 110 randomly selected individuals according to sign and symptoms of *Meda dhatu sarata* selected as per criteria of inclusion and exclusion. Data were statistically analysed to determine the correlation between *Meda Sara* and Body Adiposity Index. **Results:** In this study 63% subjects were female and 37% were male; socio-economic status showed higher incidence in Upper class (48%) and next in Upper middle class (39%). There was statistically significant correlation observed between physical characters of *Meda Sara* and Body Adiposity Index, majority of individuals in both *Pravara Sara* (57.14%) and *Madhyama sara* (64.07%) have high tendency to fall under the Healthy range of BAI. **Conclusion:** Assessment of *meda sarata* among 110 individuals, 93.6% belonged to *madhyama medasara* whereas only 6.36% were of *pravara medasara*. This study concluded that Body Adiposity Index have significant correlation with *meda sarata*. Henceforth, BAI can be considered as reliable, objective tool for assessment of *meda sarata*.

Keywords: *Sara, Meda Sarata, Dhatu, Body Adiposity Index*

INTRODUCTION

Dhatu Sara is one among such fundamentals concerning which very sparse explanation is found in the classics. It is one among the *Dasha Vidha Atura Pariksha* by which the *Bala* and *Ayu* of a person can be ana-

lysed. In spite of its great importance, it is usually neglected while examining the patient. The practical difficulty faced by a physician while assessing a person for *Dhatu Sara* is the lack of objective tools. *Meda*

Sara, one among the *Dhatu Sara* concerns attention for its better understanding and improved applicability in clinical practice. Moreover revalidation and revitalization is essential through research, in both fundamental and applied aspect of *Ayurveda*.

Importance of *Sara* determination lies in exploring *Bala* of an individual *Dhatu*¹. Since the *Bala* of individual *Dhatu* collectively provides *Bala* of *Sharira*. Assessment of *Medasarata* is practically difficult due to lack of objective parameters. Hence this study is planned to bring about objective parameters for assessment of *Medasarata*.

Snigdhatta is one such subjective parameter mentioned in *Meda Sara Lakshana* which can be used to assess the same. *Snigdhatta* refers to *Sneha / Aruksha / Chik-kana / Masruna*² and oily³ and is the contribution of *Jala Mahabhuta*. It promotes luster to *Varna, Swara, Netra, Kesha, Loma, Nakha, Danta, Oshta, Mutra, Pureesha, Sweda*⁴.

Adequate amount of body fat is required to carry out certain physiological functions in body, like promoting luster to hair, lips, nails etc. Body Adiposity Index is one such scientific quantitative method of calculating the amount of body fat as a proportion of body weight⁵.

GENERAL CONSIDERATIONS OF MEDA-SARA PERSON:-

The *Meda Sara* persons have excellence of *Meda Dhatu* in comparison with individuals of other *Sara*.

Medasara persons will have *Snigdhatta* specifically in *Varna, Swara, Netra, Kesha, Loma, Nakha, Danta, Oshta, Mutra, Purisha*. They will be endowed with *Vitta, Aishwarya, Sukha, Upabhoga, Pradana, Arjava, Sukumara* and *Upachara*⁶. It is told that *Meda Sara* persons have *Snigdhatta* expressed in *Mutra, Sweda* and *Swara*. And have distinctive features of *Bruhat Shareera* and *Ayasa Asahishnuta*⁷. The *Meda Sara* persons will have *Sushareera, Vitta* and *Putra*⁸.

Body Adiposity Index- objective parameter

The **body adiposity index (BAI)** is a method of estimating the amount of body fat in humans. The BAI is calculated without using body weight, unlike the body mass index (BMI). Instead, it uses the size of the hips compared to the person's height⁹.

$$BAI = (HC / (HM)^{1.5}) - 18$$

Where

BAI =Body Adiposity Index

HM =Height in Metres

HC = Hip Circumference in Centimetres

Based on population studies, the BAI is approximately equal to the percentage of body fat for adult men and women of differing ethnicities¹⁰.

Bergman and colleagues developed the BAI index using data from a Mexican-American population study. Percentage of body fat, as measured by the dual-energy X-ray absorptiometry (DXA), was used as a “gold standard” for validation of the scales accuracy.

Body Adiposity Index Classifications for Women				
Age (years)	Underweight	Healthy	Overweight	Obese
20 – 39	Less than 21%	21% to 33%	Greater than 33%	Greater than 39%
40 – 59	Less than 23%	23% to 35%	Greater than 35%	Greater than 41%
60 – 79	Less than 25%	25% to 38%	Greater than 38%	Greater than 43%
Body Adiposity Index Classifications for Men				
Age (years)	Underweight	Healthy	Overweight	Obese
20 – 39	Less than 8%	8% to 21%	Greater than 21%	Greater than 26%
40 – 59	Less than 11%	11% to 23%	Greater than 23%	Greater than 29%
60 – 79	Less than 13%	13% to 25%	Greater than 25%	Greater than 31%

METHODOLOGY

AIM & OBJECTIVES:

AIM: Relative study of *Medasarata* in context of Body Adiposity index.

OBJECTIVE OF THE STUDY:

1. To ascertain parameters to determine *Medasarata*.
2. To assess body adiposity index in individuals.

3. To find out correlation between *Meda Sara* and body adiposity index in *pravara-madhyam-avara meda sara* individuals.

Steps of Study: -

The study was planned in the following steps:-

1. Selection and categorization of subjects.
2. Socio demographic study, constitutional study, evaluation of Physical and socio-psychological characteristic of *Medasara* in subjects.
3. Measurement of Body Adiposity Index in subjects.
4. Analysing and comparing the results obtained.

SURVEY STUDY DESIGN: Survey study was conducted in two phases:

1. Validation of Survey Questionnaire for reliability and consistency.
2. Collection of Data from subjects using Survey Questionnaire. A preliminary list of items related to *Meda Sara* was included, based on classical description of its *Lakshana*, and same was converted into questions and presented in form of questionnaire in English language. The prepared questionnaire comprised of two sections with physical characters and socio-psychological characters. The items in the questionnaire were developed in such a way that it was easily understood and filled by subjects themselves, aged above 16 years. The volunteers were given options to record their responses in the form of scores '0', '1', '2', '3' by marking the respective column provided for the purpose.

Pilot Study: A self-administered questionnaire was distributed to 10 individuals in each of four groups viz., Ayurvedic Academicians, Ayurvedic Practitioners, Ayurvedic Researchers and Ayurvedic Scholars, their response were analysed and proforma framed subjected to the validation process. The data analysis was done using the software 'Statistical Package for Social Sciences', Version 20 (SPSS Inc. Chicago, IL, USA). For the purpose of analysis the following coding was used 0, 1, 2, 3. For the purpose of validation, each section of the questionnaire was considered as an independent scale and these scales were tested for their reliability using Cronbach's Coefficient Alpha. While validating the scales, value of alpha greater

than 0.7 and item-total correlation greater than 0.2 were considered acceptable. For this research, *pravara Meda dhatu* was considered when score obtained is more than 65% score. *Madhyama* refers to average and so in this category *dhatu* quality neither superior nor inferior. Keeping this fact in mind, range for *madhyama sara* was decided to be in between 33% to 65%, and for *avara sara* it was fixed less than 33%.

Study Design: Cross-sectional survey study was conducted from October 2018 to December 2018, with written informed consent obtained from all study participants. Ethics clearance was obtained from Institutional Ethics Committee of A & U Tibbia College and hospital, Delhi dated. 12.7.17. **Survey Method:** Self-administered questionnaire, **Sampling Frame:** The volunteer were selected from the PG and UG students of A & U Tibbia College and hospital, Delhi. **Sample Size:** The sample size was calculated on the basis of respondent to item ratio. i.e. 5:1; $5 \times 22 = 110$ (no. of items in questionnaire = 22)

Sampling Technique: Simple random sampling technique was used to select representative subjects.

Inclusion criteria

1. Age 20-30yrs irrespective of gender.
2. Individuals having BMI <25 and Waist to Hip Ratio (WHR) < 0.85.
3. No history of serious illness or disease.
4. Not under any type of medical treatment for last six months.

Exclusion criteria

1. Individuals having BMI >25 and WHR > 0.85.
2. Pregnant and lactating women.
3. Patients suffering from congenital anomalies.
4. Patients suffering from Dyslipidaemia and endocrinal abnormality.
5. Taking alcohol or narcotics as a daily habit.

OBSERVATIONS & RESULTS

Gender: In the present study out of 110 volunteers, majority of volunteers were female i.e. 63%.

Diet: Majority of subjects belong to mixed diet by food habit (61%) and remaining subjects were taking Vegetarian diet (39%).

Socio-Economic status: Maximum subjects participated in the study are from Upper class (43%), fol-

lowed by Upper Middle class (39%), lower upper (10%), lower (3%).

Characters of *Medasara* based distribution showed that the maximum subjects belong to *Madhyama Sara*

Category 93.64% followed by only 6.36% subjects belong to *Pravasara*.

TABLE 1: Distribution of subjects based on Body adiposity index

	Healthy	Over weight	Obese	Total
Male	11	19	12	42
Female	59	9	0	68
Total	70	28	12	110
	63.63%	25.45%	10.09%	100%

Body Adiposity Index: Maximum subjects fall under Healthy range of Body adiposity Index (63.63%) followed by Overweight (25.45%) and very less in obese category (10.09%).

BAI & MEDASARA

Cross tabulation of Physical characters of *MedaSara* to that of Body Adiposity Index showed that majority of healthy subjects fall under *pravara sara* (57.14%) and *madhyama sara* (64.07%).

Pearson Chi-Square showed statistically significant relation between physical characters of *Meda Sara* and body Adiposity index at $X^2(3) = 0.156198, p < 0.05$. A Spearman's Rank Order correlation was run to determine the relationship and there was a significant correlation between them, which was statistically significant at $r_s = 0.153, p < 0.05$.

TABLE 2

MEDASARA	BAI				Total
		Healthy	Overweight	Obese	
<i>Madhyama</i>	Count	66	26	11	103
	%	64.07%	25.24%	10.67%	100%
<i>Pravara</i>	Count	4	2	1	7
	%	57.14%	28.57%	14.28%	100%
Total		70	28	12	110

TABLE 3: Correlation between Characters of *Meda Sara* With Body Adiposity Index

Characteristics Of Mre-dasara	Body Adiposity Index			
	N	R _s	P	REMARK
<i>Snigdha Varna</i>	110	.008	.05	NS
<i>Snigdha Swara</i>	110	.18	.05	S
<i>Snigdha Netra</i>	110	-.082	.05	NS
<i>Snigdha Kेशha</i>	110	.145	.05	S
<i>Snigdha Loma</i>	110	.043	.05	NS
<i>Snigdha Nakha</i>	110	-.026	.05	NS
<i>Snigdha Danta</i>	110	.016	.05	NS
<i>Snigdha Oshtha</i>	110	-.009	.05	NS
<i>Snigdha Mutra</i>	110	.059	.05	NS
<i>Snigdha Pureesha</i>	110	.105	.05	S

<i>Snigdha Sweda</i>	110	-.032	.05	NS
<i>Bruhat Sharir</i>	110	-.026	.05	NS
<i>Aayasasahishnu</i>	110	.093	.05	NS
<i>Vitta</i>	110	.16	.05	S
<i>Aishwarya</i>	110	.068	.05	NS
<i>Sukha</i>	110	.047	.05	NS
<i>Upbhoga</i>	110	.027	.05	NS
<i>Pradaan</i>	110	-.061	.05	NS
<i>Aarjava</i>	110	-.049	.05	NS

Correlation between physical and socio-psychological characters of Medasara and Body Adiposity Index showed that *Snigdha Swara*, *Snigdha Kesha*, *Snigdha Pureesha* and *Vitta* shown significant correlation at $r_s=.18, p <.05, r_s=.145, p <.05, r_s=.105, p <.05, r_s=.16, p <.05$.

DISCUSSION

In this study 63% were female and 37% were male. Females put on more body fat than boys during adolescence and adulthood. This is perfectly normal and healthy. As the study was single cantered, there were more number of females in college in comparison to males. Majority of subjects consumed mixed diet (61%) and remaining subjects were Vegetarians (39%). This is evident with the finding that Meat fat comprises mostly monounsaturated and saturated fatty acids, with oleic (C18:1), palmitic (C16:0), and stearic acid (C18:0) being the most ubiquitous. Meat and meat products are considerable sources of cholesterol in the diet. In most industrialized countries, a high meat intake contributes to a higher than recommended total and saturated fat and cholesterol intake¹¹. Hence, diet having the fats in proper quantity is required for better status of *Meda dhatu*. The distribution of the volunteers based on socio-economic status showed higher incidence in Upper class (48%) and next in Upper middle class (39%). A cross tabulation showed that *Meda Sara* is found to be more common in the economically upper class population, whereas only (3%) population lied in lower class. This finding is consistent with the survey carried out by Indian National Family Health Programme called “Indigenous

health and socioeconomic status in India”. It reviews that upper and lower socioeconomic class accounts to over or moderately nourished and undernourished health inequality in this developing country¹². Physical and Socio-Psychological characters of *Medasara* based distribution showed that the maximum subjects belong to *Madhyama Sara* Category 93.64% followed by *Pravara Sara* including 6.36%. This can be due to continuous physical and mental stress, faulty lifestyle in the present era; most subjects belong to *Madhyama sara* category. It was found that maximum subjects fall under Healthy range of Body adiposity Index (63.63%) followed by Overweight (25.45%) and quite low in obese category (10.09%). It might be attributed to the age group selected for the assay, in which body adiposity index falls mostly under Healthy range.

Discussion on Result

Body adiposity index (BAI) indicates the amount of body fat and both *pravara* and *madhyama medasara* individuals due to their perfect and near to perfect *meda dhatu* belonged to healthy range of BAI. Correlation between physical and socio-psychological characters of *Medasara* and Body Adiposity Index showed that *Snigdha Swara*, *Snigdha Kesha*, *Snigdha Pureesha* and *Vitta* shown significant correlation at $r_s=.18, p <.05, r_s=.145, p <.05, r_s=.105, p <.05, r_s=.16, p <.05$. *Snigdha Swara*: It is seen that opera singers are often pleasingly plump as a large amount of fatty tissue surrounding the voice box (larynx) increases its resonance capability and thus produces a more pleasing sound. It is almost impossible to have a great deal of fatty tissue around the voice box without carrying a great deal of fatty tissue elsewhere on the body and opera singers need a far more powerful diaphragm than normal to be able to project their voice above the sound of a large orchestra in a large opera house. A large chest cavity and good control of the lungs will

provide a suitable mass to help drive the diaphragm to some extent¹³. *Snigdha kasha*: According to study “Adipocyte Lineage Cells Contribute to the Skin Stem Cell Niche to Drive Hair Cycling” states¹⁴:

Resident skin adipocytes regenerate de novo in parallel with the hair cycle. Immature adipocytes are necessary and sufficient for hair follicle regeneration. Immature adipocytes express PDGF (platelet derived growth factors) ligands to promote hair regeneration. Hence, this shows importance of adipocytes (*meda dhatu*) in improving hair quality. *Snigdha Pureesha*: Unctuous stool is a sign of well lubricated body which is a classical characteristic of *medasara*. *Vitta* is one among the socio-psychological characteristic of *Medasara*, depicting wealth status of *Medasara* individuals. This fact was observed by researchers from time to time as stated in study, “this association between wealth and increased body mass was often reflected in the art of European masters such as Rubens (1577–1640) who depicted women with a full-bodied, hour-glass shape; a shape which was associated with opulence and fertility”¹⁵, proving the *laksahana* explained by *Acharya Charaka* in *sara pariksha*.

CONCLUSION

Dhatusarata is qualitative, quantitative and utilitarian evaluation of *dhatus*. As *dhatu sarata* represents tissue perfection, *Meda sarata* contributes the magnificence of adipose tissue and lipids. After assessment of *meda sarata* among 110 individuals, 93.6% belonged to *madhyama medasara* whereas only 6.36% were of *pravara medasara*. This could be because of shortage of *pravara sara purusha* in current circumstance because of modified way of life, ecological components, physical and mental pressure influencing individual imperativeness. *Meda sarata* had shown significant positive correlation with Body Adiposity Index and Body Mass Index. This study concluded that Body Adiposity Index has shown significant correlation with *meda sarata*. Henceforth, BAI can be considered as reliable, objective tool for assessment of *meda sarata* as an adjuvant to *shastraokta lakshana*. Further detailed observation study on larger population will be required to confirm the results obtained in the study.

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Source of Support: Nil

Conflict Of Interest: None Declared

How to cite this URL: Deepika Sethi et al: Observational Study On Meda Sara Sarata Vis-À-Vis Body Adiposity Index. International Ayurvedic Medical Journal {online} 2019 {cited September, 2019} Available from: http://www.iamj.in/posts/images/upload/1941_1946.pdf