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Original article

# A Study of Anthropometric parameters in obese females of Western Rajasthan.

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ABSTRACT

Obesity is the excessive deposition of fat. Prevalence of obesity to be higher among women. In some modern day societies, women are more likely to diet to lose weight for cosmetic than for health reasons. Aims & objective: The aim of the present study was delineate the effective parameters of obesity. Material and method: The present study (cross sectional study) was performed at Department of Anatomy, Dr. S.N. Medical College, Jodhpur, Rajasthan, on 46 obese females (21-45 yr age group) which are found from total 100 selected subjects on the bases of BMI. BMI, Waist circumference, Hip circumference, waist hip ratio and sub scapular & Suprailiacal skin fold thickness were measured. Results: In the present study Observation shows that Mean BMI, Waist circumferenc have highly significant relationship and Hip circumference, waist hip ratio, Subscapular and Suprailiacal (skin fold thickness) have significant relationship in obese females between 26-30 yrs and 31-35 yrs age group.



## 1. Introduction

Obesity is Generalized and excessive accumulation of body fat in the subcutaneous region, in response to excessive energy storage and decreased energy expenditure.

Obesity is one of the biggest public health problems in developed countries and is also becoming increasingly extensive in developing countries. It affects a person not only physically but psychologically as well. Highest Rate of overweight and obese individuals is present in Punjab, Kerala and Delhi. [NFHS – 3 Nutritional statuses of Adults 2009]. Obesity is more prevalent in urban than rural population,due to the sedentary life style and less physical activity in urban area.[1]

Obesity in adults is strongly associated with many serious medical complications such as hypertension, diabetes mellitus, dyslipidemia, cardiovascular disease, hyperuricemia, gout and osteoarthritis. [WHO, 2003].

Previous research on obesity in India has found that prevalence of obesity to be higher among women.[2 & 3]

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The factors affecting obesity are Education, Occupation, Marital status, Dietary habits, Physical activity, Sleep duration. Especially in women, a strong inverse association between obesity and socioeconomic status.

The Body mass index (BMI) has been used routinely to classify subjects as obese or non obese. Diptendu Chatterjee et al suggested that WC and HC were most strong correlated with body fat than WHR.[4] Mozaffer Rahim Hingorjo et al reported that in females, fat content estimation by skin fold thickness was a far better indicator both overweight and obese.[5]

Thus the aim of this study is to delineate the study of various anthropometric Parameters in obese females of western Rajasthan Population. The findings of this study can provide some baseline data on the magnitude of this obesity problem, with emphasis on women in Rajasthan, as well as identify factors to focus on when addressing the problem of obesity among women.

## 2. Materials And Methods

The present study (cross sectional study) was performed at Department of Anatomy, Dr. S.N. Medical College, Jodhpur, Rajasthan, on 46 obese females (21-45 yr age group) which are found from total 100 selected subjects on the bases of BMI. The Females were further subdivided into various age groups:

1.21-25 years age group
2.26-30 years age group
3.31-35 years age group
4.36-40 years age group
5.41-45 years age group

Various anthropometric parameters were measured:

Body mass index(BMI) (Kg/$m^2$):

Weight calculated by weighing machine and height by measuring tape. BMI was calculated using following formula [Garrow JS and Websler J, 1985]

BMI (Kg/$m^2$) = Weight (Kg) / Height ($m^2$)

Proposed classification of BMI for Asians [WHO]

| Class | BMI (Kg/$m^2$) |
|---|---|
| Underweight | <18.5 |
| Normal | 18.5-23 |
| Overweight | 23-25 |
| Obese | >25 |

**Waist circumference (WC) (cm):**

WC was measured at most lateral contour of the abdomen by a measuring tape.

**Hip circumference (HC) (cm):**

HC was measured at the widest portion of the hips by a measuring tape.

**Waist to hip ratio (W/H):**

W/H was calculated by dividing Waist circumference by Hip circumference.

**Skin fold thickness (mm):**

Skin fold measurements were also taken at the following sites by using skin fold measuring calipers:

Suprailical(SI)-Above iliac crest, at the level of umbilicus.

Sub scapular (SS) - below inferior angle of scapula.

Arithmetic mean, standard deviation were calculated for all the parameters studied.

## 3. Result and Discussion:

In the first act of Shakespeare's Julius Caesar, the Roman emperor suggests that higher body weight correlates with a well-balanced mental disposition. In Caesar's times, of course, obesity was not considered a medical risk factor. Since the nineteenth century, however, a high-calorie diet together with a sedentary lifestyle has been recognised as a potential risk factor for cardiovascular disease, cancer, and diabetes mellitus. Evidence suggests that the situation is likely to get worse especially among women. One of the reasons for this is because women tend to gain greatest amount of weight during their childbearing age (between 25–44 years old).

Prevalence of obesity in this study was 46% (46 subjects were obese). Rekia Belahsen et al revealed that the prevalence of overweight and obesity among childbearing women are about 25% and 10%, respectively, based on BMI.[1]

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Mean BMI (in Kg/$m^2$) in 21-25yrs, 26-30yrs, 31-35yrs, 36-40yrs, and 41-45yrs of obese subjects in present study was 25.03±0.02, 25.97±0.71, 31.09±3.35, 33.31±1.63, 29.77±3.61 kg, respectively. A statistically significant relation between 21-25 yr and 26-30 yr and 36-40 and 41-45 age groups and a highly significant difference was observed in BMI of the obese subjects between 26-30 and 31-35 yr age groups. (Table-1) Tyagi and kapoor reported that increase in BMI with age and declining in advanced age.[6]

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Mean waist Circumference (in cm) in 21-25yrs, 26-30yrs, 31-35yrs, 36-40yrs, and 41-45yrs of obese subjects in present study was 84.86±5.96, 85.94±2.65, 102.20±8.49, 103.60±3.60, 101.33±6.14 cm, respectively. A highly significant difference between 26-30 and 31-35 yr age groups. (Table-2) Rekia Belahsen et al observed WC exceeding 80 cm was associated in women with BMI > 25kg/$m^2$ (84.3 cm in overweight and 93.9 cm in obese women).[1] Egle Perissinotto et al found the mean value of waist circumference was not significantly between the two genders (male & female) and decreased significantly with age, in men only.[7]

· Mean hip Circumference (in cm) in 21-25yrs, 26-30yrs, 31-35yrs, 36-40yrs, and 41-45yrs of obese subjects in present study was 1.80±2.59, 2.94±0.93, 9.81±4.39, 3.87±1.58, 1.43±1.66cm, respectively. A significant difference between 26-30 and 31-35 yr age groups. (Table-3) Egle Perissinotto et al found the mean value of hip circumference was significantly higher in women than in men reflecting the thicker gluteal subcutaneous fat in women. The hip circumference decreased significantly with age in both sexes.[7]

· Mean subscupular (in mm) in 21-25yrs, 26-30yrs, 31-35yrs, 36-40yrs, and 41-45yrs of obese subjects in present study was 24.60±3.59, 25.40±3.59, 31.54±1.97, 36.67±11.5, 31.59 ±5.19 mm, respectively. A significant difference was observed between 26-30 and 31-35 yr and 36-40 and 41-45 yr age groups. (Table-4)

· Mean suprailiac (in mm) in 21-25yrs, 26-30yrs, 31-35yrs, 36-40yrs, and 41-45yrs of obese subjects in present study was 28±3.16, 28.25±5.49, 35.52±1.62, 34.16±2.92, 33.60±4.74 mm, respectively. A significant difference was observed between 26-30 and 31-35 yr age groups. (Table-5) Asthana S et al reported that Skin-Fold Thickness (SFT) significantly related to higher prevalence rate of obesity as compared to BMI.[8] Mozaffer Rahim Hingorjo et al reported that in females, fat content estimation by skin fold thickness was a far better indicator both overweight and obese.[5]

WC, WHR and BMI were significantly correlated with all anthropometric parameters measured even after age adjustment, which indicates an association of overall obesity with central obesity in this population.

**Table No.1 Shows Age group wise mean BMI (kg/$m^2$) of Obese Female**

| Age Group (yrs) | N | BMI (Kg/$m^2$) Mean | ±SD | ±SE | t' test | Level of sig |
|---|---|---|---|---|---|---|
| 21-25 | 5 | 25.03 | 0.02 | 0.01 | 2.905 | S |
| 26-30 | 10 | 25.97 | 0.71` | 0.22 | 4.789 | HS |
| 31-35 | 5 | 31.09 | 3.35 | 1.50 | 1.441 | NS |
| 36-40 | 6 | 33.31 | 1.63 | 0.66 | 2.308 | S |
| 41-45 | 20 | 29.77 | 3.61 | 0.80 | | |

***HS = Highly Significant *S = Significant*NS = Non Significant**

**Table No.2 Shows Age group wise mean Waist circumference (cm) and Hip circumference (cm) of Obese Female**

| | WAIST CIRCUMFERENCE (cm) | | | | | | HIP CIRCUMFERENCE (cm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age Group(yrs) | N | Mean | ±SD | ±SE | t' test | Level of sig | Mean | ±SD | ±SE | t' test | Level of sig |
| 21-25 | 5 | 84.86 | 5.96 | 2.66 | | | 97.26 | 1.80 | 2.59 | | |
| 26-30 | 10 | 85.94. | 2.65 | 0.84 | .4980 | NS | 98.31 | 2.94 | 0.93 | .4747 | NS |
| 31-35 | 5 | 102.20 | 8.49 | 3.80 | 5.706 | HS | 107.6 | 9.81 | 4.39 | 2.843 | S |
| 36-40 | 6 | 103.60 | 3.60 | 1.47 | .3689 | NS | 105.8 | 3.87 | 1.58 | 4081 | NS |
| 41-45 | 20 | 101.33 | 6.14 | 1.37 | .8548 | NS | 105.6 | 1.43 | 1.66 | .0732 | NS |

**Table No.3 Shows Age group wise mean Waist Hip ratio (W/H) of Obese Female**

| | WAIST HIP RATIO (W/H) | | | | | |
|---|---|---|---|---|---|---|
| Age Group(yrs) | N | Mean | ±SD | ±SE | t' test | Level of sig |
| 21-25 | 5 | 0.87 | 0.01 | 0.00 | | |
| 26-30 | 10 | 0.87 | 0.02 | 0.01 | .2206 | NS |
| 31-35 | 5 | 0.95 | 0.05 | 0.02 | 4.294 | HS |
| 36-40 | 6 | 0.97 | 0.04 | 0.02 | .8512 | NS |
| 41-45 | 20 | 0.96 | 0.05 | 0.01 | .6805 | NS |

**Table No.4 Shows Age group wise mean Skinfold thickness at Subscpular (SS), Suprailiac (SI) of Obese Female**

| | SUB SCAPULAR (mm) | | | | | | SUPRAILIAC (mm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age Group(yrs) | N | Mean | ±SD | ±SE | t' test | Level of sig | Mean | ±SD | ±SE | t' test | Level of sig |
| 21-25 | 5 | 24.60 | 3.59 | 0.68 | | | 28 | 3.16 | 1.41 | | |
| 26-30 | 10 | 25.40 | 3.59 | 1.14 | .4699 | NS | 28.25 | 5.49 | 1.73 | 0932 | NS |
| 31-35 | 5 | 31.54 | 1.97 | 0.88 | 3.518 | S | 35.52 | 1.62 | 0.72 | 2.849 | S |
| 36-40 | 6 | 36.67 | 11.5 | 4.68 | .9791 | NS | 34.16 | 2.92 | 1.19 | .9179 | NS |
| 41-45 | 20 | 31.59 | 5.19 | 1.01 | 2.087 | NS | 33.60 | 4.74 | 1.60 | .2751 | NS |

## 4. Conclusion

The study shows that Mean BMI, Waist circumferenc have highly significant relationship and Hip circumference, waist hip ratio, Subscapular and Suprailiacal (skin fold thickness) have significant relationship in obese females between 26-30 yrs and 31-35 yrs age group.

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