

Comparative Clinical Study Ofrole Of Mustadikwathghanvati In Sthoulya (Obesity) By Antaparimarjanandmustadichurna In Bahiparimarjanchikista

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Abstract:

Sthoulya(Obesity) is the major and basic cause of lifestyle disorders like Diabetes mellitus, Hypertension, Coronary heart disease. Sthoulya(Obesity) is increasing at an alarming rate in developed industrialized countries which are undergoing rapid nutrition and lifestyle transition. Obesity is one of the most effective diseases which affect someone's social, physical and mental status. In Ayurveda; Sthoulya (Obesity) is regarded as Medoroga, a disorder of MedaDhatu, which includes fat tissue and fat metabolism. According to Ayurveda; Sthoulya begins with an imbalance of Doshas (Vata, Pitta and Kapha), Agni (digestive fire), Malas (waste products) or an imbalance of Srotas (microcirculatory channels). This collection of imbalances then interferes with the formation of tissues or Dhatus and leads to a tissue imbalance that we experience as excess weight.

Overweight and obesity are linked to more deaths worldwide than underweight. Overall, about 13% of the world adult population (15% of women and 11% of men) was obese in 2016. The worldwide prevalence of obesity nearly tripled between 1975 and 2016. Around 5-8.8% of school children are obese in India. And if the rates increase at a pace like this, 27 million Indian children will be obese by 2030.

Now a day's every person is running after life's goal hence does not have time to think and act for healthy life and not able to follow the proper Dincharya, Ritucharya, Dietetics rules and

regulations. Due to artificial living lifestyle, person suffers from so many disorders for themselves; Sthoulyais one of them.

Keeping in the view of above concepts, research work entitled “Comparative Clinical Study of role of MustadiKwathGhanvati in Sthoulya (Obesity) by Antaparimarjan and MustadiChurna in BahiparimarjanChikista” is taken into consideration.

The result of study showed that excessive intake of oily and fatty food, sedentary lifestyle, and psychological factor along with genetically predisposition play a major role in aetiopathogenesis of Sthoulya (obesity).

Furthermore it was also found that MustadiKwathGhanvati effectively helps in reducing weight & BMI ratio. The effect of study shows that MustadiKwathGhanvati provided better relief as compare to MustadichurnaUdhavartana in the management of Sthoulya

Keywords:

Sthoulya, Medoroga, MustadiKwathGhanvati, Mustadichurna, Antaparimarjan and Bahiparimarjan Chikista

INTRODUCTION:

The nature has taught the man how to be healthy before science has discovered the law of health, but it is an irony of the fate that on this earth on one hand millions do not get enough food and roam in skeletal appearance while on the other hand there are so many more who, beside over eating leads sedentary life to march towards an untimely death.

Obesity is blessing of modern age of machines and materialism. It is physiological and psychological as well as social disorder, which is most disfavored by modern society for social and medical reasons. The present day society expects peak physical and mental performance from each of its member and obese person is unable to find out himself physically and mentally fit for it. It occurs as a result of physical activities with increased intake of daily diet results into clinical entity which can be called as obesity. According to WHO (report 2012), Obesity is one of disease among top ten selected risk to the health.

1. 350 million Causes of obesity reported.
2. 12% are of adult of total population.
3. Total health care expenditure for obesity patients is 10-15%.

The common way to find out whether you are *Sthoulya* or *Atisthoola* is ascertained by calculating the Body Mass Index (BMI). BMI is an estimate of body fat and can indicate risk for disease. BMI is a simple index and calculated by dividing person weight in kilograms by his height in square meters. The World Health Organization^[1] (WHO) defines as follows:

Sr. No.	Weight	BMI Range
1	Normal weight	18.5 to 24.9
2	Overweight	25.0 to 29.9
3	Obesity 1	30 to 34.9
4	Obesity 2	35 to 39.9
5	Extreme Obesity	>40

A definition of *Swastha Purusha*^[2,3]; a healthy body is the only one media to achieve ultimate goal among the *Chaturvidh Purushartha*.

Acharya Sushrut also told that *Madhyamshariri* is the best but *Atisthula* and *Atikrisha* are always affected with some complaints.

Acharyacharaka has quoted a *Sthoulya* under the eight varieties of important which designated as *Astauninditapurusha*, *Sthoulya* comprises one of them.

In pathogenesis of *Sthoulya*^[3,8], *kapha (kledak)*, *vata(saman and vyana)*, *medodhatu (fats, lipid)*, *medodhatwagnimandyata* are main responsible factors. So in this study, *tiktarasapradhan* drugs in compound formulation of *MustadiKwathGhanvati* for *Antaparimarjan* and *MustadichurnaUdhavartana* for *Bahiparimarjan* has been selected.

AcharyaCharaka^[4,5] has stated that regular administration of *MustadiKwath* as a formulation can cure all the *SantarpanjanyaVyadhis* or diseases due to overnutrition.^[6]

The content of *MustadiKwath* is easily available throughout year. They have properties like *lekhan ,deepan ,pachan ,anuloman , karshan* . All are *kaph-pitta shamak*, so they help in correcting the fat metabolism, restore cholesterol. *Udhavartana* normalize *kapha* and liquefies *Meda* by giving firmness and increased its complexion, increased *sukradhatu* and also give strength to the body. It increases formation of blood.

According to *Acharyasushruta*^[7], *Udhavartana* helps to restore the deranged *vayu* of to it the body its normal condition and also liquefies *kapha* and *meda* of the body by giving cleanness and smoothness to the skin. It also dilate orifices of *sira* and increase *twakgatagni (bhrajakagni)*.

Aim:

To study the clinical efficacy of *MustadiKwathGhanVatiin Antaparimarjanachikista* and *MustadiChurnaUdhavartanain Bahiparimarjanachikista* in *Sthoulya* (obesity)

Objectives:

- 1) To assess the effect of compound formulation of *MustadiKwathGhanvati* for *Antaparimarjan* in *Sthoulya* i.e. obesity.
- 2) To assess the effect of *MustadiChurnaUdhavartana* for *Bahiparimarjan* in *Sthoulya* i.e. obesity.
- 3) To evaluate the changes in lipid profile, weight and BMI due to *Antaparimarjan* and *bahiparimarjanachikista*.
- 4) Comparison in between *MustadiKwathGhanvati* for *Antaparimarjan* and *MustadiChurnaUdhavartana* for *Bahiparimarjan*

Materials and Methods:

1] Research design:

A Randomized Control Trial

2] Participant:

- Patients –*Sthoulya*(Obesity)
- Gender-Both Male and Female
- Age- From 18 yrs-60 yrs of age.

3] Sampling procedure:

Comparative, Open, Random sampling

Grouping:

Gro ups	No. of pati ents	Ag e	Sex	Intervent ion	Dose/day	Dur ation
Group A	30	18 yrs to 60 yrs	Male and Female	<i>Mustadik wathGhannvati.</i>	500mg Tab. 2tabs/day Before meals with <i>Koshnajal</i>	6weeks
Group B	30	18 yrs to 60 yrs	Male and Female	<i>Mustadic hurnaUdhavartana</i>	As required	6weeks

4] Selection of cases:

Patients having classical signs and symptoms of *Sthoulya* were selected after clinical & objective examination. I had selected 60 patients of *Sthoulya*. These patients were selected randomly Follow-up assessment was done by specially prepared case record forms of every patient to meet all baseline requirement. Follow-up signs & symptoms were recorded.

5] Method of Selection of Patients

a) Inclusion Criteria:-

- Patients having cardinal signs and symptoms of *Sthoulya*
- Age - 18 to 60 years.
- B.M.I. -25-30kg/m
- Both sexes
- Willing to give written informed consent.

b) Exclusion Criteria:-

Diagnosed cases of:

- Diabetes
- Cardiopulmonary disease
- Parkinson’s disease

- Pregnant and Lactating women
- Age below 18 and above 60
- BMI below 25 and above 30 kg/m²
- Patients who refuse to participate in study

6] Investigations:-

- CBC with ESR
- Lipid profile
- BSL fasting & postprandial
- Urine routine & microscopic

7] Drug – Contents of *MustadiKwathGhanavati*(cha.su.23/11)

Sr. No	Name	Latin name	Part
1	<i>Musta</i>	Cyperusrotundus Linn.	1 part
2	<i>Aragvadha</i>	Cassia fistula Linn.	1 part
3	<i>Patha</i>	Cissampelospaireira	1 part
4	<i>Amalki</i>	Phyllanthusemblica	1 part
5	<i>Haritki</i>	Terminaliachebula	1 part
6	<i>Bibhitak</i>	Terminaliabellirica	1 part
7	<i>Devdaru</i>	Cedrusdeodara	1 part
8	<i>Gokshur</i>	Tribulusterrestris	1 part
9	<i>Khadir</i>	Senegalia catechu	1 part
10	<i>Nimba</i>	Azadirachtaindica	1 part
11	<i>Haridra</i>	Curcuma longa	1 part
12	<i>Daruharidra</i>	Berberisaristata	1 part
13	<i>Tvak</i>	Cinnamomum verumPresl.	1 part

14	<i>Kutaj</i>	Holarrhenaantidysenterica wall.	1 part
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Method of preparation –

- A) For *Antaparimarjanchikista -Mustadikwathaghanavati*(MKG) was prepared in the laboratory by following classical method described in ‘*Ayurvedic Formulary of India*’. In addition, its main ingredients include 9 traditional medicinal herbs. All the ingredients of MKG were procured from the local market
- B) For *Bahiparimarjanchikista* –all the above drugs should be taken in powder form in equal amount.

8] Diet –

All *pathyakaravihar* mentioned in Obesity is advised.

9] Diagnostics Criteria -

- (1) Patients with Body Mass Index in between 25-30kg/m² considered as Obese.
(2) Patients having clinical signs & symptoms of *Sthoulya*.

10] Follow up -

- (1) Symptomatic improvement, after every week.
(2) Lab Investigations done before and after treatment.

11] Case Record Form –

Record, of all patients included in trial is documented & follow up is mentioned in case record forms.

12] Clinical examination –

Complete clinical examination from the point of view of obesity to diagnose & assess the condition of patient.

13] Criteria of Assessment –

Symptoms of obesity plus Symptoms of *Sthoulya* mentioned in the text or practically observed are assessed at each follow up. Presence or absence of these symptoms will be registered. Different symptoms graded into four grade scales (0-3) on the basis of severity to assess the changes in clinical symptoms of *Sthoulya*. Study of changes in gradation of each symptom was done before and after treatment

	Parameters	Symptoms	Scoring
	<i>Kshudrashwash</i>	<i>Shwas</i> at rest.	3
		<i>Shwas</i> on little exertion	2
		<i>Shwas</i> on more exertion	1
		No <i>kshudrashwas</i>	0
	<i>Daurgandhya</i>	Severe	3
		Moderate	2
		Mild	1
		No <i>Daurgandhya</i>	0
	<i>Swedatipravritti</i>	<i>Swedatipravritti</i> at rest.	3
		<i>Swedatipravritti</i> on little exertion	2
		<i>Swedatipravritti</i> on more exertion	1
		No <i>Swedatipravritti</i> .	0
	<i>Aalasya</i>	Feels good than sleeping than lying.	3
		Feels good while lying than sitting.	2
		Feels good than sitting than standing.	1
		Feels good while walking/standing than sitting	0
	<i>Daurbalya</i>	Tiredness of the whole day.	3
		Tiredness upto 12hrs.	2
		Tiredness for the 6-8 hrs.	1
		No tiredness.	0
	Constant Hunger correlated with <i>Kshudhaativridhi</i>	Requires total 2 meals & 4 breakfast still feels hungry.	3
		Requires extra meal / heavy breakfast additional to regular 2 meals to satisfy	2
		Requires 1 extra breakfast with 2 meals & regular/Light breakfast to satisfy.	1
		Two meals a day with light breakfast satisfies hunger	0

Total Effects of Therapy:

Percentage of relief in symptom & signs with respect to each of patient will be as follows & will be classified as per definition described of Cured, Markedly improved, Improved & Unchanged.

- 1) **Cured** – Complete relief in signs and symptoms along with certain lab parameter & maintenance of same condition for about one yr. without medicine will be considered as cured.
- 2) **Markedly improved** – 50% & more than 50% relief in sign & symptoms of the patients along with certain definite changes in physical & biochemical parameter will be considered as markedly improved.
- 3) **Improved** – 25% to 50% relief in signs & symptoms as mentioned in criteria of assessment will be considered to be improved.
- 4) **Unchanged** - Patient who does not have any relief in signs, symptoms & lab investigation will be considered as unchanged. Along with this, the patient exhibiting improvement < 25% is also kept in this group

Observation and Results:

1) Table showing Ahara pattern Distribution in 60 patients of Sthoulya:

	Ahara pattern	No. of patients Gr. A(n=30)	No. of patients Gr. B (n=30)	Total no of patients studied (n=60)	Total %
	Ve g	8	6	14	23.33 %
	Mixed	22	24	46	76.66 %
	Total	30	30	60	100

2) Table Showing Prakriti of 60 patients of Sthoulya:

Sr. no	Prakriti	No. of patients Gr. A(n=30)	No. of patients Gr. B(n=30)	Total no of patients studied(n=60)	Total %
1	Kapha-Vata	3	5	8	13.33
2	Kaph – Pitta	15	15	30	50
3	Pitta - Vata	3	1	4	6.66
4	Pitta - Kapha	7	7	14	23.33
5	Vata - Kapha	1	1	2	3.33
6	Vata - Pitta	1	1	2	3.33
	Total	30	30	60	100%

3) Table showing Agni in 60 patients of Sthoulya:

Sr. no	<i>Agni</i>	No. of patients Gr. A(n=30)	No. of patients Gr. B(n=30)	Total no of patients studied (n=60)	Total %
1	<i>Mandagni</i>	8	8	16	26.66%
2	<i>Tikshna</i>	12	13	25	41.66%
3	<i>Visham</i>	10	9	19	31.66%
	Total	30	30	60	100%

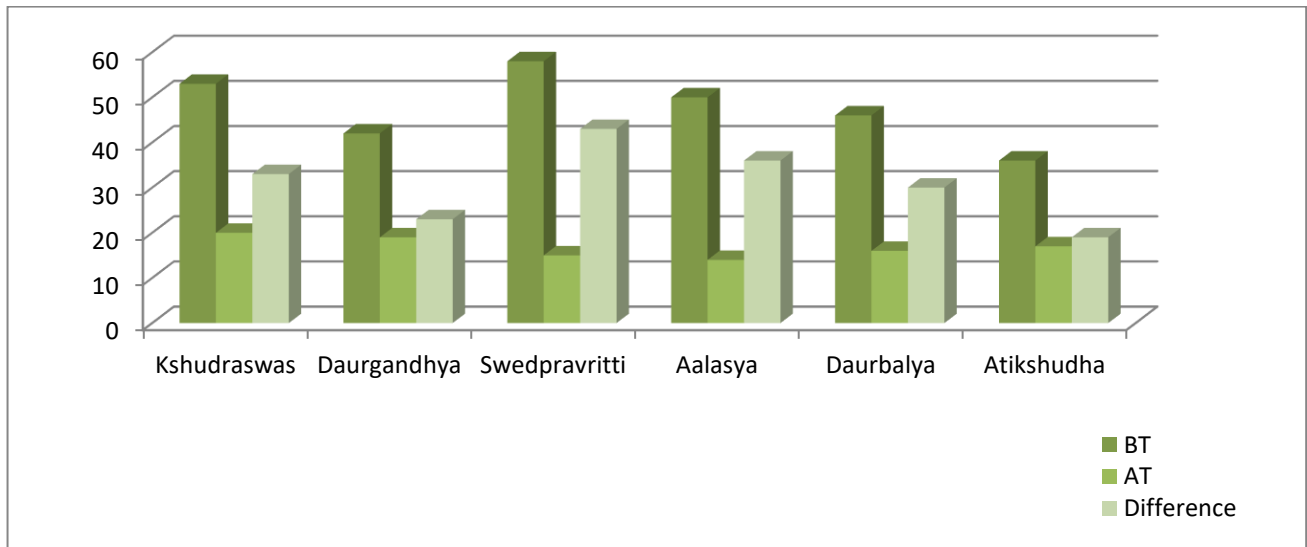
4) Table showing Koshta of 60 patients of Sthoulya:

Sr. no.	<i>Koshta</i>	No. of patients Gr. A(n=30)	No. of patients Gr. B(n=30)	Total no of patients studied(n=60)	Total %
1	<i>Krura</i>	8	9	17	28.33
2	<i>Madhyam</i>	12	11	23	38.33
3	<i>Mrudu</i>	5	5	10	16.66
	Total	30	30	60	100%

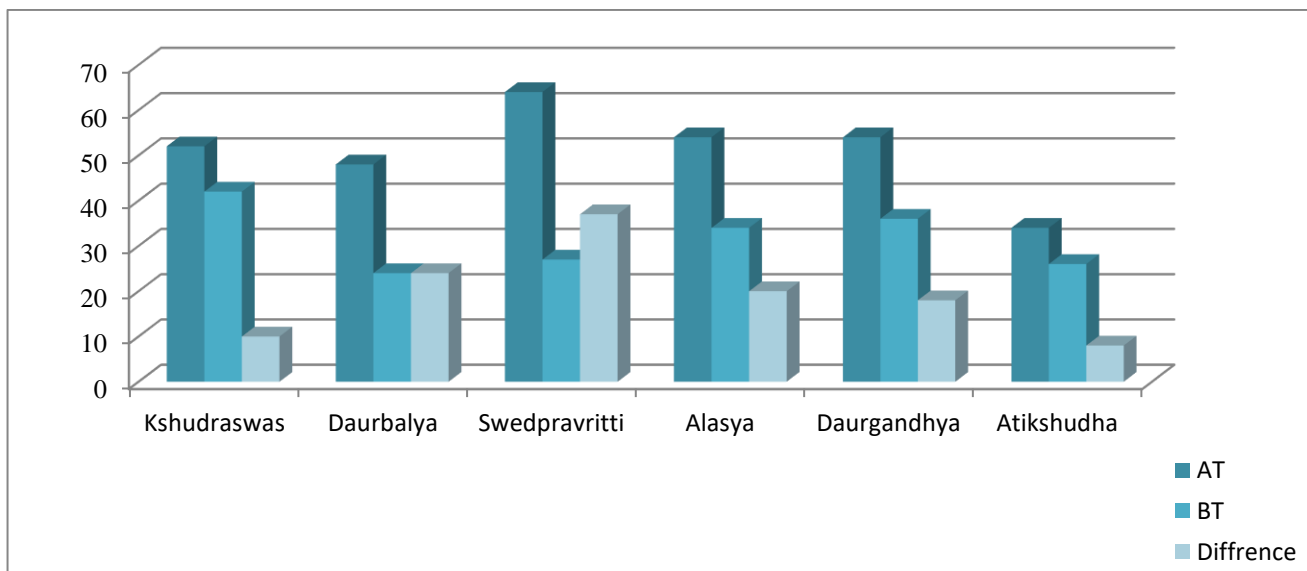
5) Table showing effect on Symptoms Score of 60 Patients of *Sthoulya*:

Symptoms	Group A				Group B			
	B T	A T	D i f f .	% R e l i e f	B T	A T	D i f f .	% R e l i e f
<i>Kshudraswa sh</i>	5 3	2 0	3 3	62.2 6%	5 2	4 2	1 0	19.2 3%
<i>Daurgandhy a</i>	4 2	1 9	2 3	54.7 6%	4 8	2 4	2 4	50%
<i>Swedatiprav ritti</i>	5 8	1 5	4 3	73.1 3%	6 4	2 7	3 7	57.8 1%
<i>Alasya</i>	5 0	1 4	3 6	72%	5 4	3 4	2 0	37.1 0%
<i>Daurgandhy a</i>	4 6	1 6	3 0	65.2 1%	5 4	3 6	1 8	33.3 3%
<i>Atiksudha</i>	3 6	1 7	1 9	52.7 7%	3 4	2 6	8 8	23.5 2%
Average score	4 7 . 5	1 6 . 8	3 0 . 7	64.6 3%	5 1 . 5	3 1 . 5	1 9 . 5	38.2 3%

Group A: Table showing effect on Symptoms Score of 30 Patients of *Sthoulya*



Group B: Table showing effect on Symptoms Score of 30 Patients of *Sthoulya*



Discussion:

A Study entitled **Comparative Clinical Study of role of *MustadiKwathGhanvati* in *Sthoulya* (Obesity) by *Antaparimarjan* and *MustadiChurna* in *BahiparimarjanChikista*** was under taken. At the end of the study, following points can be concluded on the basis of Observations made in the form of Tables & Graphs and minutely discussed in the previous chapters, following conclusion are drawn.

- Majority of Patients were from the age group 30-50yrs.
- There was more number of Females than Males. Females are more prone to obesity due to feminine factor like menopause and aggravating factors like delivery, I.U.C.D., oral contraceptive pills, miscarriage.
- Maximum numbers of Patients were of Hindu religion.
- Most of the Patients were from middle and Upper Middle Class and were educated.
- Incidence of family History of *Sthoulya* was observed in 35%. While no such history was noted 65%.
- Most of the patients (76.66%) have mixed-diet Habit.
- Most of the patients work was of sedentary type causing *Sthoulya*.
- Most of the patients had habits related to *ViharlikeAsyasukh, Swapnasukh, Chankramandweshha*
- Most of the Patients are of *Kaphaprdhanprakriti*.
- Most of the patients having *MadhyamSamhanan, MadhyamSatva&Madhyamvyayamshakti*.
- All patients were residing at *Anup Desha* for a longer period.
- *Meda, Mamsa&Rasa Dhatudushti* were seen markedly in all the patients.
- *Medovaha, Udakvaha, Mootravaha&SwedavahaSrotodushti* were found remarkably in all the patients.
- A significant improvement was observed in symptoms of patients of group A
- Comparison between two groups with respect to symptoms score was evaluated by Mann Whitney's test & significant difference was noted in both groups for symptoms like- *ksudraswash, Alasya, Daurbalya*.
- No significant difference was noted in both groups for symptoms like *swedatipravritti, Daurgandhya, Atiksudha*.
- Also parameters of Group A like Weight, Waist circumference, BMI & hematological parameters like T. Cholesterol, showed extremely significant results by unpaired 't' test in comparison with *Bahiparimarjanchikista*.
- In *MustadighanVati* having Highly Significant results were obtained in comparison to *MustadiChurnaUdhavartana*.
- In case of Group A Patients - 27(90%) were improved, patients 2(6.66%) were Markedly improved, 1(3.33%) patients remain unchanged & No one patient was cured completely.
- In case of Group B, 11(3.33%) Patients were improved, no patients were markedly improved, and 19 (63.33%) patients remain unchanged.

Studies on various aspects of obesity were reported by Sagar et.al. ^[9], Sawalet. al. ^[10], Sratsa et.al. ^[11] and Acharya et.al ^[12]. The studies are evident from the Global Burden of Disease Studies^[13-17]. Related studies were also reported by Agrawal et. al^[18], Dixit et. al. ^[19], and Wajpayee^[20,23].

CONCLUSION:

MustdiKwathGhanvati(AntaparimarjanChikista) has provided better result in almost all the parameters than *Mustadichurna(Udhavartanachikitsa)* because it eliminates *Doshas* from the body and simultaneously absorbed drug perform its action of *SampraptiVighatana* at cellular level.

Hence, it is concluded that '*AntaparimarjanChikista*' is effective than '*BahiparimarjanChikista*' in treating symptomatic conditions *Sthoulyai.e* Obesity.

Though this is not a detailed study in the field of *Ayurveda* & Obesity, it has been carried out sincerely on its level. The results of this work are encouraging & may become a ray of hope that will split the darkness of ignorance about the concepts of *Ayurveda*. The efficacy of this drug can be evaluated further along both parallel treatments with larger sample size & prolonged duration of treatment in future.

REFERENCES:

1. Harrison's Principles of Internal Medicine, 18th Edition, Vol 1, Chapter 78, Pg 631.
2. Bhagwan dasR.k Sharma, Charaka Sam-hita; 1st ed. Varanasi: Chaukamba; Sanskrit series; 2009, Vol-1, SantarpaniyaAdhyaya, Chapter 23, Verse 6. p.395
3. Chakradatta with Vaidayaprabha Hindi commentary, Reprint 2015, ChaukhambhaBharati Academy, Varanasi, ChikitsaSthana 36/17, pg 222.
4. Sharma RK, Dash VB, editors. Chowkhamba Sanskrit Series. 7th ed. Varanasi: Sutra Sthana; 2002. Agnivesha,CharakaSamhita Text with English Translation & Critical Exposition Based on Chakrapanidatta's 'Ayurveda Dipika' p. 122. [[Google Scholar](#)]
5. Touyz, L. Z., & Touyz, S. J. "Kissing, Saliva and Human Papilloma Virus: Principles, Practices, and Prophylaxis. *Journal of Medical Research and Health Sciences*, 3(9), (2020), 1078-1086. <https://doi.org/10.15520/jmrhs.v3i9.245>
6. Bagwan dasR.k Sharma, CharakaSamhita. 1st ed. Varanasi: Chaukamba Sanskrit series; 2009, Vol-1, SantarpaniyaAdhyaya, Chapter 23, Verse 3. p.395.
7. Bagwan dasR.k Sharma, CharakaSamhitha. 1st ed. Varanasi: Chaukamba Sanskrit Series; 2009, Vol-1, AstuninditiyaAdhyaya, Chapter 21, Verse 4. p.375
8. Lohith B.A, Text Book on PanchaKarama1st ed. Varanasi: ChaukambaOrientalia; 2016, Vol-1, SnehanaAdhyaya, Chapter 2,p107-08. ISSN: 978-81-7637-365-4.
9. SushrutaSamhita of Maharishi Sushruta, KavirajAmbikaduttaShastri, Reprint 2007, ChaukhambhaBharati Academy, Varanasi, Sutra Sthana 15/37, pg 62.
10. Tomasi, D., & Webb, S. "Human Gastrointestinal Microbiota and Neural Activity: Effects of Probiotics on Mental and GI Health. *Journal of Medical Research and Health Sciences*, 3(9), (2020), 1070-1077. <https://doi.org/10.15520/jmrhs.v3i9.244>
11. Sagar, V., A. Wanjari, S. Kumar, and A.P. Munshi. "Echocardiographic Assessment in Various Obesity Phenotypes." *International Journal of Pharmaceutical Research* 11, no. 2 (2019): 1804–7. <https://doi.org/10.31838/ijpr/2019.11.02.201>.
12. Sawal, A., U. Gajbe, B. Singh, A. More, and N. Bankar. "Effect of Feminine Obesity on the Outcome of Oocyte in Subfertile Females." *International Journal of Current Research and Review* 12, no. 14 Special Issue (2020): 22–24. <https://doi.org/10.31782/IJCRR.2020.2224>.

13. Sratasa, S., S. Acharya, S. Kumar, S. Lahole, and S. VasantraoBarekar. "Prevalence of Non-Alcoholic Fatty Liver Disease in Different Phenotypes of Obesity." *International Journal of Pharmaceutical Research* 11, no. 3 (2019): 1418–23.
14. Eman A Shakir, ZainabNazar (2017) Obesity increase the risk of carpal tunnel syndrome, *International Journal Of Scientific Research And Education*.05,04 (April-17) 6309-12
15. AbidillahMursyid, Waryana, LastmiWayansari, WiworoHaryani (2017) Canteen Manager And Elementary Student Empowerment About Local Food To Combat AnemiaInternational Journal Of Scientific Research And Education.05,07 (July-17) 6726-33
16. <https://doi.org/10.31838/ijpr/2019.11.03.154>.
17. Acharya, S., and S. Shukla. "Metabolic Healthy Obesity-a Paradoxical Fallacy?" *Journal of Clinical and Diagnostic Research* 12, no. 10 (2018): OE07-OE10. <https://doi.org/10.7860/JCDR/2018/36809.12165>.
18. Murray, Christopher J L, Aleksandr Y Aravkin, PengZheng, Cristiana Abbafati, Kaja M Abbas, Mohsen Abbasi-Kangevari, FoadAbd-Allah, et al. "Global Burden of 87 Risk Factors in 204 Countries and Territories, 1990–2019: A Systematic Analysis for the Global Burden of Disease Study 2019." *The Lancet* 396, no. 10258 (October 2020): 1223–49. [https://doi.org/10.1016/S0140-6736\(20\)30752-2](https://doi.org/10.1016/S0140-6736(20)30752-2).
19. Vos, Theo, Stephen S Lim, Cristiana Abbafati, Kaja M Abbas, Mohammad Abbasi, MitraAbbasifard, Mohsen Abbasi-Kangevari, et al. "Global Burden of 369 Diseases and Injuries in 204 Countries and Territories, 1990–2019: A Systematic Analysis for the Global Burden of Disease Study 2019." *The Lancet* 396, no. 10258 (October 2020): 1204–22. [https://doi.org/10.1016/S0140-6736\(20\)30925-9](https://doi.org/10.1016/S0140-6736(20)30925-9).
20. Wang, Haidong, Kaja M Abbas, MitraAbbasifard, Mohsen Abbasi-Kangevari, HedayatAbbastabar, FoadAbd-Allah, Ahmed Abdelalim, et al. "Global Age-Sex-Specific Fertility, Mortality, Healthy Life Expectancy (HALE), and Population Estimates in 204 Countries and Territories, 1950–2019: A Comprehensive Demographic Analysis for the Global Burden of Disease Study 2019." *The Lancet* 396, no. 10258 (October 2020): 1160–1203. [https://doi.org/10.1016/S0140-6736\(20\)30977-6](https://doi.org/10.1016/S0140-6736(20)30977-6).
21. Kinyoki DK, Ross JM, Lazzar-Atwood A, Munro SB, Schaeffer LE, Abbasalizad-Farhangi M, et al. Mapping local patterns of childhood overweight and wasting in low- and middle-income countries between 2000 and 2017. *Nat Med* 2020;26(5):750-759.
22. Lozano R, Fullman N, Mumford JE, Knight M, Barthelemy CM, Abbafati C, et al. Measuring universal health coverage based on an index of effective coverage of health services in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 2020.
23. Agrawal, Sachin, Sunil Kumar, VaibhaoGabhane, SouryaAcharya, and Anil Wanjari. "Electrocardiography and Echocardiography Correlation in Patients of Left Ventricular Hypertrophy." *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH* 13, no. 12 (December 2019). <https://doi.org/10.7860/JCDR/2019/42697.13329>.
24. Dixit, Anubhuti, MahalaquaNazliKhatib, Shilpa Gaidhane, Abhay M. Gaidhane, and Quazi Syed Zahiruddin. "Assessment of Serum Lipid Profile in Patients with Thyroid Disorders in a Rural Backdrop of Central India." *MEDICAL SCIENCE* 24, no. 101 (February 2020): 1–11.
25. Wajpeyi, SadhanaMisar. "Analysis of Etiological Factors of Dyslipidemia -A Case Control Study." *INTERNATIONAL JOURNAL OF AYURVEDIC MEDICINE* 11, no. 1 (March 2020): 92–97.
26. Shiv LalSolanki, BhagrajCoudhary, Bharat Meharda, Abhilasha Mali. An Epidemiological Study of Overweight and Obesity in High School Children of Udaipur City, (Rajasthan) *International Journal of Current Research and Review*. Vol 10 Issue 08, April, 33-37\
27. chigurupalli, kiran, Vashistha, A., Patel , .Deepanjali, Purohit, R., Peter, S., & Bhandari, M. (2019). Retrospective Dosimetric analysis of Bone marrow sparing vs non bone marrow sparing Image Guided Volumetric Modulated Arc Therapy in intact Carcinoma Cervix patients. *Journal of Current Medical Research and Opinion*, 2(10), 288–292. <https://doi.org/10.15520/jcmro.v2i10.214>