

Incidental Risk Of Sthaulya (Obesity) Among Individuals Of Some Part Of Sakkardara Region At Nagpur: An Observational Study

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ABSTRACT-

Introduction-

Obesity is one of the most serious health problem of current era. Affecting both developed and developing countries and children as well as adults. It's a 5th leading risk of global death. Adverse effect of obesity affecting population in transition are hypertension, hyperlipidemia, diabetes, coronary heart disease and glucose intolerance. Obesity has reached epidemic proportion in India with morbid obesity affecting 5% of the country's population. Obesity lowers the life expectancy. Ayurveda has very well explained the causes, symptoms & treatment of obesity. Acharya Charaka has also mentioned Sthaulya in Santarpanjanya Vyadhi. At an individual level, a combination of food intake and a lack of physical activity is thought to explain most cases of obesity. Limited number of cases due to genetic, medical reasons and psychiatric illness.

Material & Methods-In this study 70 individuals are selected from our institutions on the basis of pre-obese, obese class 1 & obese class 2. after diagnosed obese individuals all were observed for demographic characteristics and the statistical analysis done.

Conclusion-

In this observational study we can conclude that Age between 30-50yrs, females, literates, upper middle class & lower middle class peoples, People having desk work & field work, Professional workers, Both vegetarians & non vegetarian, people having good sleep, presence

of stress, people having regular bowel habits, pittakaphaj&pittavataj predominant prakriti all these factors might be the risk factors for Sthaulya or obesity

Keywords-Sthaulya, Obesity, incidence, risk factor

INTRODUCTION

The word *Sthaulya* is derived from *Muladhātu*, 'sthu' with 'Ach' *pratyaya*, which stands probably for 'bulky' or 'big' or 'thick'.¹

Obesity can be defined as an abnormal growth of adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyperplastic obesity) or a combination of both. Obesity is an increase in body weight beyond the limitation of skeletal & physical requirements as the result of excessive accumulation of body fat.² Obesity is the fifth leading risk of global deaths. Worldwide obesity has more than doubled since 1980. In 2008, more than 2.4 billion adults were overweight. Of these over 200 million men and nearly 300 million women were obese. In 2012, more than 40 million children under 5 years of age were overweight. Once considered a high income country problem, overweight and obesity are also now raising in low and middle income countries, particularly in urban settings. About 30 million overweight children are living in developing and 10 million in developed countries. Obesity is the 5th leading risk of global death. It leads to 44% of the diabetes burden, 23% of Ischemic heart disease and 7-41% of certain cancer.³

Overweight prevalence was higher among females than males and in urban area than rural areas. Obesity has reached epidemic proportion in India with morbid obesity affecting 5% of the country's population. 1.3% of males and 2.5% of females aged more than 20 years were obese in the year 2008.⁴ Obesity lowers the life expectancy.

Obesity is a key risk factor in natural history of other chronic and non-communicable diseases, the typical time sequence of emergence of chronic diseases following the increased prevalence of obesity is important in public health planning. The first adverse effects of obesity to emerge in population in transition are hypertension, hyperlipidemia and glucose intolerance, while coronary heart disease and long term complications of diabetes, such as renal failure begin to emerge several years later. It is matter of time before same mortality rates for such diseases will be seen in developing countries as those prevailing 30 years ago in industrialized countries.

At an individual level, the main causes of obesity are combination of excessive food energy intake and a lack of physical activity are thought to explain most cases of obesity.

Now a day's obesity is affecting the individuals at all ages, both the sexes, irrespective of occupation, irrespective of income, irrespective of nature of work. Obesity is becoming a huge problem for all the individuals in current era along with major transient diseases & complication. There are many Hazards of Obesity in different branches of Medical field like IHD, angina in Cardiology, PCOD, Infertility & Menstrual problems in Reproductive and Endocrinology, Dementia in Psychology likewise many more occurs.

In Ayurveda *Sthaulya* is explained by various *Acharyas* along with their causes, symptoms, & treatment. Description of *Sthaulya* is also given in *Vedas* like *Atharvaveda*, *Upnishad* like *BruhadaaranyakUpnishad* also in *Agnipurān*, *BhagvatMahapurān*. Different definitions of *Sthaulya* in explained in *Amarkosha*, *Vachaspathyam*, *Shabdakalpadrum*.

Causes of *Sthaulya* given in *charaksamhita* are eating *Guru*, *Madhura*, *Sheeta*, *SnigdhaPadharta*, *Avyama*, *Avyavaya*, *Divaswapnata*, *Harshada*, etc.⁵ According to *Ayurveda*, *Charkahas* included *Atisthaulya* in *AshtaninditPurusha*.⁶ In *Charka Samhita*, *Atisthaulya* is mentioned in *Santarpanjanyaroga* (*Santarpaniyaadhyaya*).⁷

Hence there is a need to study demographic distribution of obesity

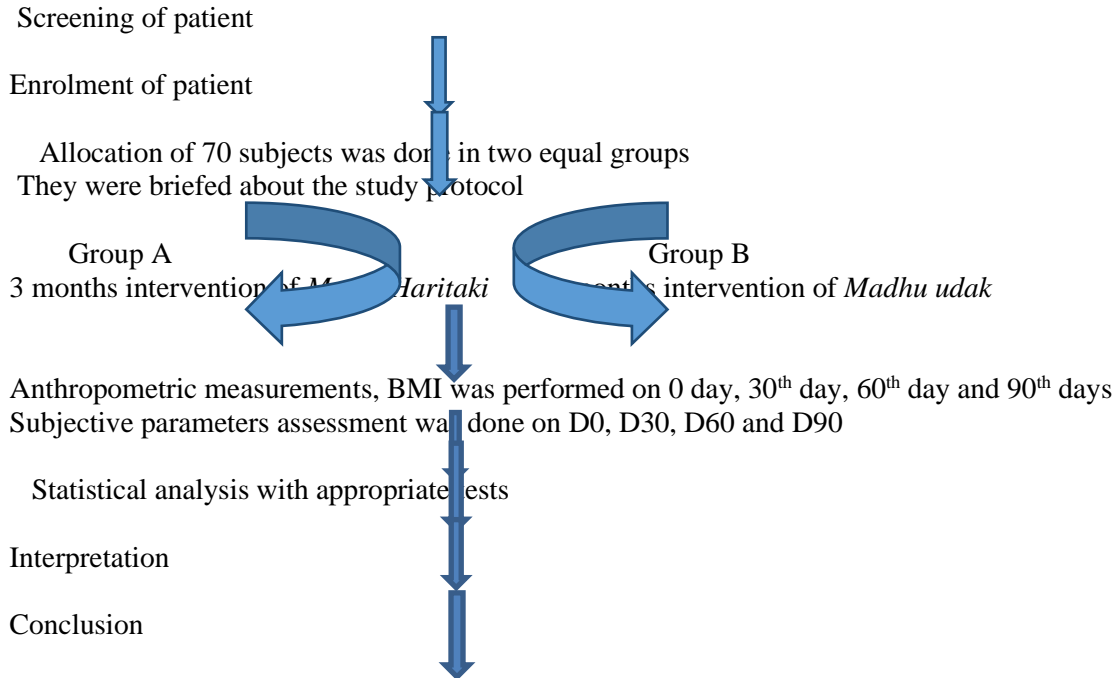
MATERIAL & METHODS

- Individuals were selected from OPDs and IPDs of our institution.
- The diagnosed individuals of Pre-obese, Obese class-1 & 2 were taken
- Study was carried out in *Swasthyarakshan* OPD of our institute.

Type of Study:

An Observational study.

STUDY DESIGN



SELECTION CRITERIA

INCLUSION CRITERIA

- 1) Well diagnosed pre-obese and obese class 1 category (i.e having BMI between 25-35).
- 2) Age group between 25-50 years.
- 3) With no any other diseases.

EXCLUSION CRITERIA

- 1) Obesity is present as a result of any other disease and systemic disorder, Genetic obesity.
- 2) ANC, PNC female candidates will be excluded

WITHDRAWL CRITERIA

- 1) Patients who developed unwanted symptoms if any.
- 2) Subjects giving less than 80% compliance.

ASSESSMENT CRITERIA

OBJECTIVE PARAMETERS

- 1) Weight in kg
- 2) Body Mass Index (BMI)
BMI = weight in kg/ height in meter square
BMI = weight in kg /height in meter square

Classification	BMI
Normal range	18.5 -24.99
Overweight	≥25

Pre-obese	25-29.99
Obese class 1	30-34.99
Obese class 2	35-39.99
Obese class 3	≥ 40

3) Ponderal index=height in cm/cube root of body weight in kg

4) Waist Hip Ratio (WHR) = waist circumference in cm /hip circumference in cm

WHR >1.0 indicates obese in male.

WHR >0.85 indicates obese in female.

5) Abdominal girth

a) 4 cm above umbilicus

b) At the level of umbilicus

c) 4 cm below umbilicus

6) Mid arm circumference

8) Body fat %, visceral fat levels with the help of Karada scan Body composition monitor HBF 375)

9) Daily water intake

a) Number of glasses per day

b) Size of each glass in ml

c) Duration a) before meal b) During meal c) after meal

SUBJECTIVE PARAMETERS

Subjective parameters have been graded as: 0,1,2,3 on the basis of severity of Ayurvedic symptomatology as follows.

1) Lack of Enthusiasm (*Javoprodha*) (*C.su 21/3*)

0- presence of enthusiasm

1- does routine work without enthusiasm

2- can do routine work only when forced to do so

3- cannot do routine work despite of force or pressure

2) Weakness (*Daurbalya / Gatrasad*) (*C.su 21/3, S.su 15/37*)

0- absent

1- performing own daily work but feeling of weakness to perform other work

2- performing routine work with a slight feeling of weakness

3- need to take rest while performing routine work

3) Tachypnoea (*Kshudraswasa*)(*S.su 15/37*)

0- normal respiratory rate

1- increased respiratory rate on 1 hour of continues routine physical work

2- increased respiratory rate on more than 1 and ½ hour of sedentary work

3- Increased respiratory rate on very less physical work or sedentary Work.

4) Excessive appetite (*kshudatimatram*) (*C.su 21/4*) (*S.su 15/37*)

0- feeling of hunger every 2 yam (6 hours)

1- feeling of hunger after every 1 and ½ yam(4.5 hours)

2- feeling of hunger after every 1 yam (3 hours)

3- feeling of hunger after every ½ yam (1.5 hours)

5) Excessive sleep (*Swapnadhikya*) (*S.su 15/37*)

0- normal sleep

1-normal sleep without cheerfulness in senses

2- Increased duration of sleep with lack energy

6) Excessive sweating (*swedabadhaha*) (*C.su 21/4*) (*S.su 15/37*)

0-absent

1- sweating which wets garments specially at axillary and groin region

2- excessive sweating at axilla , groin and sweating at all over body

3-sweating which wets undergarments and oozing of the clothes occur
7) Body odor (*Daurgandhya*) (C.su 21/4) (S.su 15/37)

- 0- absent
- 1- mild offensive , self-attainable body odor
- 2- moderate offensive and attainable by near person
- 3- severe offensive and attainable

Place of work:-

Swasthyarakshan OPD, of our institution.

Ethical Clearance:-

Ethical clearance from Ethical committee of our institute was obtained before beginning of the research work.

Case Report Form:-

Records of all patients were documented and follow up were mentioned in case report form before and after completion of study.

Sampling Technique:-

Simple random method

OBSERVATIONS AND RESULTS

In this study 70 subjects with a single group of Pre-obese, Obese class 1 & 2 after the screening according to Indian Basal Metabolic Score were selected randomly as per selection criteria irrespective of sex, religion and socio-economic status. They were enrolled according to inclusion criteria. Subjects attending Outdoor Patient unit of *Swasthavritta* department in hospital were examined. After complete examination, subjects were recruited by allotting numbers from 1-70. All observations were statistically analyzed and results obtained are presented as below-

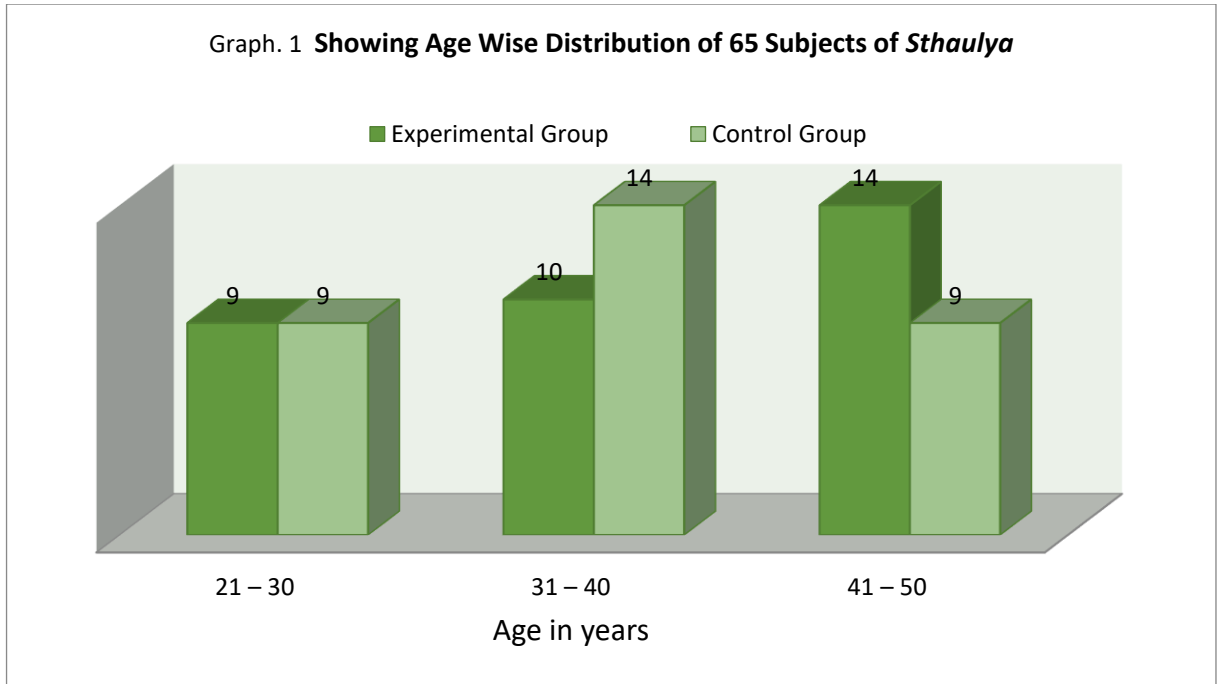
1) Total number of Subjects recruited in the study-70

Initially 70 subjects were enrolled. So the demographic data for the same is provided.

Table.1

Table Showing Age Wise Distribution of 65 Subjects of *Sthaulya*

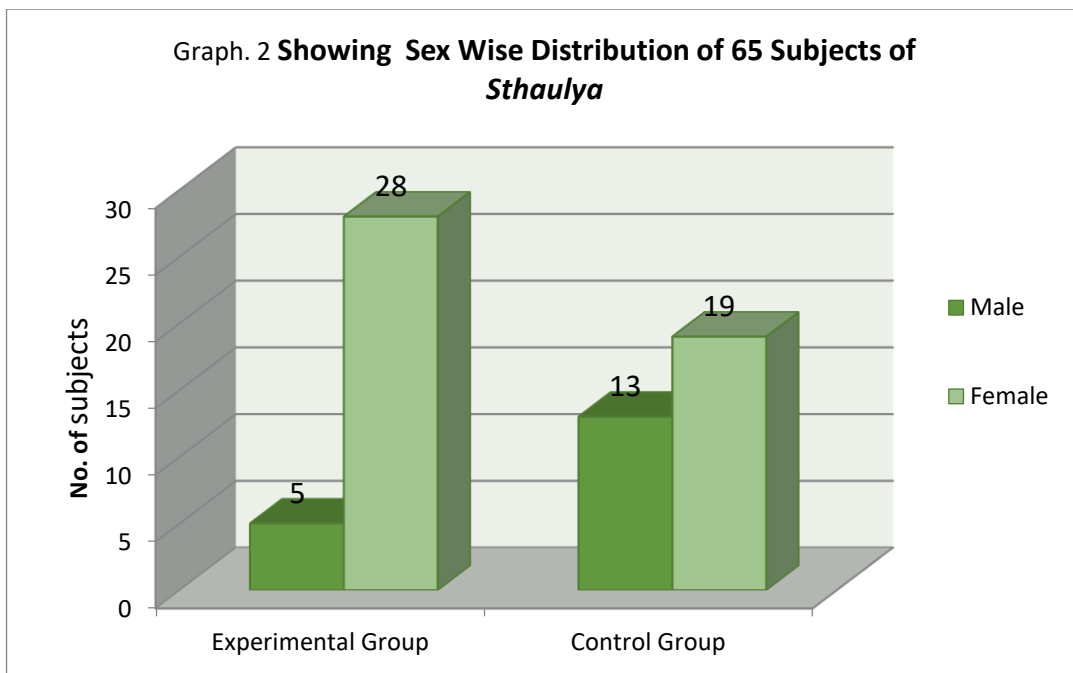
Age in years	Experimental Group A		Control Group B	
	Number	Percentage	Number	Percentage
21 – 30	9	27.27	9	28.12
31 – 40	10	30.30	14	43.75
41 – 50	14	42.42	9	28.12
TOTAL	33	100	32	100
Mean age SD Range	37.69 8.93		36.40 7.97	
P=0.5415,NS				



In this study, it was observed that maximum number of subjects i.e.42.42 % subjects in Experimental Group & 28.12% in Control group belonging to age group 41-50 yrs. and 30.30% subjects in Experimental Group & 43.17 % in Control group belonging to age group 31-40 yrs.’ and the rest of them i.e. 27.27% subjects in Experimental Group & 28.13 % in Control group belonging were between the age group of 21-30yrs showed in table and graph no 1

Table 2
Table Showing Sex Wise Distribution of 65 Subjects of *Sthaulya*

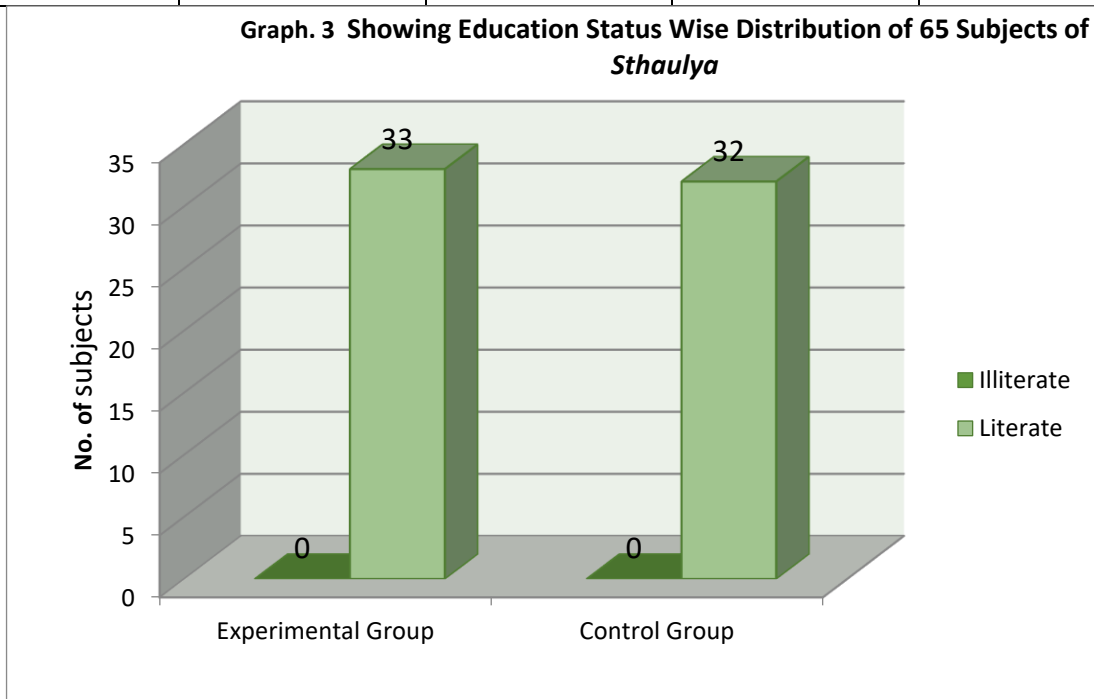
Sex	Experimental Group (A)	%	Control Group (B)	%
Male	5	15.15	13	40.63
Female	28	84.85	19	59.38



Above table and graph no 2 shows that incidence of *Sthaulya* was more in females than in males. Among total 65 patients, 47 patients that mean 85.71 % individuals of the study were females.

Table 3
Table Showing Education Status Wise Distribution of 65 Subjects of *Sthaulya*

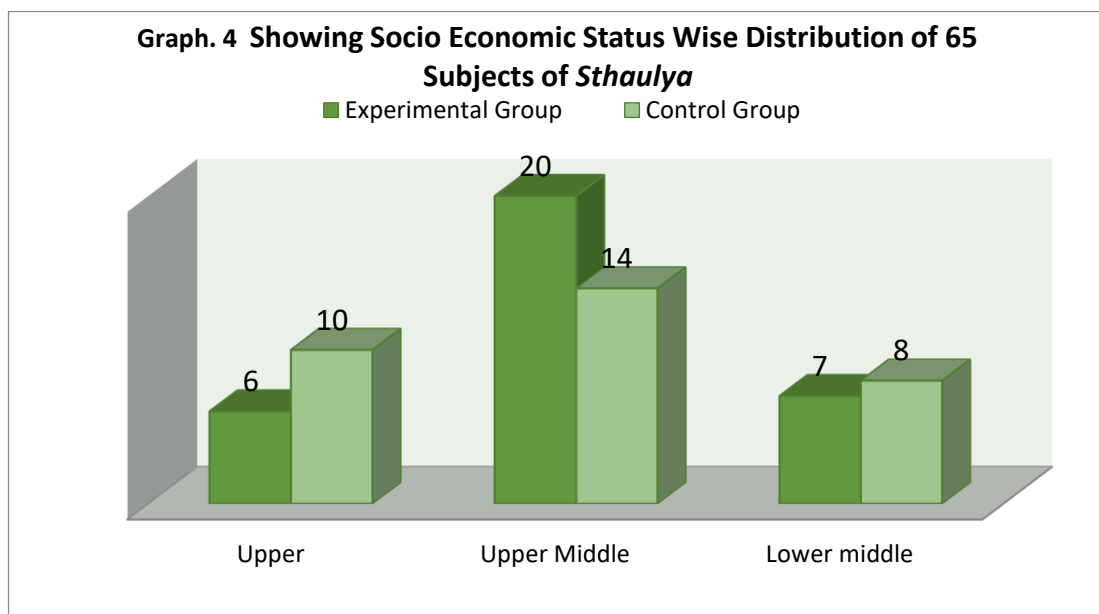
Education	Experimental Group A		Control Group B	
	Number	Percent	Number	Percent
Illiterate	0	00	0	00
Literate	33	100	32	100



Above table and graph no 3 data shows that the incidence of *Sthaulya* was more in literate in both the groups as compared to Illiterate one. They were 100%.

Table 4
Table Showing Socio Economic Status Wise Distribution of 65 Subjects of *Sthaulya*

SES	Experimental Group A		Control Group B	
	Number	Percent	Number	Percent
Upper	6	18.18	10	31.25
Upper Middle	20	60.61	14	43.75
Lower middle	7	21.21	8	25

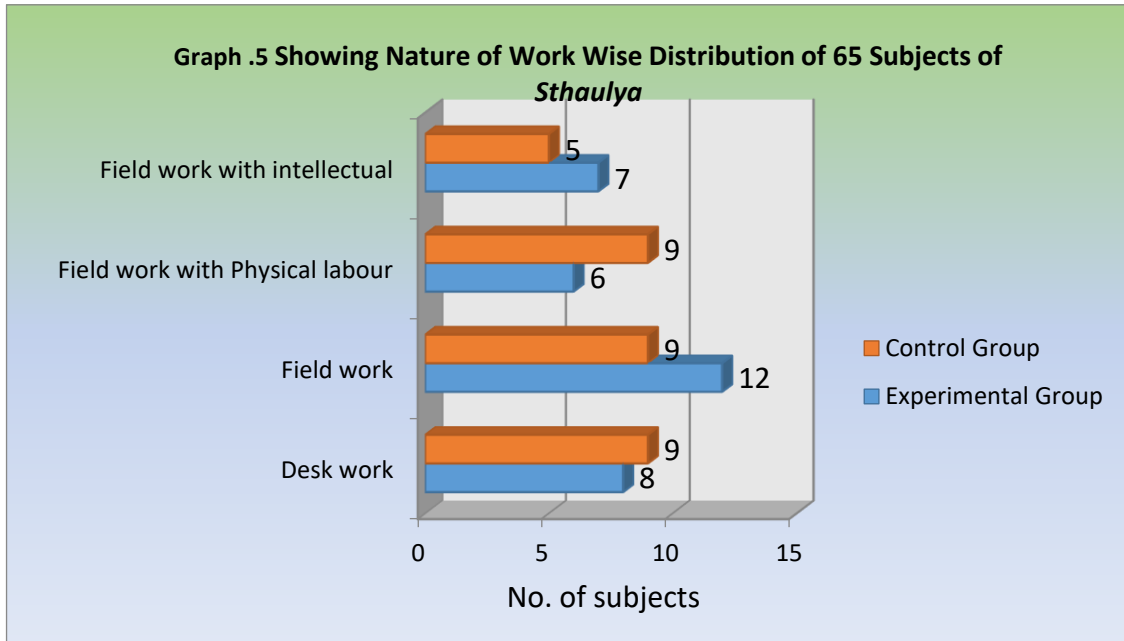


According to above data, incidence of *Sthaulya* was more in Upper middle class people in both the groups. In this study 60.61% patients were from Upper Middle Class Group in Experimental group and 43.75% in Control group, Lower Middle Class group having 21.21% of *Sthaulya* in Experimental group and 31.25% in Control group & Lower Middle Class having 18.18% in Experimental group and 25% in Control group showed in table and graph no 4.

Table 5
Table Showing Nature of Work Wise Distribution of 65 Subjects of *Sthaulya*

	Experimental Group (A)		Control Group (B)	
	Number	Percent	Number	Percent
Desk work	8	24.24	9	28.13
Field work	12	36.36	9	28.13
Field work with Physical	6	18.18	9	28.13

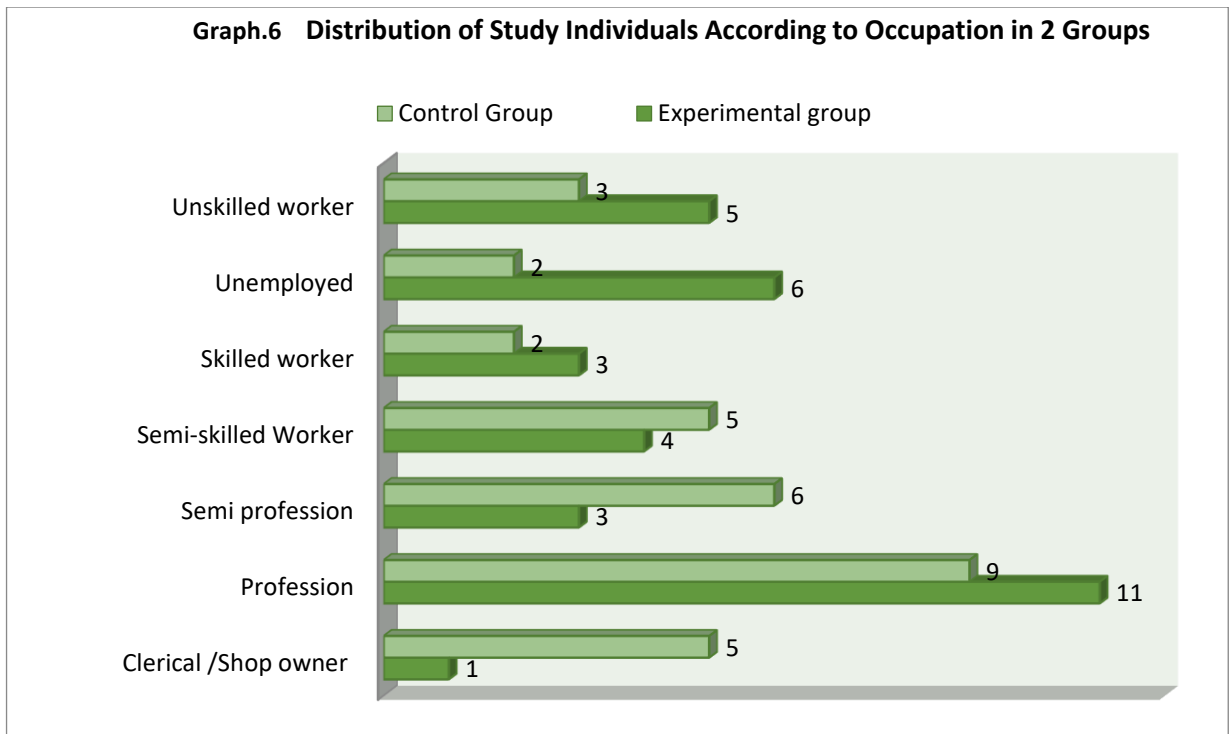
labour				
Field work with intellectual	7	21.21	5	15.63



Nature of work wise distribution of the subjects showed that maximum subjects in group A i.e.36.36 % subjects and 28.13% in group B i.e. we're doing Field work. Whereas 24.24% subjects in group A and 28.13 % subjects in group B were doing Desk work.21.21 % subjects in group A and15.63 % subjects in group B were doing field work with intellectual. Remaining 18.18% subjects in group A and 28.13% subjects in group B were doing field work with physical labour showed in table and graph no 5.

Table.6
Distribution of Study Individuals According to Occupation in 2 Groups

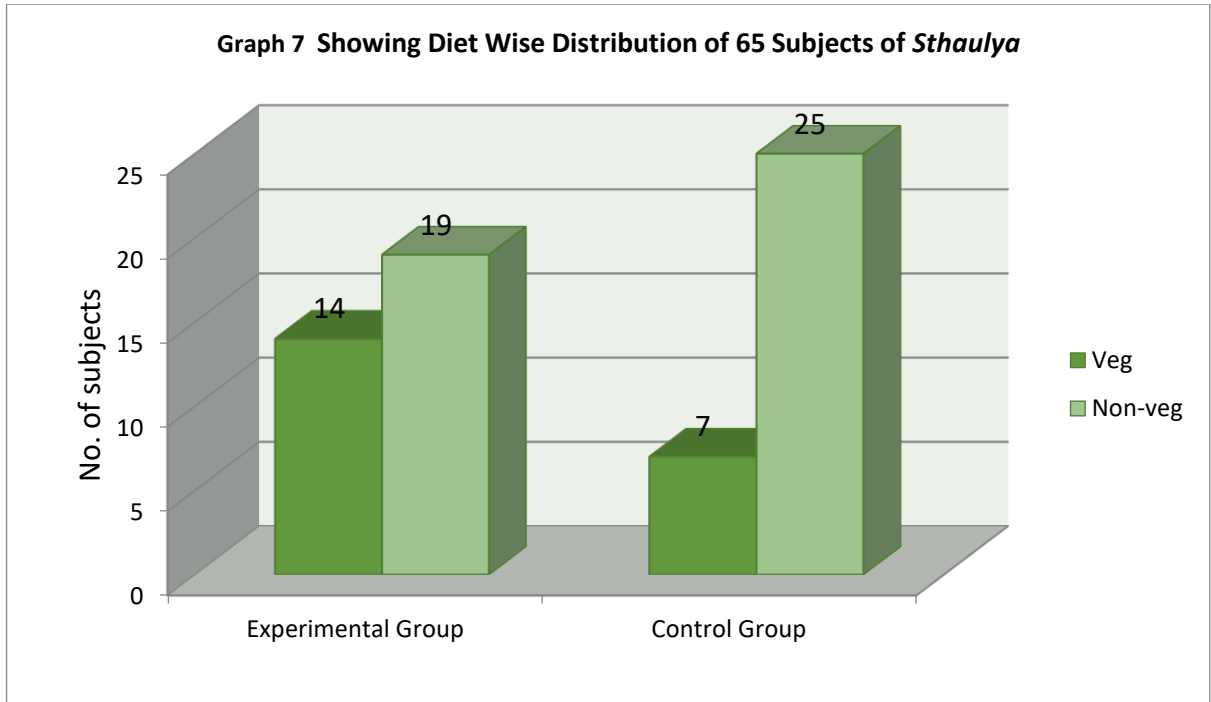
Occupation	Experimental group		Control Group	
	Number	Percent	Number	Percent
Clerical /Shop owner	1	3.03	5	15.63
Profession	11	33.33	9	28.13
Semi profession	3	9.09	6	18.75
Semi-skilled Worker	4	12.12	5	15.63
Skilled worker	3	9.09	2	6.25
Unemployed	6	18.18	2	6.25
Unskilled worker	5	15.15	3	9.38



Above table and graph no 6 showed subjects according to their occupation shows that maximum number of subjects from both the groups belongs to profession likewise 33.33% in experimental group & 28.13% in control group. Whereas minimum numbers are clerical /shop owner i.e 3.03% in experimental group and 6.25% are skilled worker and unemployed in control group.

Table 7
Table Showing Diet Wise Distribution of 65 Subjects of *Sthaulya*

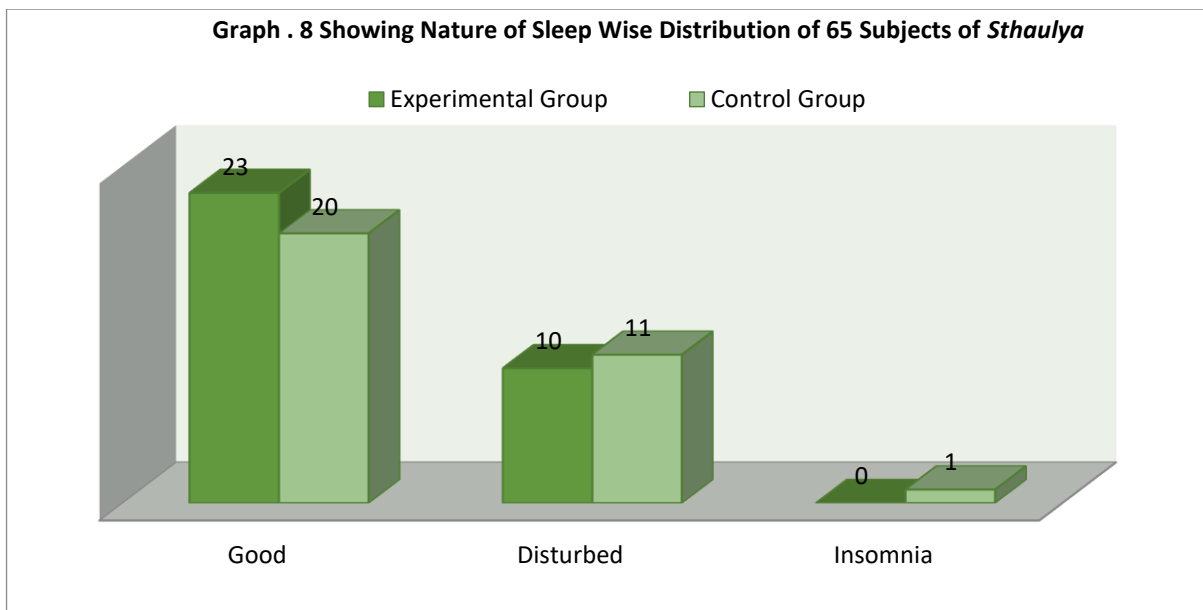
	Experimental Group A		Control Group B	
	Number	Percent	Number	Percent
Veg	14	42.42	7	78.13
Non-veg	19	57.58	25	21.88



Above table and graph no 7 shows that, incidence of *Sthaulya* was more in patients with Non vegetarian diet pattern than those who were vegetarian. About 57.58% subjects in experimental group and 21.88 % in control group having Non vegetarian diet & 42.42% in Experimental and 21.88 % in control group having pure vegetarian diet pattern.

Table 8
Table Showing Nature of Sleep Wise Distribution of 65 Subjects of *Sthaulya*

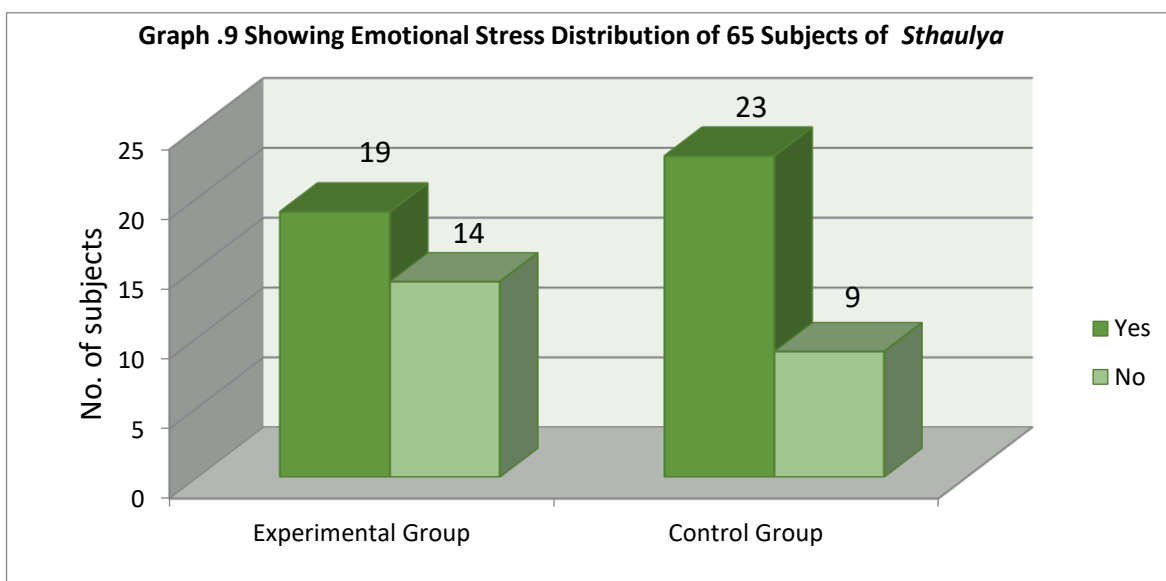
Nature of Sleep	Experimental Group A		Control Group B	
	Number	Percent	Number	Percent
Good	23	69.70	20	62.5
Disturbed	10	30.30	11	34.38
Insomnia	0	00	1	3.13
Total	33	100	32	100



Above table and graph no 8 shows that maximum numbers of subjects having Good sleep i.e 69.70 % in Experimental group & 62.5 % in control group, 30.30% subjects of Experimental group & 34.38% in control group having disturbed sleep and 0% in Experimental and 3.13 % in control group having Insomnia.

Table 9
Table Showing Emotional Stress Distribution of 65 Subjects of *Sthaulya*

Emotional Stress	Experimental Group A		Control Group B	
	Number	Percent	Number	Percent
Yes	19	57.58	23	71.88
No	14	42.42	9	28.13
Total	33	100	32	100

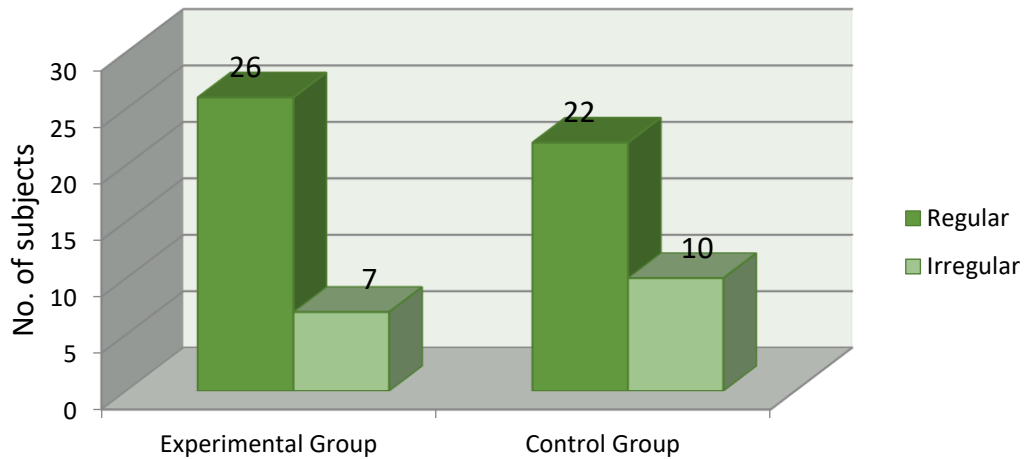


Above table and graph no 9 shows that 57.58% subjects under experimental group & 71.88 % subjects under Control group having Emotional stress whereas 42.42% subjects under Experimental group & 28.13% subjects under Control group are not having stress.

Table 10
Table Showing Bowel Habit Distribution of 65 Subjects of *Sthaulya*

Bowel Habit	Experimental Group (A)		Control Group (B)	
	Number	Percent	Number	Percent
Regular	26	78.78	22	68.75
Irregular	7	21.21	10	31.25
Total	33	100	32	100

Graph .10 Showing Bowel Habit Distribution of 65 Subjects of *Sthaulya*

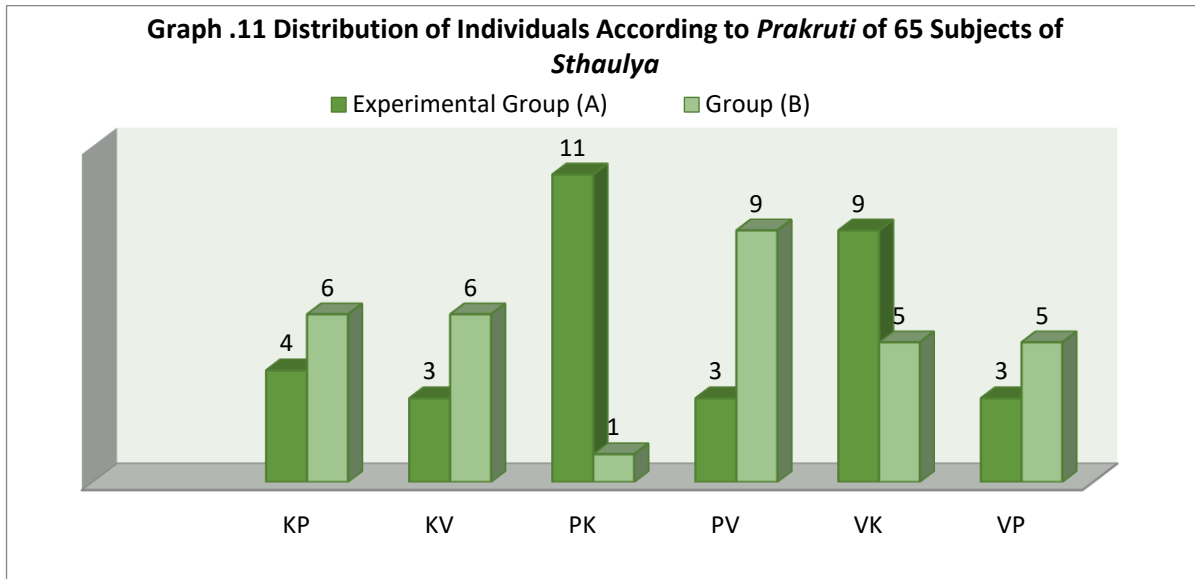


From above table and graph no 10 shown that 78.78 % subjects in Experimental group & 68.75 % subjects in Control group were having regular bowel habits on the other side 21.21 % subjects in Experimental group & 31.25 % subjects in control group having irregular bowel habits.

Table 11
Distribution of Individuals According to *Prakruti* of 65 Subjects of *Sthaulya*

<i>Prakruti</i>	Experimental Group (A)		Control Group (B)	
	Number	Percent	Number	Percent
KP	4	12.12	6	18.75
KV	3	9.09	6	18.75
PK	11	33.33	1	3.13
PV	3	9.09	9	28.13
VK	9	27.27	5	15.63
VP	3	9.09	5	15.63
Chi2-value	14.3642			

p-value	0.010,S			
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From above table and graph no 11 shown that *Prakruti* wise distribution of 65 subjects had shown that maximum number of subjects in group A i.e.33.33% were of *PittakaphajPrakriti* and 28.13% in group B were of *PittaVatajPrakriti*. Whereas 27.27% in group A were of *VatakaphajPrakruti* and 18.75% in group B were belonging to *Kaphapitta&KaphavaytaPrakruti*. 12.12% in group A were *Kaphapittaj* and 15.63% in group B were belonging to *Vatakaphaj&VatapittajPrakruti*.Remaining 9.09% in Group A belongs to *Kaphavataj, Pittavataj&Vatapittaprakruti* and 3.13% in group B belongs to *Pittakaphaj*

DISCUSSION

Analysis according to Age (table.1)

Out of 65 subjects maximum number of subjects 42.42 % subjects in Experimental Group in age group 41-50 yrs & 43.17 % in Control group belonging to age group 31-40yrs. and minimum number 27.27% subjects in Experimental Group & 28.13 % in Control group belonging were between the age group of 21-30yrs.According to study more obese are from group age between 35-64 age group.⁸

Maximum number of subjects from 41-50yrs as well as 31-40yrs because of decreased physical activity, increased level of stress, change is diet& lifestyle.

Analysis according to Sex (table.2)

Out of 65 subjects maximum were females in both the groups 84.85% in group A & 59.38% in group B. on other side males were 15.15 % in group A & 40.63% in group B. Also as per study more women's are obese than menin developing countries.⁹

Thus *Sthaulya* (obesity) is more in females than males.

Analysis according to Education status (table.3)

Out of 65 subjects all the subjects in both groups are literate. This shows that 100 % literate subjects were there in the study. It signifies that *Sthaulyata* is more in literate people.

Analysis according to Socio Economic status (table.4)

Socio economic status of 65 subjects shows that maximum number of subjects are from upper middle class likewise 60.61 in group A & 43.75% in group B. Whereas 21.21% in group A are from lower middle class & 31.25% in group B are from upper class. Remaining 18.18% in group A are from upper class & 25% are from lower middle class.

Hence it shows that a maximum subject belongs to upper middle class because of sedentary lifestyle and change in dietary pattern.

Analysis according to Nature of Work(table.5)

Nature of work wise distribution shows that out of 65 subjects maximum were doing field work in group A & 28.13 in group B were doing field work, desk work as well as field work with physical labour. Minimum 18.18% were doing field work with physical labour in group A & 15.63% were doing field work with intellectual are from group B. This shows that *Sthaulyata* is found maximum in desk worker, field worker and those who were doing field work with physical labour.

Analysis according to level of Occupation (table.6)

Level of education of 65 subjects indicates that maximum subjects were in profession in both the groups 33.33 in group A & 28.13% in group B, on the other hand minimum subjects 9.09% were from semi profession as well as were skilled worker in group A whereas 6.25% were skilled worker and unemployed from group B.

Hence we can say that those who are in profession are more obese as compared to others.

Analysis according to Diet (table.7)

Diet wise distribution of 65 subjects shows that maximum subjects were vegetarian in group A whereas maximum subjects were non vegetarian in group B. Thus we can say that *Sthaulyata* is found in vegetarian as well as non-vegetarian peoples.

Analysis according to Sleep (table.8)

Sleep wise distribution of 65 subjects shows that maximum subjects were having good sleep i.e 69.70% in group A & 62.5% in group B. Secondly 30.30% in group A & 34.38% in group B were having disturbed sleep and rest of the 0% on group A & 3.13% in group B were having insomnia.¹⁰

Analysis according to Emotional stress (table.9)

Analysis according to emotional stress shows that maximum subjects in both the groups were having stress, 57.58% in group A & 71.88% in group B. Indicates that there may be direct relation of stress and *Sthaulyata*. In the past years, evidence is found that stress, and particularly, an increase of the glucocorticoid stress hormone cortisol plays a role in cause of obesity.¹¹

Analysis according to Bowel habit (table.10)

Out of 65 subjects maximum subjects were having regular bowel habit, 78.78% in group A & 68.75% in group B. Remaining 21.21% in group A and 31.25% in group B were having irregular bowel habit. This shows that bowel habit is not affected in *Sthaulya* subjects.

Analysis according to *Prakruti*(table.11)

Out of 65 subjects maximum subjects in group A were having *pittakaphajprakruti* whereas in group B maximum were having *pittavatajprakruti* On the other side minimum subjects in group A were having *kaphavataj&vatapittajprakruti* and 3.13% subjects were having *pittakaphajprakruti* in group B.

Studies on different aspects of obesity were reported by Sagar et.al.¹², Sawalet. al.¹³, Sratsa et.al.¹⁴ and Acharya et.al¹⁵. Similar studies are reflected from the Global Burden of Disease Studies¹⁶⁻²⁰. Related studies were also reported by Agrawal et. al²¹, Dixit et. al.²², and Wajpayee²³.

CONCLUSION

In this observational study we can conclude that Age between 30-50yrs, as compare to male females are more prone, literates, upper middle class & lower middle class peoples, People having desk work & field work, Professional workers, Both vegetarians & non vegetarian, people having good sleep, presence of stress, people having regular bowel habits, *pittakaphaj&pittavatajpredominant prakriti* all these factors might be the risk factors for *Sthaulya* or obesity.

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