# CHAPTER III

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# RESULTS AND FINDINGS

## RESULTS:

This chapter presents the results and findings obtained by analyzing the data collected during the investigation done among the Tawang Monpas of Arunachal Pradesh. The chapter clearly summarized the findings of the primary data collected during the research study. The results have been categorized under six major headings. These are:

A. Socio-demographic aspects

B. Respiratory parameters

C. Blood pressure parameters

D. Nutritional parameters

E. Correlation between respiratory and anthropometric characteristics

F. Correlation between blood pressure and nutritional parameters

## A. SOCIO-DEMOGRAPHIC ASPECTS:

The socio-demographic findings have always been recognized as a fundamental part of a research study. Socio-demographic studies includes datas on age, sex, household, educational status, marital status, occupation status, economic status and so on. These data provides a number of information about the population.

### Age and sex distribution:

Age and sex distribution of a society are the building block for the composition of a population group. An excess of males (1077) when compared to female (1005) is observed among the Tawang Monpa group. As the age increases, the number of individuals gradually increases in both male and female population from 0-9 years to 20-29 years age group. Whereas it is observed that from the age group of 30-34 years the number of individuals gradually decreases in both the population group. The sex ratio is 933.15 females of per 1000 males.

**Table II: Distribution of population by age and sex of the Tawang Monpa**

| Age Group | Male | | Female | | Total | | Sex Ratio |
|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | |
| 0-9 | 137 | 12.72 | 132 | 13.13 | 269 | 12.92 | 963.50 |
| 10-19 | 175 | 16.25 | 170 | 16.92 | 345 | 16.57 | 971.43 |
| 20-29 | 258 | 23.96 | 290 | 28.86 | 548 | 26.32 | 1124.03 |
| 30-39 | 176 | 16.34 | 166 | 16.52 | 342 | 16.43 | 943.18 |
| 40-49 | 136 | 12.63 | 151 | 15.02 | 287 | 13.78 | 1110.29 |
| 50-59 | 100 | 9.29 | 63 | 6.27 | 163 | 7.83 | 630.00 |
| 60-69 | 47 | 4.36 | 18 | 1.79 | 65 | 3.12 | 382.98 |
| 70-79 | 36 | 3.34 | 11 | 1.09 | 47 | 2.26 | 305.56 |
| 80-89 | 11 | 1.02 | 3 | 0.30 | 14 | 0.67 | 272.73 |
| >90 | 1 | 0.09 | 1 | 0.10 | 2 | 0.10 | 1000.00 |
| Total | 1077 | 100 | 1005 | 100 | 2082 | 100.00 | 933.15 |

**Size of family:**

In demography the size of family means the total number of children born of a woman or a couple at a point of time, but in common use, family size refers to the total number of persons in a family. The influence of family size plays an important role in different demographic trend (Misra et al., 1982). These are: a) financial stability in the family, b) division of labour among the members in a family, c) process of decision making in a family and d) provision of security and care to the aged, the sick and pregnant women.

**Table II.1: Family size of the Tawang population**

| Family | n | % |
|---|---|---|
| Small (≤3 members) | 167 | 33.4 |
| Medium (4-6 members) | 317 | 63.4 |
| Big (7-9 members) | 16 | 3.2 |
| Total | 500 | 100 |

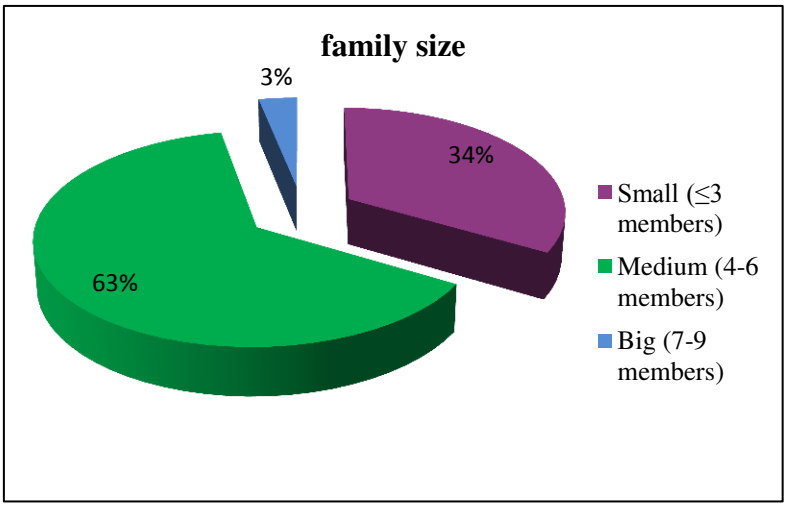



**Figure II.1: Pie diagram showing the size of family**

Table II.1 shows the percentage of various sizes of family. The population shows highest frequency of medium family (63.4%) and the lowest frequency of big family (3.2%). Small sized families also occurred in high frequency (33.4%).

**Table II.2: Distribution of population by age and sex in percentage of the study population group**

| Age Group | Male | | Female | | Total | | Sex Ratio |
|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | |
| -20 | 133 | 26.28 | 78 | 16.53 | 211 | 21.57 | 586.47 |
| 21-30 | 115 | 22.73 | 164 | 34.75 | 279 | 28.53 | 1426.09 |
| 31-40 | 92 | 18.18 | 109 | 23.09 | 201 | 20.55 | 1184.78 |
| 41-50 | 80 | 15.81 | 57 | 12.08 | 137 | 14.01 | 712.50 |
| 51-60 | 57 | 11.26 | 41 | 8.69 | 98 | 10.02 | 719.30 |
| 60+ | 29 | 5.73 | 23 | 4.87 | 52 | 5.32 | 793.10 |
| Total | 506 | 100 | 472 | 100.00 | 978 | 100.00 | 932.81 |

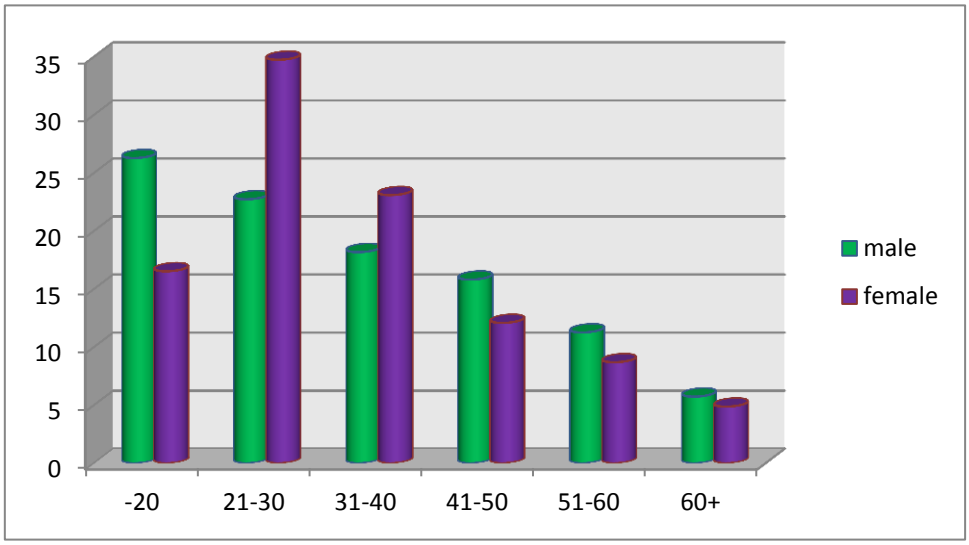



**Figure II.2: Bar diagram showing the distribution of population by age and sex in percentage**

The above table represents the distribution of sex according to age. There are total 506 male and 472 female which makes a total of 978. Highest number of male is

found in the age group of below 20 years i.e. 133 (26.28%) while lowest is seen in the age group of above 60 years i.e. 29 (5.73%). In the female population highest numbers are seen in the age group of 21-30 years i.e. 164 (34.75%) while lowest is seen in the age group of above 60 years i.e. 23 (4.87%). The sex ratio is 932.81.

**Table II.3: Distribution of population by sex and marital status**

| Marital status | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Unmarried | 166 | 32.81 | 95 | 20.13 | 241 | 24.64 |
| Married | 325 | 64.23 | 354 | 75.00 | 699 | 71.47 |
| Widower/Widow | 10 | 1.98 | 16 | 3.39 | 26 | 2.66 |
| Divorce | 5 | 0.99 | 7 | 1.48 | 12 | 1.23 |
| Total | 506 | 51.74 | 472 | 48.26 | 978 | 100 |

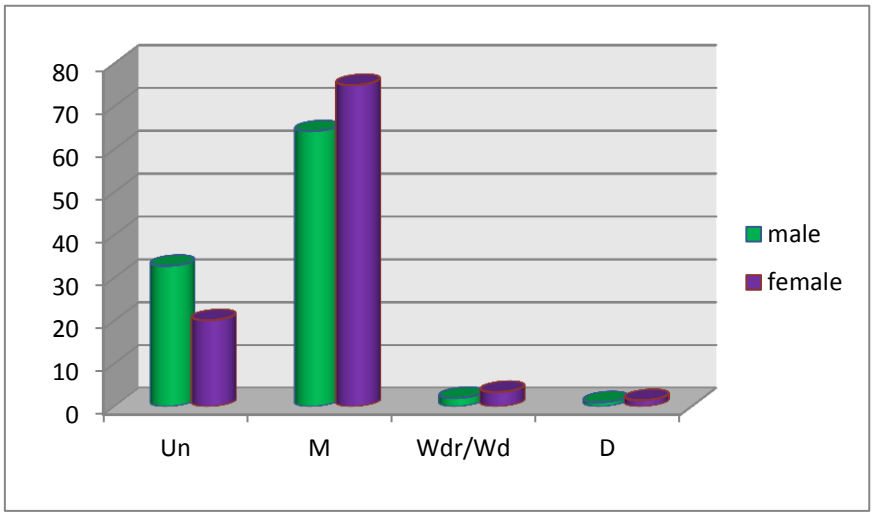



**Figure II.3: Bar diagram showing the distribution of population by marital status**

**Table II.4: Distribution of population by age-sex and marital status**

| Age Group | Male (n=506) | | | | Female (n=472) | | | |
|---|---|---|---|---|---|---|---|---|
| | un % | m % | w % | d% | un % | m % | w% | d % |
| -20 | 125 (24.70) | 8 (1.58) | - | - | 69 (14.62) | 9 (1.91) | - | - |
| 21-30 | 39 (7.71) | 76 (15.02) | - | - | 23 (4.87) | 134 (28.39) | 3 (0.64) | 4 (0.85) |
| 31-40 | 2 (0.40) | 84 (16.60) | 3 (0.59) | 3 (0.59) | 3 (0.64) | 102 (21.61) | 2 (0.42) | 2 (0.42) |
| 41-50 | - | 75 (14.82) | 3 (0.59) | 2 (0.40) | - | 51 (10.81) | 5 (1.06) | 1 (0.21) |
| 51-60 | - | 56 (11.07) | 1(0.20) | - | - | 40 (8.47) | 1 (0.21) | - |
| 60+ | - | 26 (5.14 | 3 (0.59) | - | - | 18 (3.81) | 5 (1.06) | - |

The table presents the distribution of population by age-sex and marital status. It reveals the maximum number of married male (16.60%) is in the age group of 31-40 and for the females (28.39%) in the age group 21-30. For unmarried category maximum number of males (24.70%) and females (14.62%) are observed in the age group of below 20 years of age. The widower is seen highest in both 31-40 and 41-50 years (0.59%). While in case of female highest widow are seen in the age group of 41-50 and above 60 years i.e. 1.06%. It is seen that divorce is also quite popular among them. In males it is seen more in the age group of 31-40 and (0.59%) while in females in the age group of 21-30 (0.85%) years.

**Educational status:**

Education plays a vital role in society. It helps us to lead a good and healthy lifestyle. The educational attainment of parents especially that of mother, has been found to have a significant relationship with the levels of infant mortality (Bhende and Kanitkar 2003).

**Table II.5: Educational status of the male and the female**

| Educational status | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Illiterate | 214 | 42.29 | 214 | 45.34 | 428 | 43.76 |
| Primary (I-IV) | 75 | 14.82 | 84 | 17.80 | 159 | 16.26 |
| High School (V-X) | 66 | 13.04 | 65 | 13.77 | 131 | 13.39 |
| Higher Secondary (XI-XII) | 87 | 17.19 | 63 | 13.35 | 150 | 15.34 |
| Graduate | 55 | 10.87 | 35 | 7.42 | 90 | 9.20 |
| Post graduate | 9 | 1.78 | 11 | 2.33 | 20 | 2.04 |
| Total | 506 | 100 | 472 | 100 | 978 | 100.00 |

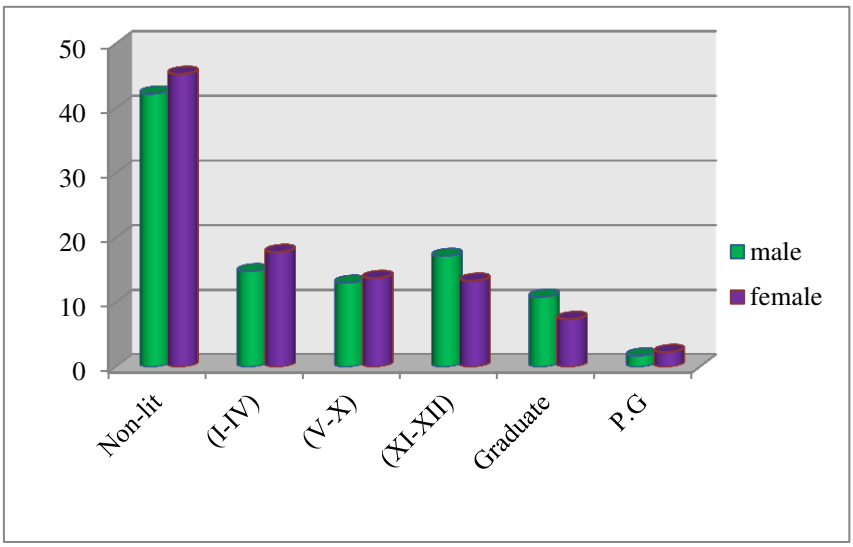



**Figure II.5: Bar diagram to show the educational status of the male and the female**

Table II.5 shows the educational status of both the male and female population group. The same is shown graphically in figures II.5. Illiteracy is more common among the female (45.34%) population group, however it is seen that 42.29% of the males are illiterate in this population. Apart from this there are 17.19% of males are higher secondary level educated. A considerable per cent (13.04%) of them is high school level and at primary level (14.82%). In the category of post graduate level education they recorded lowest percentage (1.78%).

Among the female in the literacy level highest per cent (17.80%) of them are in primary level. A good per cent of them (13.77%) is having high school level education and at higher secondary level (13.35%). A very low range of educational status is observed in graduate (7.42%) and post graduate level (2.33%). Hence from the above it can be said that education is found to be quite low among the population group

**Table II.6: Educational status according to age group of the males**

| Age Group | Illiterate | | I-IV | | V-X | | XI-XII | | Graduate | | Post Graduate | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| <20 | 39 | 7.71 | 22 | 4.35 | 14 | 2.77 | 41 | 8.10 | 17 | 3.36 | - | - | 133 | 26.28 |
| 21-30 | 40 | 7.91 | 24 | 4.74 | 16 | 3.16 | 11 | 2.17 | 20 | 3.95 | 4 | 0.79 | 115 | 22.73 |
| 31-40 | 43 | 8.50 | 11 | 2.17 | 10 | 1.98 | 14 | 2.77 | 10 | 1.98 | 4 | 0.79 | 92 | 18.18 |
| 41-50 | 39 | 7.71 | 8 | 1.58 | 16 | 3.16 | 10 | 1.98 | 7 | 1.38 | | | 80 | 15.81 |
| 51-60 | 31 | 6.13 | 7 | 1.38 | 9 | 1.78 | 8 | 1.58 | 1 | 0.20 | 1 | 0.20 | 57 | 11.26 |
| >60 | 22 | 4.35 | 3 | 0.59 | 1 | 0.20 | 3 | 0.59 | - | - | - | - | 29 | 5.73 |
| Total | 214 | 42.29 | 75 | 14.82 | 66 | 13.04 | 87 | 17.19 | 55 | 10.87 | 9 | 1.78 | 506 | 100.00 |

**Table II.7: Educational status according to age group of the females**

| Age Group | Illiterate | | I-IV | | V-X | | XI-XII | | Graduate | | Post Graduate | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| <20 | 29 | 6.14 | 12 | 2.54 | 14 | 2.97 | 17 | 3.60 | 6 | 1.27 | - | - | 78 | 16.53 |
| 21-30 | 62 | 13.14 | 26 | 5.51 | 22 | 4.66 | 28 | 5.93 | 18 | 3.81 | 8 | 1.69 | 164 | 34.75 |
| 31-40 | 47 | 9.96 | 22 | 4.66 | 15 | 3.18 | 14 | 2.97 | 9 | 1.91 | 2 | 0.42 | 109 | 23.09 |
| 41-50 | 30 | 6.36 | 13 | 2.75 | 8 | 1.69 | 3 | 0.64 | 2 | 0.42 | 1 | 0.21 | 57 | 12.08 |
| 51-60 | 28 | 5.93 | 7 | 1.48 | 6 | 1.27 | - | - | - | - | - | - | 41 | 8.69 |
| >60 | 18 | 3.81 | 4 | 0.85 | - | - | 1 | 0.21 | - | - | - | - | 23 | 4.87 |
| Total | 214 | 45.34 | 84 | 17.80 | 65 | 13.77 | 63 | 13.35 | 35 | 7.42 | 11 | 2.33 | 472 | 100.00 |

From the table II.6 and II.7 it is observed that illiteracy is more popular among the females (45.32%) while in male it is 42.29%. Female literacy is better in lower classes (17.80%) and post graduate level (2.33) as compared to male individuals. While male literacy level is higher from V-X to graduate level when compared to female.

**Occupational status:**

Surroundings of a man and his occupation from which he earns his livelihood play an important role on his health habit (Bhende and Kanitkar, 2003). A man's occupation is related to his income. Both these income and education may influence his food habit and housing condition.

**Table II.8: Occupational status of male and female population**

| Occupational Status | Male | | Occupational Status | Females | |
|---|---|---|---|---|---|
| | no. | % | | no. | % |
| Agriculturist | 207 | 40.91 | Agriculturist | 170 | 36.02 |
| Business | 54 | 10.67 | Business | 38 | 8.05 |
| Service | 62 | 12.25 | Service | 40 | 8.47 |
| Driver | 15 | 2.96 | Housewife | 89 | 18.86 |
| Labour | 93 | 18.38 | Labour | 70 | 14.83 |
| Pension Holder | 5 | 0.99 | Pension Holder | - | - |
| Student | 70 | 13.83 | Student | 65 | 13.77 |
| Total | 506 | 100.00 | Total | 472 | 100.00 |

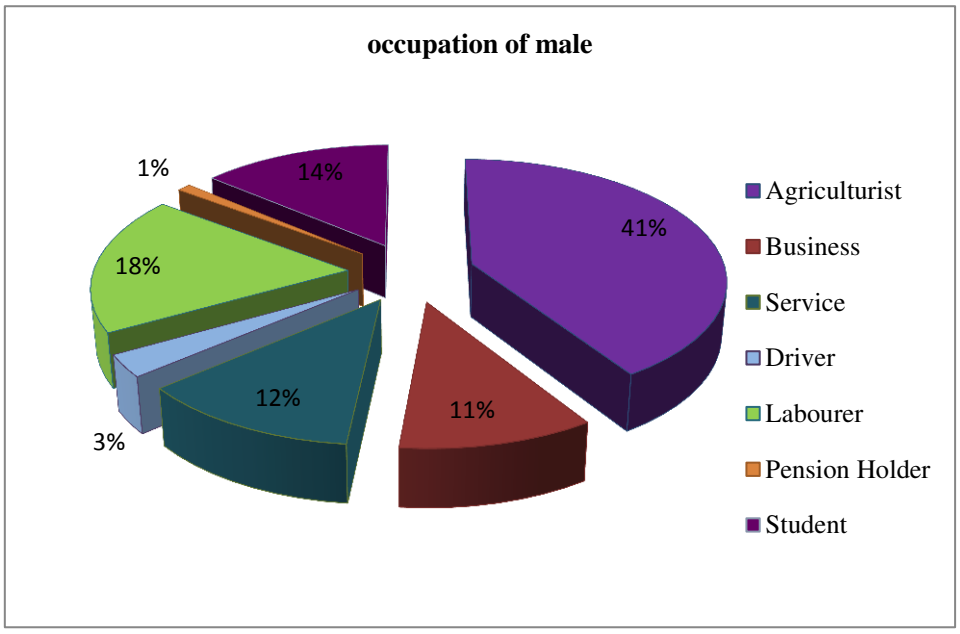



**Figure II.8a: Pie diagram to show the occupational status of male population**

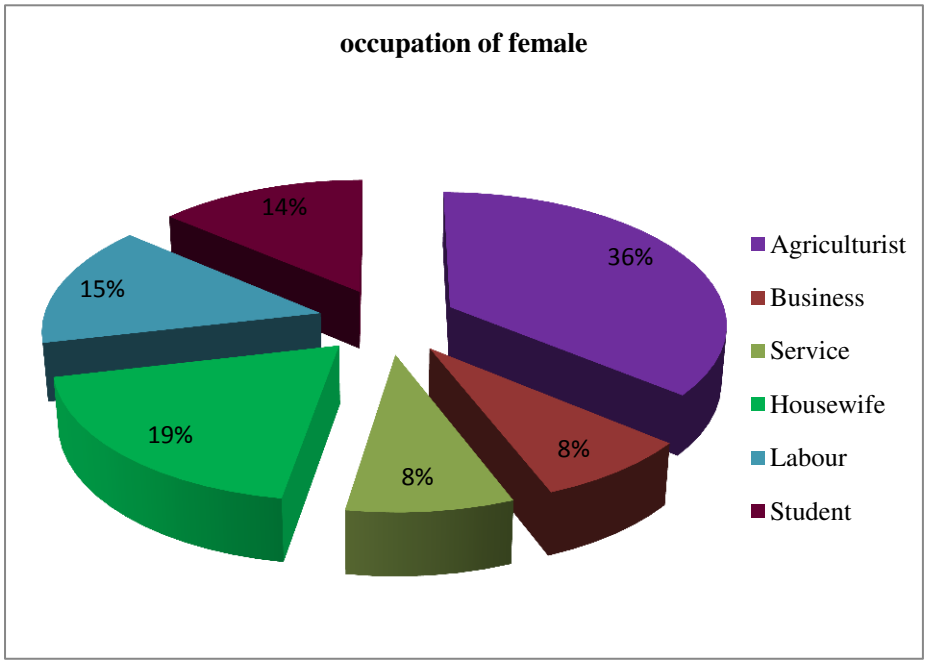



**Figure II.8b: Pie diagram to show the occupational status of female population**

Occupational status of both male and female population are shown in the above table. The same is shown graphically in Figures 8a and 8b. More than 40.91% of the

males are agriculturists and 10.67% are engaged in business. A good per cent of them engaged themselves as labourer (18.38%) followed by service holder (12.25%) and student (13.83%). Among the females 36.02 % are agriculturist. Female labourer makes a percentage of 14.83. In service and business 8.47% and 8.05% females are engaged. Female as student makes a total of 13.77 %.

**Table II.9: Occupational status according to age group of the males**

| Age Group | Student | | Agriculturist | | Labour | | Service | | Business | | Pension Holder | | Driver | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | n | % | n | % | n | % | n | % | n | % |
| <20 | 62 | 12.25 | 44 | 8.70 | 18 | 3.56 | 4 | 0.79 | 5 | 0.99 | - | - | | | 133 | 26.28 |
| 21-30 | 8 | 1.58 | 55 | 10.87 | 14 | 2.77 | 20 | 3.95 | 12 | 2.37 | - | - | 6 | 1.19 | 115 | 22.73 |
| 31-40 | - | - | 35 | 6.92 | 25 | 4.94 | 15 | 2.96 | 12 | 2.37 | - | - | 5 | 0.99 | 92 | 18.18 |
| 41-50 | - | - | 30 | 5.93 | 19 | 3.75 | 13 | 2.57 | 15 | 2.96 | - | - | 3 | 0.59 | 80 | 15.81 |
| 51-60 | - | - | 24 | 4.74 | 17 | 3.36 | 10 | 1.98 | 5 | 0.99 | - | - | 1 | 0.19 | 57 | 11.26 |
| >60 | - | - | 19 | 3.75 | | 0.00 | | | 5 | 0.99 | 5 | 0.988 | | | 29 | 5.73 |
| Total | 70 | 13.83 | 207 | 40.91 | 93 | 18.38 | 62 | 12.25 | 54 | 10.67 | 5 | 0.988 | 15 | 2.96 | 506 | 100.00 |

**Table II.10: Occupational status according to age group of the females**

| Age Group | Student | | Agriculturist | | Labour | | Service | | Business | | House wife | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| <20 | 35 | 7.42 | 24 | 5.08 | 8 | 1.69 | 3 | 0.64 | 2 | 0.42 | 6 | 1.27 | 78 | 16.53 |
| 21-30 | 30 | 6.36 | 61 | 12.92 | 30 | 6.36 | 18 | 3.81 | 10 | 2.12 | 15 | 3.18 | 164 | 34.75 |
| 31-40 | - | - | 44 | 9.32 | 22 | 4.66 | 10 | 2.12 | 12 | 2.54 | 21 | 4.45 | 109 | 23.09 |
| 41-50 | - | - | 18 | 3.81 | 7 | 1.48 | 4 | 0.85 | 5 | 1.06 | 23 | 4.87 | 57 | 12.08 |
| 51-60 | - | - | 19 | 4.03 | 3 | 0.64 | 3 | 0.64 | 5 | 1.06 | 11 | 2.33 | 41 | 8.69 |
| >60 | - | - | 4 | 0.85 | - | - | 2 | 0.42 | 4 | 0.85 | 13 | 2.75 | 23 | 4.87 |
| total | 65 | 13.77 | 170 | 36.02 | 70 | 14.83 | 40 | 8.47 | 38 | 8.05 | 89 | 18.86 | 472 | 100.00 |

The above table II.9 and II.10 reveals the age wise distribution of occupational status of both males and females. It is seen that highest number of male occur in the age group of below 20 years where majority of them engage themselves are student (12.55%) while highest number of females appear in the age group of 21-30 years where large numbers are engaged as agriculturist (12.92%). Similarly among the males in the age group 21-30, 31-40, 41-50, 51-60 and above 60 years is agriculturist, same is seen among the female participants in the age group of 21-30, 31-40 and 51-60 where more number are agriculturist. But in the age group 41-50 and above 60 more numbers of them are housewife.

**Table II.11: Income level of the participants**

| Monthly Income | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| <15000 | 168 | 33.20 | 226 | 47.88 | 394 | 40.29 |
| 15000-25000 | 241 | 47.63 | 189 | 40.04 | 430 | 43.97 |
| >25000 | 97 | 19.17 | 57 | 12.08 | 154 | 15.75 |
| Total | 506 | 51.74 | 472 | 48.26 | 978 | 100.00 |

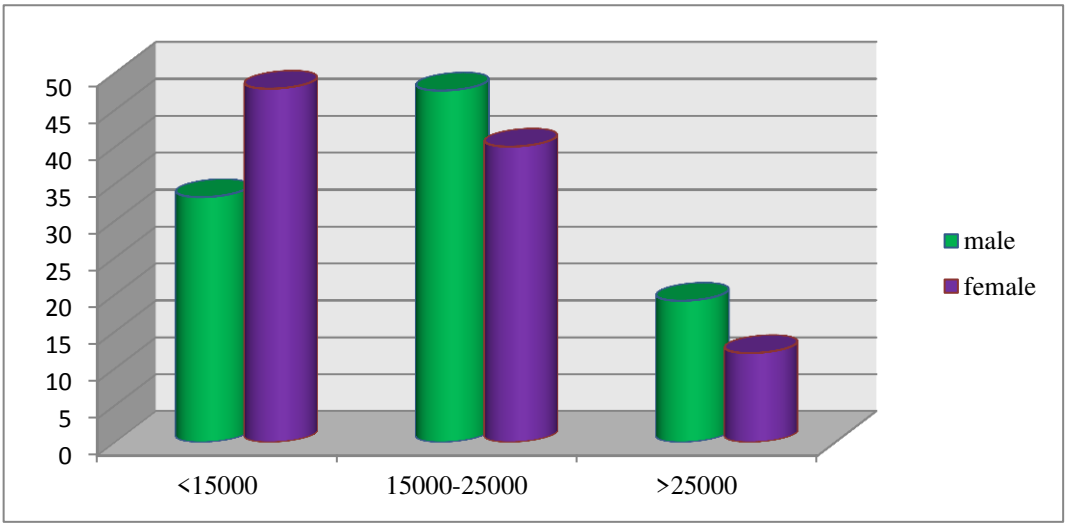



**Figure II.11: Bar diagram to show the income level of the population**

Income level of the families of the participants is an essential part of research work. It is studied to understand the economic status of the respondent. Here the table suggest that highest number of males (47.63%) are in the monthly income level of Rs 15000-25000 and among females (47.88%) in the monthly income level of <15000. very few of the males (19.17%) and females (12.08%) are in the monthly income of more than 25000.

## B. RESPIRATORY PARAMETERS:

Respiratory parameters are generally measured by pulmonary function test. These tests are made to study the normal and altered conditions of lung function. The test is generally analyzed using a spirometer. The forced vital capacity (FVC), forced expiratory volume in one second (FEV1) and FEV1/FVC are the three most important measurements in spirometry. In this section findings on respiratory parameters is been analyzed.

**Table III: Distribution of the respiratory population by age and sex in percentage**

| Age Group | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| <20 | 95 | 39.75 | 55 | 25.58 | 150 | 33.04 |
| 21-30 | 45 | 18.83 | 70 | 32.56 | 115 | 25.33 |
| 31-40 | 39 | 16.32 | 41 | 19.07 | 80 | 17.62 |
| 41-50 | 27 | 11.30 | 18 | 8.37 | 45 | 9.91 |
| 51-60 | 19 | 7.95 | 22 | 10.23 | 41 | 9.03 |
| >60 | 14 | 5.86 | 9 | 4.19 | 23 | 5.07 |
| Total | 239 | 100 | 215 | 100 | 454 | 100 |

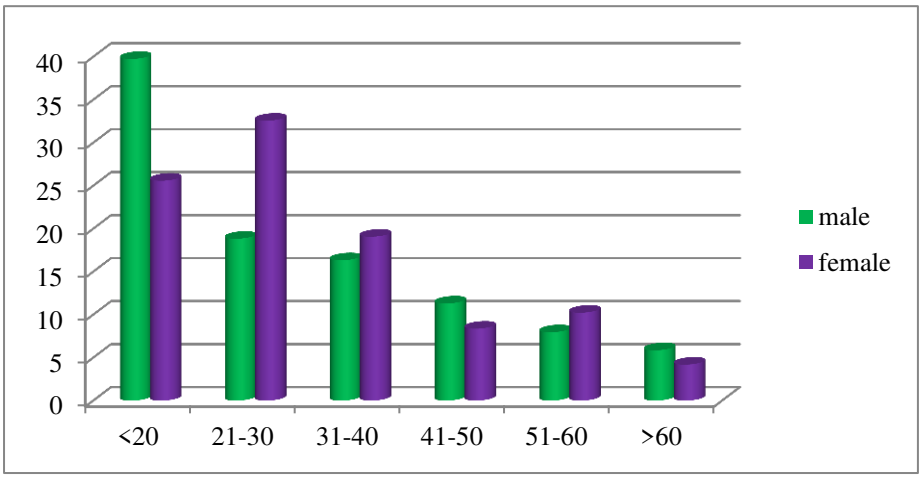



**Figure III: Bar diagram showing the distribution by age and sex in percentage**

The above table represents the distribution of sex according to age. There are total 239 male and 215 female which makes a total of 454. Highest number of male is found in the age group of below 20 years i.e. 95 (39.75%) while lowest is seen in the age group of above 60 years i.e. 14 (5.86%). In the female population highest numbers are seen in the age group of 21-30 years i.e. 70 (32.56%) while lowest is seen in the age group of above 60 years i.e. 9 (4.19%).

**Table III.1: Anthropological data of the respiratory population**

| Variables | Male | Female | Total |
|---|---|---|---|
| | Mean (±SD) | Mean (±SD) | Mean (±SD) |
| Age(years) | 31.07 (±15.23) | 31.78 (±14.21) | 31.41 (±14.74) |
| Height(cm) | 166.16 (±7.27) | 156.80 (±5.71) | 161.73 (±8.07) |
| Weight (kg) | 62.32 (±12.23) | 55.63 (±10.57) | 59.15 (±11.94) |
| FVC | 2.84(±0.60) | 2.43 (±0.35) | 2.65 (±0.54) |
| FEV1 | 2.74 (±0.54) | 2.34 (±0.36) | 2.55 (±0.50) |
| FEV1/FVC | 96.84 (±5.27) | 96.34 (±6.35) | 96.61 (±5.80) |

The table III.1 shows the mean age of the population is 31.41 (±14.74) years. Similarly mean height, weight, FVC, FEV1 and FEV1/FVC are 161.73 (±8.07) cm, 59.15 (±11.94) kg, 2.65 (±0.54), 2.55 (±0.50) and 96.61 (±5.80) respectively. Apart from the mean age of female which is approximately same to the male population, the

mean value of other parameters such as height, weight, FVC, FEV1 and FEV1/FVC are higher in the males as compared to their female counterparts.

**Table III.2: Physical attributes of the participants of the respiratory groups**

| Variables | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| Gender | n | % | n | % | n | % |
| | 239 | 52.64 | 215 | 47.36 | 454 | 100 |
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Height (cm) | 166.16 | 7.27 | 156.80 | 5.71 | 161.73 | 8.07 |
| Weight (kg) | 62.32 | 12.23 | 55.63 | 10.57 | 59.15 | 11.94 |
| BMI (kg/m²) | 22.56 | 4.18 | 22.68 | 4.51 | 22.62 | 4.34 |
| Respiratory Parameters | | | | | | |
| FVC | 2.84 | 0.60 | 2.43 | 0.35 | 2.65 | 0.54 |
| FEV1 | 2.74 | 0.54 | 2.34 | 0.36 | 2.55 | 0.50 |
| FEV1/FVC | 96.84 | 5.27 | 96.34 | 6.35 | 96.61 | 5.80 |

The Table III.2 represents the mean height, weight and BMI of the female participants are 156.80 cm, 55.63 kg and 22.68 kg/m² respectively. With the males having a higher mean height of (166.16cm) and weight (62.32kg) than their female counterparts. The mean BMI of the female participants (22.68kg/m²) was found to be slight higher than the mean BMI of the male participants (22.56kg/m²). The result also

shows the mean FVC, FEV1 and FEV1/FVC of the participants to be 2.65, 2.55 and 96.61 respectively. The mean FVC, FEV1 and FEV1/FVC was found to be higher in male participants (2.84, 2.74and 96.84 respectively) than their female counterparts (2.43, 2.34 and 96.34 respectively).

**Table III.3: Age wise distribution of mean and S.D of respiratory parameters of the total population**

| Age Group | n | FVC | | FEV1 | | FEV1/FVC | |
|---|---|---|---|---|---|---|---|
| | | Mean | S.D | Mean | S.D | Mean | S.D |
| <20 | 150 | 2.84 | 0.69 | 2.69 | 0.62 | 95.13 | 6.15 |
| 21-30 | 115 | 2.63 | 0.42 | 2.57 | 0.41 | 97.97 | 4.05 |
| 31-40 | 80 | 2.56 | 0.45 | 2.49 | 0.47 | 97.10 | 6.75 |
| 41-50 | 45 | 2.53 | 0.38 | 2.46 | 0.33 | 97.56 | 4.38 |
| 51-60 | 41 | 2.34 | 0.40 | 2.29 | 0.40 | 97.83 | 3.50 |
| >60 | 23 | 2.53 | 0.27 | 2.37 | 0.34 | 93.64 | 9.45 |

Age-wise mean and S.D of respiratory parameters are presented in the above table for the total population. It is seen that with the increase of age there is a gradual decrease in the mean value apart in the age group of above 60 years. While in case of $FEV_1$/FVC (%) no such trend of increase or decrease according to age is found in the population group.

**Table III.4: Age wise distribution of mean and S.D of respiratory parameters of the male population**

| Age Group | n | FVC | | FEV1 | | FEV1/FVC | |
|---|---|---|---|---|---|---|---|
| | | Mean | S.D | Mean | S.D | Mean | S.D |
| <20 | 95 | 3.12 | 0.68 | 2.93 | 0.62 | 94.23 | 6.67 |
| 21-30 | 45 | 2.84 | 0.51 | 2.81 | 0.45 | 98.96 | 2.63 |
| 31-40 | 39 | 2.65 | 0.47 | 2.62 | 0.46 | 99.08 | 2.46 |
| 41-50 | 27 | 2.63 | 0.37 | 2.57 | 0.27 | 98.11 | 3.96 |
| 51-60 | 19 | 2.35 | 0.45 | 2.30 | 0.43 | 97.59 | 3.80 |
| >60 | 14 | 2.57 | 0.26 | 2.52 | 0.25 | 98.10 | 2.87 |

Age-wise mean and S.D of respiratory parameters are presented in the above table for the male population. It is seen that with the increase of age there is a gradual decrease in the mean value apart in the age group of above 60 years. While in case of $FEV_1$/FVC (%) no such trend of increase or decrease according to age is found in the male population.

**Table III.5: Age wise distribution of mean and S.D of respiratory parameters of the female population**

| Age Group | n | FVC | | FEV1 | | FEV1/FVC | |
|---|---|---|---|---|---|---|---|
| | | Mean | S.D | Mean | S.D | Mean | S.D |
| <20 | 55 | 2.37 | 0.39 | 2.28 | 0.37 | 96.68 | 4.79 |
| 21-30 | 70 | 2.49 | 0.28 | 2.42 | 0.29 | 97.34 | 4.65 |
| 31-40 | 41 | 2.47 | 0.41 | 2.36 | 0.44 | 95.22 | 8.76 |
| 41-50 | 18 | 2.38 | 0.35 | 2.3 | 0.34 | 96.72 | 4.95 |
| 51-60 | 22 | 2.33 | 0.37 | 2.29 | 0.37 | 98.03 | 3.29 |
| >60 | 9 | 2.47 | 0.29 | 2.14 | 0.35 | 86.71 | 11.99 |

Here the table reveals the distribution of age-wise mean and S.D of respiratory parameters for the female population. Similar to the males here also it is seen that with the increase of age there is a gradual increase in the mean value apart in the age group of above 60 years. While in case of $FEV_1$/FVC (%) no such trend of increase or decrease according to age is found in the female category.

**Table III.6: Age wise distribution of total population in accordance to weight, height and BMI**

| Age Group | n | | Weight | Height | BMI |
|---|---|---|---|---|---|
| <20 | 150 | Mean | 55.67 | 162.28 | 21 |
| | | S.D | 12.23 | 7.44 | 3.63 |
| 21-30 | 115 | Mean | 54.07 | 161.7 | 20.71 |
| | | S.D | 10.55 | 8.17 | 3.91 |
| 31-40 | 80 | Mean | 61.34 | 162.3 | 23.34 |
| | | S.D | 9.72 | 9.76 | 3.52 |
| 41-50 | 45 | Mean | 66.82 | 160.93 | 25.85 |
| | | S.D | 10.26 | 7.07 | 3.95 |
| 51-60 | 41 | Mean | 67.22 | 160.17 | 26.29 |
| | | S.D | 7.71 | 8.01 | 3.18 |
| >60 | 23 | Mean | 70.26 | 160.65 | 27.33 |
| | | S.D | 9.03 | 7.11 | 4.11 |

The above table shows the age wise distribution of weight, height and BMI among total participants. The highest mean weight and BMI are seen in the category of above 60 (70.26±9.03kg) and (27.33±4.11kg/m²) respectively while highest mean height in the age group of below 20 years (162.28±7.44cm). The lowest mean weight is

seen in the category 21-30 (54.07±10.55 kg), lowest mean height in the age group of 51-60 (160.17±8.01cm) and BMI in 21-30 (20.71±3.91kg/m²).

**Table III.7: Age wise distribution of male population in accordance to weight, height and BMI**

| Age Group | n | | Weight | Height | BMI |
|---|---|---|---|---|---|
| <20 | 95 | Mean | 58.71 | 165.43 | 21.3 |
| | | S.D | 12.81 | 6.36 | 3.7 |
| 21-30 | 45 | Mean | 58.8 | 168.07 | 20.83 |
| | | S.D | 12.07 | 7.48 | 4.2 |
| 31-40 | 39 | Mean | 64.79 | 168.33 | 22.95 |
| | | S.D | 9.78 | 8.88 | 3.62 |
| 41-50 | 27 | Mean | 67.93 | 164.26 | 25.15 |
| | | S.D | 11.57 | 6.83 | 3.89 |
| 51-60 | 19 | Mean | 70.05 | 165.95 | 25.58 |
| | | S.D | 7.19 | 7.15 | 3.47 |
| >60 | 14 | Mean | 70 | 162.93 | 26.42 |
| | | S.D | 8.23 | 6.52 | 3.25 |

The above table shows the age wise distribution of weight, height and BMI among total male participants. The highest mean weight is seen in the age group of 51-60 years (70.05±7.19kg), highest mean height in 31-40 (168.33±8.88cm), highest mean BMI is seen in above 60 years (26.42±3.25 kg/m²). The lowest mean weight is seen in the category of below 20 years (58.71±12.81kg), lowest mean height in above 60 (162.93±6.52cm) and BMI in 21-30 (20.83±4.2kg/m²).

**Table III.8: Age wise distribution of female population in accordance to weight, height and BMI**

| Age Group | n | | Weight | Height | BMI |
|---|---|---|---|---|---|
| <20 | 55 | Mean | 50.44 | 156.84 | 20.48 |
| | | S.D | 9.12 | 5.88 | 3.46 |
| 21-30 | 70 | Mean | 51.03 | 157.61 | 20.63 |
| | | S.D | 8.2 | 5.6 | 3.73 |
| 31-40 | 41 | Mean | 58.05 | 156.56 | 23.71 |
| | | S.D | 8.54 | 6.62 | 3.42 |
| 41-50 | 18 | Mean | 65.17 | 155.94 | 26.89 |
| | | S.D | 7.94 | 3.75 | 3.93 |
| 51-60 | 22 | Mean | 64.77 | 155.11 | 26.9 |
| | | S.D | 7.43 | 4.69 | 2.85 |
| >60 | 9 | Mean | 70.67 | 157.11 | 28.73 |
| | | S.D | 10.67 | 6.83 | 5.07 |

The above table shows the age wise distribution of weight, height and BMI among female participants. The highest mean weight, height and BMI are seen in the category above 60 years (70.67±10.67 kg), in 21-30 years (157.61±5.60 cm) and in above 60 years (28.73±5.07 kg/m²) respectively. The lowest mean weight is seen in the category of below 20 years (50.44±9.12 kg), lowest mean height in 51-60 (155.11±4.69 cm) and lowest BMI in below 20 years (20.48±3.46 kg/m²).

**Table III.9: Distribution of FEV1/FVC levels among the total population**

| Classification | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Normal | 238 | 99.6 | 209 | 97.22 | 447 | 98.46 |
| Mildly Abnormal | - | - | 4 | 1.86 | 4 | 0.88 |
| Moderately Abnormal | 1 | 0.4 | 1 | 0.46 | 2 | 0.44 |
| Moderate to Severely Abnormal | - | - | 1 | 0.46 | 1 | 0.22 |
| Severely Abnormal | - | - | - | - | - | - |
| Very Severely Abnormal | - | - | - | - | - | - |
| Total | 239 | 100% | 215 | 100% | 454 | 100 |

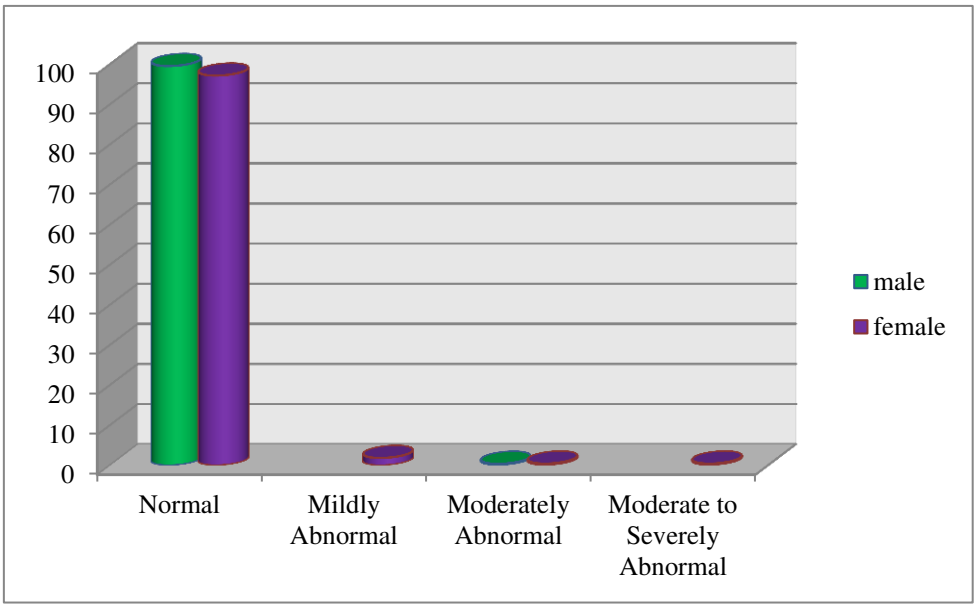



**Figure III.9: Bar diagram showing the distribution of FEV1/FVC levels of the both population**

The table represents the FEV1/FVC value of the total population. It is seen that majority of the population are seen in the range of normal makes a total of 447

(98.46%). Gradually it is decreasing to mildly abnormal total of 4 (0.88%). While 2 (0.44%) individuals are seen in the moderately abnormal group and an only 1 (0.22%) individuals is found in moderate to severely abnormal. While no individual is found in severely abnormal and very severely abnormal categories.

It is seen that in the male category highest numbers are in the normal which is 238(99.6%). And only 1(0.4%) is seen in the moderately abnormal category. While no individual are found in the other categories. Whereas majority of the female population are found in the normal range which is 209 (97.22%). A gradual decrease is seen in the ranges. 4 (1.86%) female individuals are seen in the range of mildly abnormal, 1 (0.46%) individual are seen in both moderately abnormal and moderate to severely abnormal.

## C. BLOOD PRESSURE PARAMETERS:

Hypertension is a major risk for cardiac disease and stroke, with an increase in risk for these ailments with progressively higher blood pressure. High blood pressure is a second leading cause of end stage renal disease, and its presence increases the rate of progression of all kidney disease (WHO, 2002). It is one of the most common conditions affecting the adult population. The following tables are on the findings on blood pressure measurement of the Tawang Monpa group

**Table IV: Anthropological data of the population**

| Variables | Male | Female | Total |
|---|---|---|---|
| | Mean (±S.D) | Mean (±S.D) | Mean (±S.D) |
| Age (years) | 37.6(±14.6) | 35.5(±12.8) | 36.58 (±13.76) |
| Height (cm) | 165.3(±6.15) | 153.76(±5.64) | 159.64 (±8.26) |
| Weight (cm) | 68.28(±11.86) | 60.87(±11.54) | 64.65 (±12.27) |
| Systolic Blood Pressure | 128.8(±9.91) | 124.26(±9.64) | 126.57 (±10.03) |
| Diastolic Blood Pressure | 85.09(±6.8) | 82.98(±7.34) | 84.05 (±7.14) |

The table IV shows the mean age of the population is 36.58 (±13.76) years. Similarly mean height, weight, systolic and diastolic blood pressure is 159.64(±8.26) cm, 64.65 (±12.27) kg, 126.57 (±10.03) mmHg and 84.05 (±7.14) mmHg respectively. The male shows a higher mean value of all the parameters as compared to females.

**Table IV.1: Distribution of population by age and sex**

| Age Group | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| <20 | 38 | 14.23 | 23 | 8.95 | 61 | 11.64 |
| 21-30 | 70 | 26.22 | 94 | 36.58 | 164 | 31.30 |
| 31-40 | 53 | 19.85 | 68 | 26.46 | 121 | 23.09 |
| 41-50 | 53 | 19.85 | 39 | 15.18 | 92 | 17.56 |
| 51-60 | 38 | 14.23 | 19 | 7.39 | 57 | 10.88 |
| >60 | 15 | 5.62 | 14 | 5.45 | 29 | 5.53 |
| Total | 267 | 50.95 | 257 | 49.05 | 524 | 100 |

The above table represents the distribution of sex according to age. There are total 267 male and 257female which makes a total of 524. Highest number of male is found in the age group of 21-30 years i.e. 70 (26.22%) while lowest is seen in the age group of above 60 years i.e. 15 (5.62%). In the female population highest numbers are seen in the age group of 21-30 years i.e. 94 (36.58%) while lowest is seen in the age group of above 60 years i.e. 14 (5.45%).

**Table IV.2: Distribution of Blood pressure level of the both the population group**

| Classification | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Normal | 16 | 5.99 | 31 | 12.06 | 47 | 8.67 |
| Prehypertension | 167 | 62.55 | 168 | 65.37 | 335 | 61.81 |
| Stage I Hypertension | 74 | 27.72 | 51 | 19.84 | 125 | 23.06 |
| Stage II Hypertension | 10 | 3.75 | 7 | 2.72 | 17 | 3.14 |
| Total | 267 | 100 | 257 | 100 | 542 | 100 |

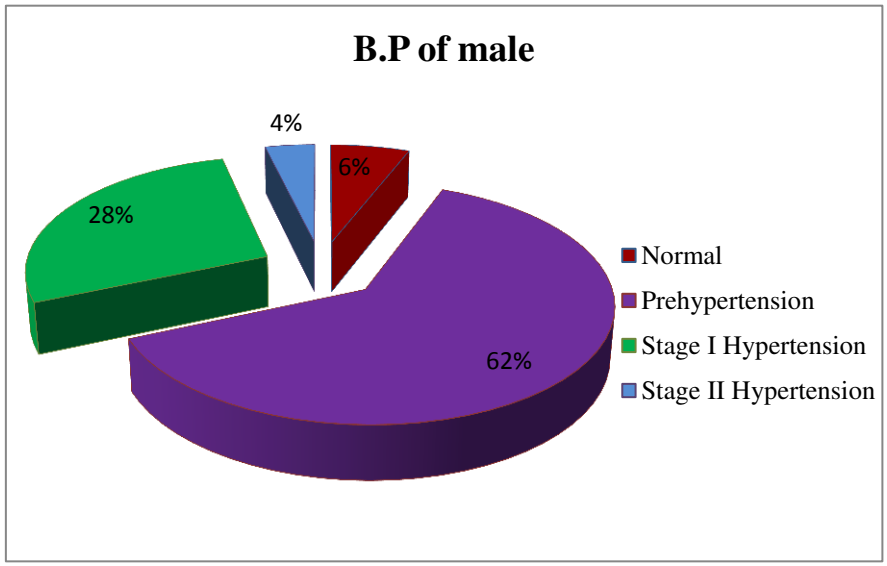



**Figure IV.2a: Bar diagram showing the distribution of blood pressure level of themale**

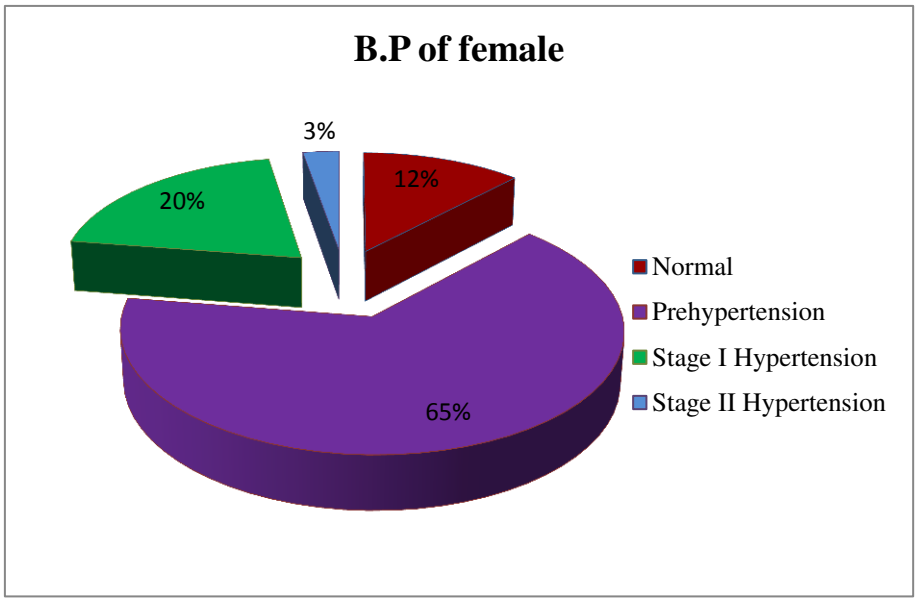



**Figure IV.2b: Bar diagram showing the distribution of blood pressure level of the female**

Blood pressure level is classified according to Joint National Committee 8$^{th}$ Classification of hypertension. The results are presented in Tables IV.2, IV.3, IV.4 and IV.5 for the males and females respectively. More than 62 percent of the males and 65 percent of the females have pre-hypertension, while more than 27 percent of the males

and 19 per cent of the females have stage I hypertension. And more than 3 percent of the males and 2 percent of the females have stage II hypertension. Thus, hypertension occurs in higher percent in the males than that of the females. Of the total population more than 61 % of them are categorized in the prehypertension level.

**Table IV.3: Mean and standard deviation of systolic and diastolic blood pressure the of male population**

| Age Group | S.B.P (mmHg) | | D.B.P (mmHg) | |
|---|---|---|---|---|
| | Mean | S.D | Mean | S.D |
| <20 | 120.26 | 5.81 | 78.84 | 4.3 |
| 21-30 | 127.11 | 7.92 | 83.34 | 4.71 |
| 31-40 | 131.7 | 9.81 | 87.4 | 7.47 |
| 41-50 | 130.6 | 9.01 | 86.9 | 5.3 |
| 51-60 | 133.52 | 12.7 | 88.37 | 7.38 |
| >60 | 129.73 | 7.99 | 86.13 | 8.99 |

The above table discusses the distribution of mean and standard deviation of the male population. Highest mean S.B.P and D.B.P are observed in the age group of 51-60 (133.52±12.7 mmHg) and (88.37±7.38 mmHg). While lowest mean S.B.P and D.B.P are seen in the age group of below 20 years (120.26±5.81 mmHg) and (78.84±4.3 mmHg) respectively.

**Table IV.4: Mean and standard deviation of systolic and diastolic blood pressure the of female population**

| Age Group | S.B.P (mmHg) | | D.B.P (mmHg) | |
|---|---|---|---|---|
| | Mean | S.D | Mean | S.D |
| <20 | 120.17 | 5.11 | 79.56 | 5.55 |
| 21-30 | 120.46 | 7.44 | 80.74 | 5.27 |
| 31-40 | 123.97 | 9.2 | 82.58 | 6.72 |
| 41-50 | 128.66 | 9.51 | 85.07 | 8.31 |
| 51-60 | 130.94 | 12.02 | 90 | 10.9 |
| >60 | 137.3 | 11.2 | 90.14 | 5.94 |

The above table discusses the distribution of mean and standard deviation of the female population. Highest mean S.B.P and D.B.P are observed in the age group of of above 60 years (137.3±11.2 mmHg) and (90.14±5.94 mmHg). While lowest mean lowest mean S.B.P and D.B.P are seen in the age group of below 20 years (120.17±5.11 mmHg) and (79.56±5.55 mmHg) respectively.

**Table IV.5: Distribution of physical attributes of the participants**

| Variables | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| Gender | n | % | n | % | n | % |
| | 267 | 50.95 | 257 | 49.05 | 524 | 100 |
| | Mean | S.D | Mean | S.D | Mean | S.D |
| Height (cm) | 165.3 | 6.15 | 153.76 | 5.64 | 159.64 | 8.26 |
| Weight (kg) | 68.28 | 11.86 | 60.87 | 11.54 | 64.65 | 12.27 |
| BMI (kg/m²) | 24.94 | 3.8 | 25.72 | 4.45 | 25.32 | 4.14 |
| B.P(mmHg) | | | | | | |
| S.B.P (mmHg) | 128.8 | 9.91 | 124.26 | 9.64 | 126.57 | 10.03 |
| D.B.P (mmHg) | 85.09 | 6.8 | 82.98 | 7.34 | 84.05 | 7.14 |

The Table IV.5 represents the mean height, weight and BMI of the participants were 159.64±8.26cm, 64.65±12.27kg and 25.32±4.14kg/m² respectively. With the

males having a higher mean height of (165.3±6.15cm) and weight (68.28±11.86 kg) than the mean height (153.76±5.64 cm) and weight (60.87±11.54 kg) of their female counterparts. The mean BMI of the female participants (25.72±4.45 kg/m²) was found to be higher than the mean BMI of the male participants (24.94±3.8 kg/m²). The result also shows the mean systolic and diastolic blood pressures of the participants to be 126.57±10.03 mmHg and 84.05±7.14 mmHg respectively. The mean systolic and diastolic BP was found to be higher in male participants (128.8±9.91 mmHg and 85.09±6.8 mmHg respectively) than their female counterparts (124.26±9.64 mmHg and 82.98±7.34 mmHg respectively).

**Table IV.6: Age wise distribution of males in accordance to weight, height, systolic, diastolic and BMI**

| Age Group | | Weight | Height | S.B.P | D.B.P | BMI |
|---|---|---|---|---|---|---|
| <20 | Mean | 59.13 | 164.41 | 120.26 | 78.84 | 21.86 |
| | S.D | 7.93 | 5.58 | 5.81 | 4.3 | 2.59 |
| 21-30 | Mean | 67.26 | 165.53 | 127.11 | 83.34 | 24.47 |
| | S.D | 12.08 | 7.16 | 7.92 | 4.71 | 3.6 |
| 31-40 | Mean | 70.53 | 165.25 | 131.7 | 87.4 | 25.8 |
| | S.D | 10.23 | 4.43 | 9.81 | 7.47 | 3.46 |
| 41-50 | Mean | 73.19 | 166.28 | 130.6 | 86.91 | 26.42 |
| | S.D | 12.95 | 6.36 | 9.02 | 5.3 | 4.06 |
| 51-60 | Mean | 71.08 | 166.1 | 133.53 | 88.37 | 25.76 |
| | S.D | 11.56 | 6.31 | 12.7 | 7.38 | 3.9 |
| >60 | Mean | 63.93 | 161.22 | 129.73 | 86.13 | 24.65 |
| | S.D | 6.35 | 5.49 | 8 | 8.99 | 2.68 |

The above table shows the age wise distribution of males. The highest mean weight and height is seen in the category 41-50 (73.19±12.95 kg) and (166.28±6.36 cm), highest mean systolic and diastolic is seen in 51-60 (133.53±12.7 mmHg) and (88.37±7.38 mmHg) respectively and highest mean BMI in 41-50 (26.42±4.06 kg/m²). The lowest mean weight is seen in the category of below 20 years (59.13±7.93 kg), lowest mean height in above 60 (161.22±5.49 cm), lowest mean systolic, diastolic and BMI in seen below 20 years (120.26±5.81 mmHg) and (78.84±4.3 mmHg) and (21.86±2.59 kg/m²) respectively.

**Table IV.7: Age wise distribution of females in accordance to weight, height, systolic, diastolic and BMI**

| Age Group | | Weight | Height | S.B.P | D.B.P | BMI |
|---|---|---|---|---|---|---|
| <20 | Mean | 56.22 | 155.55 | 120.17 | 79.57 | 23.23 |
| | S.D | 10.39 | 4.48 | 5.11 | 5.39 | 4.09 |
| 21-30 | Mean | 57 | 154.01 | 120.47 | 80.74 | 24.01 |
| | S.D | 9.9 | 5.3 | 7.44 | 5.26 | 3.82 |
| 31-40 | Mean | 63.25 | 153.88 | 123.97 | 82.59 | 26.67 |
| | Mean | 10.13 | 5.45 | 9.17 | 6.72 | 3.76 |
| 41-50 | S.D | 65.62 | 152.99 | 128.67 | 85.08 | 27.94 |
| | Mean | 11.85 | 6.41 | 9.51 | 8.31 | 4.01 |
| 51-60 | S.D | 64.42 | 153.18 | 130.32 | 90 | 27.43 |
| | Mean | 16.78 | 6.72 | 11.72 | 10.28 | 6.71 |
| >60 | S.D | 64.86 | 151.59 | 137.29 | 90.14 | 28.08 |
| | Mean | 11.31 | 6.41 | 8.58 | 5.95 | 3.55 |

The above table shows the age wise distribution of females. The highest mean weight is seen in the category 41-50 (65.62±11.85 kg), highest mean height in below 20 years (155.55±4.48 cm), highest mean systolic, diastolic and BMI in seen above 60 (137.29±8.58 mmHg) and (90.14±5.95 mmHg) and (28.08±3.55 kg/m²) respectively. The lowest mean weight is seen in the category below 20 years (56.22±10.39 kg), lowest mean height in above 60 years (151.59±6.41cm), lowest mean systolic, diastolic and BMI in seen below 20 years (120.17±5.11 mmHg) and (79.57±5.39 mmHg) and (23.23±4.09 kg/m²) respectively.

## D. NUTRITIONAL PARAMETERS:

Nutrition has been a major health hazard all over the world. Assessment of nutritional status helps us to understand the health status of a population group. For this purpose of the study, these nutritional assessments was carried out using anthropometric measurements and indices on the basis of BMI, waist circumference, waist to hip ratio, waist to height ratio and conicity index. The section deals with those findings of nutritional assessment of the Tawang Monpa group.

**Table V: Age wise distribution of anthropometric measurements of the male**

| Age Group | n | | Weight (kg) | Height (cm) | Waist Circumference (cm) | Hip Circumference (cm) |
|---|---|---|---|---|---|---|
| <20 | 38 | Mean | 59.13 | 164.41 | 84.73 | 89.39 |
| | | S.D | 7.93 | 5.58 | 7.06 | 4.69 |
| 21-30 | 70 | Mean | 67.26 | 165.53 | 87.31 | 93.00 |
| | | S.D | 12.08 | 7.16 | 7.86 | 6.26 |
| 31-40 | 53 | Mean | 70.53 | 165.25 | 90.82 | 94.38 |
| | | S.D | 10.23 | 4.43 | 8.55 | 5.19 |
| 41-50 | 53 | Mean | 73.19 | 166.28 | 92.84 | 96.09 |
| | | S.D | 12.95 | 6.36 | 8.66 | 7.54 |
| 51-60 | 38 | Mean | 71.08 | 166.10 | 95.15 | 94.09 |
| | | S.D | 11.56 | 6.31 | 7.73 | 7.61 |
| >60 | 15 | Mean | 63.93 | 161.22 | 92.53 | 91.39 |
| | | S.D | 6.35 | 5.49 | 5.35 | 6.32 |

The table shows the distribution of anthropometric measurements of the male population. Highest mean weight is found in the age group 41-50 years (73.19±12.95 kg) and likewise highest mean height, waist circumference and hip circumference are 41-50 (166.28±6.36 cm), 51-60 (95.15±7.73 cm) and 41-50 (96.09±7.54 cm) respectively. Similarly lowest mean for weight are below 20(59.13±7.93 kg), for height is above 60 (161.22±5.49 cm). Lowest mean for waist circumference and hip

circumference are in the age group of below 20 (84.73±7.06 cm) and (89.39±4.69 cm) respectively.

**Table V.1: Age wise distribution of anthropometric measurements of the female**

| Age Group | n | | Weight (kg) | Height (cm) | Waist Circumference (cm) | Hip Circumference (cm) |
|---|---|---|---|---|---|---|
| <20 | 38 | Mean | 56.22 | 155.55 | 82.87 | 90.01 |
| | | S.D | 10.39 | 4.48 | 10.04 | 6.29 |
| 21-30 | 70 | Mean | 57 | 154.01 | 85.66 | 91.35 |
| | | S.D | 9.9 | 5.3 | 9.77 | 6.21 |
| 31-40 | 53 | Mean | 63.26 | 153.88 | 93.04 | 95.18 |
| | | S.D | 10.13 | 5.45 | 9.3 | 6.61 |
| 41-50 | 53 | Mean | 65.62 | 152.99 | 96.75 | 97.06 |
| | | S.D | 11.85 | 6.41 | 9.2 | 7.92 |
| 51-60 | 38 | Mean | 64.42 | 153.18 | 100.24 | 100.33 |
| | | S.D | 16.78 | 6.72 | 13.07 | 10.12 |
| >60 | 15 | Mean | 64.86 | 151.59 | 101.83 | 99.61 |
| | | S.D | 11.31 | 6.41 | 7.79 | 8.07 |

The table shows the distribution of anthropometric measurements of the female population. Highest mean weight is found in the age group 41-50 years (65.62±11.85 kg) and likewise highest mean height, waist circumference and hip circumference below 20 (155.55±4.48 cm), above 60 (101.83±7.79 cm) and 51-60 (100.33±10.12cm)

respectively. Similarly lowest mean for weight, waist circumference and hip circumference and are below 20(56.22±10.39 kg), (82.87±10.04 cm) and (90.01±6.29 cm) respectively. While lowest mean height is seen in the age group of above 60 years (151.59±6.41 cm).

**Table V.2: BMI distribution among the participants**

| Category | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| Underweight | 8 | 3.00 | 8 | 3.11 | 16 | 3.05 |
| Normal Weight | 79 | 29.59 | 67 | 26.07 | 146 | 27.86 |
| Over Weight | 54 | 20.22 | 48 | 18.68 | 102 | 19.47 |
| Obese | 126 | 47.19 | 134 | 52.14 | 260 | 49.62 |
| Total | 267 | 100 | 257 | 100 | 524 | 100 |

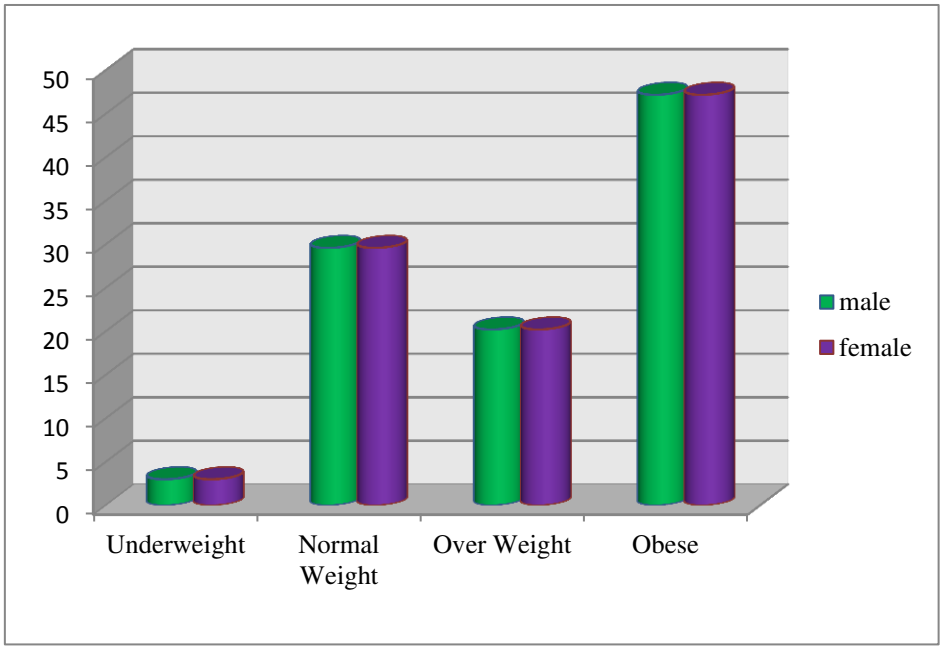



**Figure V.2: Bar diagram showing the BMI distribution among the participants**

Table V.2 shows the distribution of body weight of both the categories. The table shows that of the total 524 individuals highest number is found in the category of obese i.e. 260 (49.62%), followed by normal weight 146 (27.86%), overweight 102 (19.47%) and least is seen in the category of underweight 16 (3.05%). It is see that females (52.14%) are more obese than the males (47.19%).

**Table V.3: Age wise distribution of BMI of the male population**

| Age Group | Underweight | | Normal Weight | | Overweight | | Obese | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | |
| <20 | 6 | 2.25 | 18 | 6.74 | 9 | 3.37 | 5 | 1.87 | 38 |
| 21-30 | - | - | 24 | 8.99 | 17 | 6.37 | 29 | 10.86 | 70 |
| 31-40 | - | - | 13 | 4.87 | 11 | 4.12 | 29 | 10.86 | 53 |
| 41-50 | - | - | 13 | 4.87 | 6 | 2.25 | 34 | 12.73 | 53 |
| 51-60 | 2 | 0.75 | 8 | 3.00 | 6 | 2.25 | 22 | 8.24 | 38 |
| >60 | - | - | 3 | 1.12 | 5 | 1.87 | 7 | 2.62 | 15 |
| Total | 8 | 3.00 | 79 | 29.59 | 54 | 20.22 | 126 | 47.19 | 267 |

**Table V.4: Age wise distribution of BMI of the female population**

| Age Group | Underweight | | Normal Weight | | Overweight | | Obese | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | |
| <20 | 3 | 1.17 | 10 | 3.89 | 4 | 1.56 | 6 | 2.33 | 23 |
| 21-30 | 4 | 1.56 | 38 | 14.79 | 20 | 7.78 | 32 | 12.45 | 94 |
| 31-40 | - | - | 9 | 3.50 | 16 | 6.23 | 43 | 16.73 | 68 |
| 41-50 | - | - | 5 | 1.95 | 5 | 1.95 | 29 | 11.28 | 39 |
| 51-60 | 1 | 0.39 | 4 | 1.56 | 1 | 0.39 | 13 | 5.06 | 19 |
| >60 | - | - | 1 | 0.39 | 2 | 0.78 | 11 | 4.28 | 14 |
| Total | 8 | 3.11 | 67 | 26.07 | 48 | 18.68 | 134 | 52.14 | 257 |

Age wise distribution of the categories of BMI reveals that among the male categories highest number of them is in the age group of 41-50 (12.73%) in the obese category. While among the females (16.73%) highest numbers are seen in the age group of 31-40 in the obese category. From the above tables it can be interpret that among both the male and female participants maximum of them are obese, followed by normal weight and then occupied by overweight category. Very least numbers are found in the underweight category in both the population group.

**Table V.5: Distribution of height vertex of the male population with range variation (Martin, 1928)**

| Classes | Ranges | n | % |
|---|---|---|---|
| Pygmy | - 129.9 | - | - |
| Very Short | 130-149.9 | 6 | 2.25 |
| Short | 150-149.9 | 40 | 14.98 |
| Lower Medium | 160-163.9 | 54 | 20.22 |
| Medium | 164-166.9 | 58 | 21.72 |
| Upper Medium | 167-169.9 | 56 | 20.97 |
| Tall | 170-179.9 | 52 | 19.48 |
| Very Tall | 180-199.9 | 1 | 0.37 |
| Giant | 200+ | - | - |
| Total | | 267 | 100 |

The table represents the distribution of height vertex of the male population. Of the total 267 males highest numbers 58 (21.72%) are medium statured. Only 1(0.37%) is found in the range of very tall. Not much difference in number is noticed in the range from lower medium to tall.

**Table V.6: Distribution of height vertex of the female population with range variation (Martin, 1928)**

| Classes | Ranges | n | % |
|---|---|---|---|
| Pygmy | - 120.9 | - | - |
| Very Short | 130-139.9 | - | - |
| Short | 140-148.9 | 49 | 19.07 |
| Lower Medium | 149-152.9 | 66 | 25.68 |
| Medium | 153-155.9 | 59 | 22.96 |
| Upper Medium | 156-158.9 | 31 | 12.06 |
| Tall | 159-167.9 | 50 | 19.46 |
| Very Tall | 168.0-186.9 | 2 | 0.78 |
| Giant | 187.0 | - | - |
| Total | | 257 | 100 |

It is seen that the classification of height vertex of male and female have difference in ranges. The above table represents the distribution of height vertex of the female population. Of the total 257 females highest numbers of females are found in the category of lower medium i.e. 66 (25.68%) and only 2 (0.78%) are found in the range of very tall.

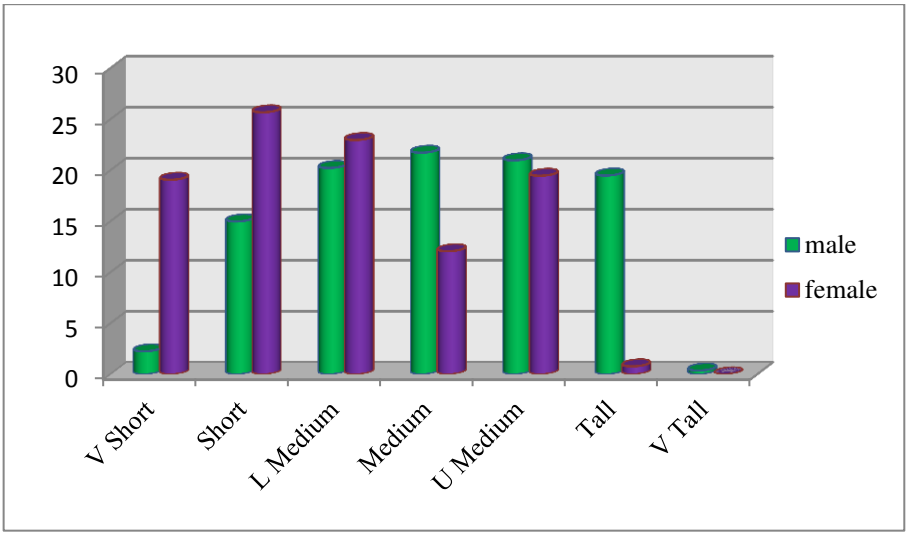



**Figure V.5 & 6: Bar diagram showing the BMI distribution among the participants**

**Table V.7: Distribution of central obesity by waist circumference for male and female**

| Categories | Male (n=267) | | Female (n=257) | | Total (n=524) | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Normal | 129 | 48.31 | 46 | 17.90 | 175 | 33.40 |
| Obese | 138 | 51.69 | 211 | 82.10 | 349 | 66.60 |
| Total | 267 | 100 | 257 | 100 | 524 | 100 |

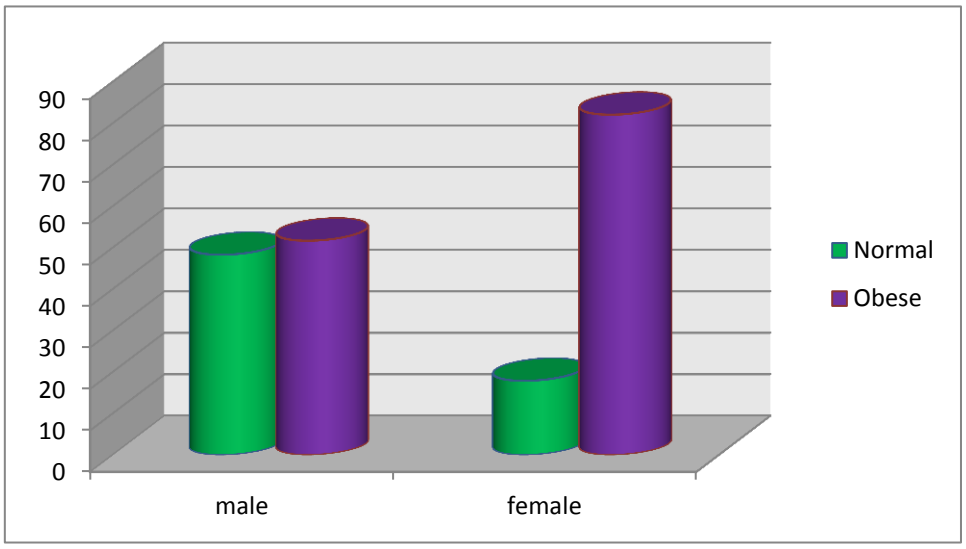



**Fig V.7: Bar diagram showing Central obesity by waist circumference for male and female**

The table shows the distribution of central obesity on the basis of waist circumference for both the population. It is observed that most of the male population is found in the obese category 138 (51.69%) followed by normal category 129 (48.31%). Among the male population not much variation is seen. But in case of female population vast difference is seen i.e. 211 (82.10%) in obese category while only 46

(17.90%) numbers of female are in normal category. The prevalence of central obesity in waist circumference is much higher in women (82.10%) than man (51.69%).

**Table V.8: Distribution of central obesity by WHR for male and female**

| Categories | Male (n=267) | | Female (n=257) | | Total (n=524) | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Normal | 34 | 12.73 | 10 | 3.89 | 44 | 8.40 |
| Obese | 233 | 87.27 | 247 | 96.11 | 480 | 91.60 |
| Total | 267 | 100 | 257 | 100 | 524 | 100 |

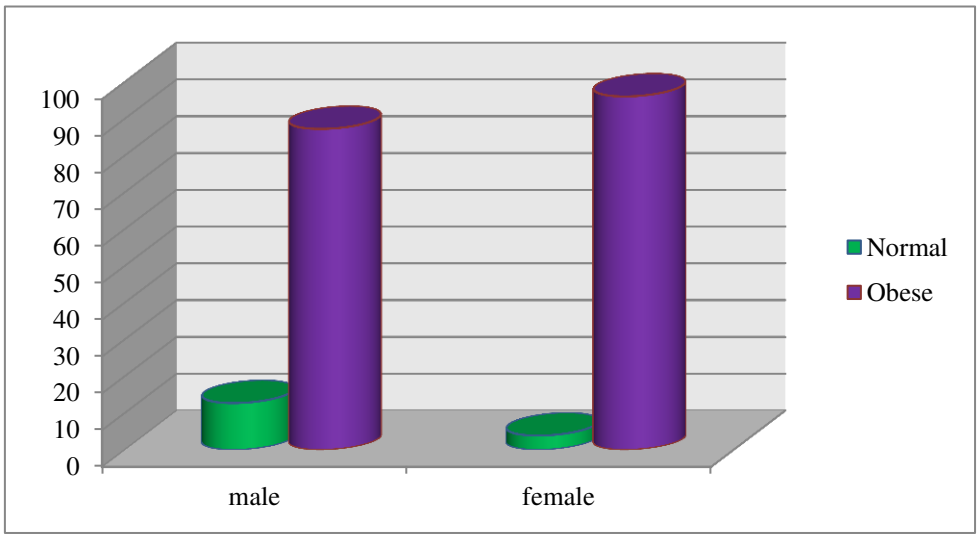



**Figure V.8: Bar diagram showing the central obesity by WHR for male and female**

The above table shows the distribution of central obesity by waist to hip ratio (WHR) for both the population. It is found that most of the male and the female population are found in the obese category 233 (87.27%) and 247 (96.11%)

respectively. The prevalence of central obesity in waist to hip ratio is much higher in women (96.11%) than man (87.27%).

**Table V.9: Age wise distribution of Waist to Hip ratio of both the population**

| Age Group | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | n | | WHR | n | | WHR |
| <20 | 38 | Mean | 0.95 | 23 | Mean | 0.92 |
| | | S.D | 0.08 | | S.D | 0.06 |
| 21-30 | 70 | Mean | 0.94 | 94 | Mean | 0.94 |
| | | S.D | 0.05 | | S.D | 0.06 |
| 31-40 | 53 | Mean | 0.96 | 68 | Mean | 0.98 |
| | | S.D | 0.06 | | S.D | 0.07 |
| 41-50 | 53 | Mean | 0.97 | 39 | Mean | 1.00 |
| | | S.D | 0.05 | | S.D | 0.05 |
| 51-60 | 38 | Mean | 1.01 | 19 | Mean | 1.00 |
| | | S.D | 0.06 | | S.D | 0.05 |
| >60 | 15 | Mean | 1.01 | 14 | Mean | 1.02 |
| | | S.D | 0.06 | | S.D | 0.04 |

The table V.9 reveals the age wise distribution of Waist to Hip ratio for both the male and female participants. Here it is observed that among both the population with the increase of age there is a gradual increase in WHR. Among the male participants highest mean WHR (1.01 cm) is found in two age groups of 51-60 and above 60 years

of age while in the female participants highest mean WHR (1.02 cm) is seen in the age group of above 60 years.

**Table V.10: Age wise distribution of Waist to Hip Ratio of both the population**

| Age Group | Male (267) | | | | Female (257) | | | |
|---|---|---|---|---|---|---|---|---|
| | Normal | | Obese | | Normal | | Obese | |
| | n | % | n | % | n | % | n | % |
| <20 | 11 | 4.12 | 27 | 10.11 | 1 | 0.39 | 22 | 8.56 |
| 21-30 | 11 | 4.12 | 59 | 22.10 | 7 | 2.72 | 87 | 33.85 |
| 31-40 | 6 | 2.25 | 47 | 17.60 | 2 | 0.78 | 66 | 25.68 |
| 41-50 | 5 | 1.87 | 48 | 17.98 | - | - | 39 | 15.18 |
| 51-60 | 1 | 0.37 | 37 | 13.86 | - | - | 19 | 7.39 |
| >60 | - | - | 15 | 5.62 | - | - | 14 | 5.45 |
| Total | 34 | 12.73 | 233 | 87.27 | 10 | 3.89 | 247 | 96.11 |

Highest numbers of both male and female participants are found in the age group of 21-30. Out of 70 males highest are in the obese category 59 (22.10%) followed by 11 (4.12%) in normal. While lowest number of male and female are in the age group of above 60 years where all 15 (5.62%) males and 14 (5.45%) females are in the obese category. Similarly in case of female participants there are 94 numbers, of which more number of females are found in the obese category 87 (33.85%) followed by only 7 (2.72%) in the normal category.

**Table V.11: Distribution of central obesity by waist-height ratio for male and female**

| Categories | Male (n=267) | | Female (n=257) | | Total (n=524) | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Normal | 37 | 13.86 | 26 | 10.12 | 63 | 12.02 |
| Obese | 230 | 86.14 | 231 | 89.88 | 461 | 87.98 |
| Total | 267 | 100 | 257 | 100 | 524 | 100 |

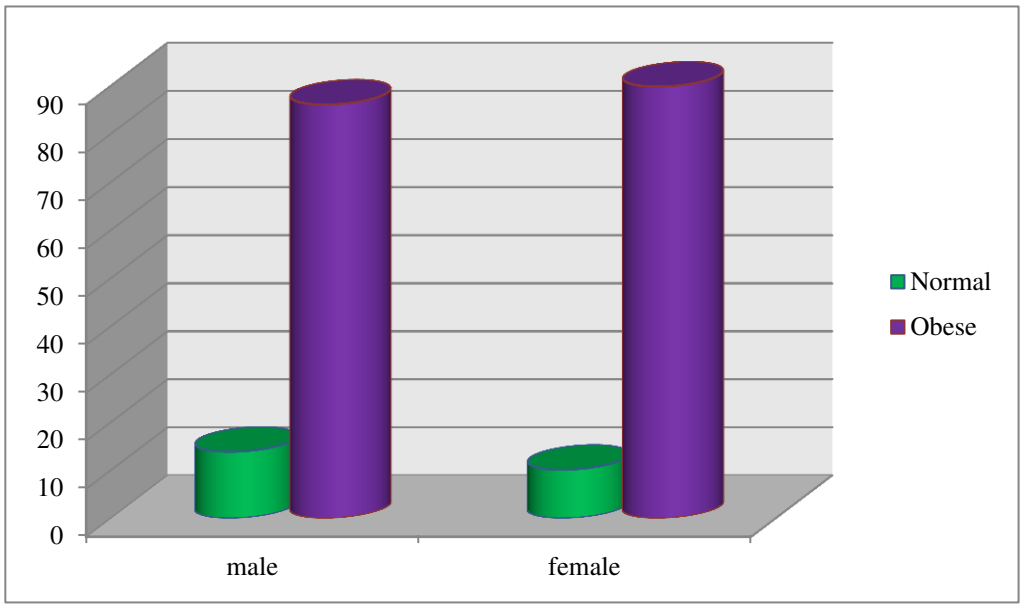



**Figure V.11: Bar diagram showing the central obesity by waist-height ratio for male and female**

The above table shows the distribution of central obesity by waist to height ratio (WHtR) for both the population. It is found that most of the male and the female population are found in the obese category 230 (86.14%) and 231 (89.88%). Here also it

is seen that the prevalence of central obesity in waist to height ratio is higher in women (89.88%than man (86.14%).

**Table V.12: Distribution of central obesity by conicity index for male and female**

| Categories | Male (n=267) | | Female (n=257) | | Total (n=524) | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| 1st Quartile | 8 | 3.00 | 22 | 8.56 | 30 | 5.73 |
| 2nd Quartile | 34 | 12.73 | 43 | 16.73 | 77 | 14.69 |
| 3rd Quartile | 45 | 16.85 | 37 | 14.40 | 82 | 15.65 |
| 4th Quartile | 180 | 67.42 | 155 | 60.31 | 335 | 63.93 |
| Total | 267 | 100 | 257 | 100 | 524 | 100 |

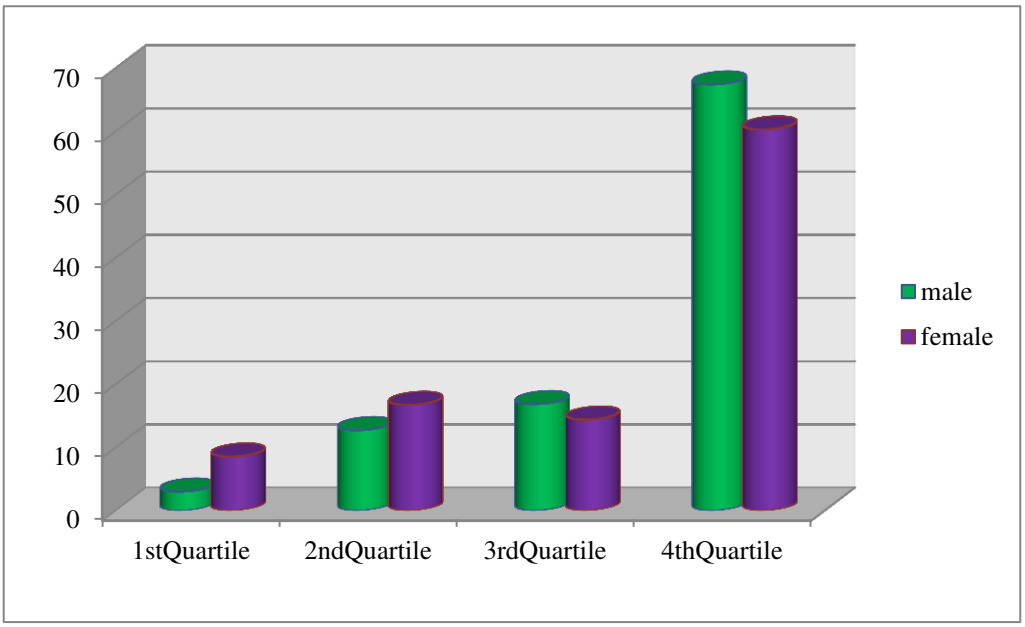



**Figure V.12: Bar diagram showing the central obesity by conicity index for male and female**

The above table shows the distribution of conicity index of both the male and female population. It is observed that majority of both the male and female population is found in the 4th quartile of the index (male 67.42% and female 60.31%). While least number of both males and females are observed in 1st quartile (male 3% and female 8.56%).

**Table V.13: Correlation of BMI and anthropometric variables**

| Variables | BMI of Male | BMI of Female |
|---|---|---|
| Weight | 0.9 | 0.919 |
| Height | 0.017 | 0.047 |
| Waist Circumference | 0.715 | 0.805 |
| Hip Circumference | 0.717 | 0.797 |
| WHR | 0.247 | 0.494 |
| WHtR | 0.725 | 0.811 |
| Conicity Index | -0.146 | 0.185 |

Here the table represents the correlation between BMI and other parameters like weight, height, waist circumference, hip circumference, WHR, WHtR and conicity index. It is seen that in the male population there is a positive and significant correlation between weight, height, waist circumference, hip circumference, WHR and WHtR but a negative and significant correlation was observed between BMI and conicity index. While in case of female population there seems to be a positive and significant correlation between BMI and all the variables.

## E. CORRELATION BETWEEN RESPIRATORY PARAMETERS AND ANTHROPOMETRIC CHARACTERISTIC:

In this section the findings on relationship between respiratory parameters and BMI is shown.

**Table VI: BMI distribution among the respiratory participants**

| Category | Male | % | Female | % | Total | % |
|---|---|---|---|---|---|---|
| Underweight | 36 | 15.06 | 46 | 21.40 | 82 | 18.06 |
| Normal Weight | 95 | 39.75 | 74 | 34.42 | 169 | 37.22 |
| Over Weight | 54 | 22.59 | 27 | 12.56 | 81 | 17.84 |
| Obese | 54 | 22.59 | 68 | 31.63 | 122 | 26.87 |
| Total | 239 | 100 | 215 | 100 | 454 | 100 |

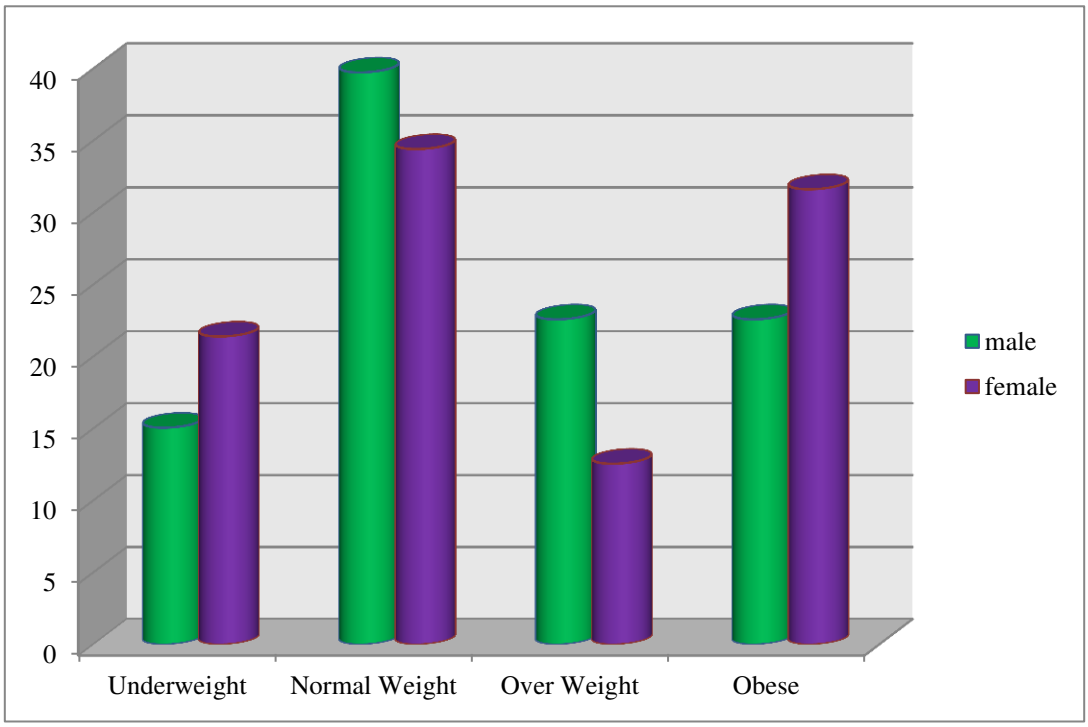



**Figure VI: Bar diagram showing the BMI distribution among the respiratory participants**

In the table of BMI distribution among the participants it is seen that highest number of participants are seen in the normal weight category, male 95(39.75%), female 74(34.42%) and total population 169 (37.22%). While least numbers are seen in the overweight category- male 54 (22.59%), female 27(12.56) and total population 81(17.84%).

**Table VI.1: Distribution of the values of FVC, FEV1 and FEV1/FVC of total participants in different BMI categories**

| BMI Category | n | Respiratory Parameters | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | BMI | | FVC | | FEV1 | | FVC/FEV1 | |
| | | Mean | S.D | Mean | S.D | Mean | S.D | Mean | S.D |
| Underweight | 82 | 16.56 | 1.55 | 2.56 | 0.37 | 2.51 | 0.40 | 98.16 | 4.78 |
| Normal Weight | 169 | 20.98 | 1.31 | 2.72 | 0.58 | 2.64 | 0.54 | 97.17 | 4.65 |
| Over Weight | 81 | 24.03 | 0.61 | 2.70 | 0.58 | 2.55 | 0.48 | 95.14 | 6.48 |
| Obese | 122 | 28.02 | 2.60 | 2.57 | 0.54 | 2.46 | 0.51 | 95.75 | 6.99 |

The above table shows the distribution of FVC, FEV1 and FEV1/FVC of total participants in different BMI categories. It is seen that in the underweight category mean value of BMI, FVC, FEV1 and FEV1/FVC are 16.56, 2.56, 2.51 and 98.16 respectively. In the normal weight category meanvalue of BMI, FVC,FEV1 and

FEV1/FVC are 20.98, 2.72, 2.64 and 97.17 respectively. In the overweight category mean value of BMI, FVC, FEV1 and FEV1/FVC are 24.03, 2.70, 2.55 and 95.14respectively. In the obese category mean value of BMI, FVC, FEV1 and FEV1/FVC are 28.02, 2.57, 2.46 and 95.75 respectively.

**Table VI.2: Distribution of the values of FVC, FEV1 and FEV1/FVC of male participants in different BMI categories**

| BMI Category | n | Respiratory Parameters | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | BMI | | FVC | | FEV1 | | FVC/FEV1 | |
| | | Mean | S.D | Mean | S.D | Mean | S.D | Mean | S.D |
| Underweight | 36 | 16.08 | 1.83 | 2.73 | 0.36 | 2.68 | 0.41 | 97.97 | 6.10 |
| Normal Weight | 95 | 20.98 | 1.34 | 2.95 | 0.60 | 2.86 | 0.55 | 96.97 | 4.88 |
| Over Weight | 54 | 24.07 | 0.62 | 2.79 | 0.67 | 2.65 | 0.54 | 95.70 | 5.67 |
| Obese | 54 | 28.13 | 2.43 | 2.77 | 0.65 | 2.68 | 0.56 | 97.01 | 4.85 |

The above table shows the distribution of FVC, FEV1 and FEV1/FVC of male participants in different BMI categories. It is seen that in the underweight category mean value of BMI, FVC, FEV1 and FEV1/FVC are 16.08, 2.73, 2.68 and 97.97respectively. In the normal weight category mean value of BMI, FVC, FEV1 and FEV1/FVC are 20.98, 2.95, 2.86 and 96.97 respectively. In the overweight category

mean and S.D value of BMI, FVC, FEV1 and FEV1/FVC are 24.07, 2.79, 2.65 and 95.70 respectively. In the obese category mean value of BMI, FVC, FEV1 and FEV1/FVC are 28.13, 2.77, 2.68 and 97.01 respectively.

**Table VI.3: Distribution of the values of FVC, FEV1 and FEV1/FVC of female participants in different BMI categories**

| BMI category | n | Respiratory Parameters | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | BMI | | FVC | | FEV1 | | FVC/FEV1 | |
| | | Mean | S.D | Mean | S.D | Mean | S.D | Mean | S.D |
| Underweight | 46 | 16.93 | 1.18 | 2.42 | 0.33 | 2.38 | 0.34 | 98.32 | 3.48 |
| Normal Weight | 74 | 20.97 | 1.29 | 2.43 | 0.38 | 2.36 | 0.37 | 97.42 | 4.34 |
| Over Weight | 27 | 23.94 | 0.58 | 2.52 | 0.28 | 2.36 | 0.26 | 94.03 | 7.85 |
| Obese | 68 | 27.94 | 2.74 | 2.40 | 0.37 | 2.28 | 0.29 | 94.75 | 8.21 |

The table VI.3 shows the distribution of FVC, FEV1 and FEV1/FVC of female participants in different BMI categories. It is seen that in the underweight category mean value of BMI, FVC, FEV1 and FEV1/FVC are 16.93, 2.42, 2.38 and 98.32 respectively. In the normal weight category mean value of BMI, FVC, FEV1 and FEV1/FVC are 20.97, 2.43, 2.36 and 97.42 respectively. In the overweight category mean value of BMI, FVC, FEV1 and FEV1/FVC are 23.94, 2.52, 2.36 and 94.03

respectively. In the obese category mean value of BMI, FVC, FEV1 and FEV1/FVC are 27.94, 2.40, 2.28 and 94.75 respectively.

**Table VI.4: BMI wise classification of FEV1/FVC of total population**

| | Normal | | Mildly abnormal | | Moderately Abnormal | | Moderate to Severely Abnormal | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| Category | n | % | n | % | n | % | n | % | n | % |
| Underweight | 81 | 17.84 | - | - | 1 | 0.22 | - | - | 82 | 18.06 |
| Normal Weight | 169 | 37.22 | - | - | - | - | - | - | 169 | 37.22 |
| Over Weight | 78 | 17.18 | 3 | 0.66 | - | - | - | - | 81 | 17.84 |
| Obese | 119 | 26.21 | 1 | 0.22 | 1 | 0.22 | 1 | 0.22 | 122 | 26.87 |
| Total | 447 | 98.46 | 4 | 0.88 | 2 | 0.44 | 1 | 0.22 | 454 | 100 |

The table represents the BMI wise classification of FEV1/FVC of total population. In the underweight category there are total 82 participants of which highest number of them are found in the normal range 81(17.84%) and 1 (0.22%) is in the moderately abnormal range. Highest number of individuals is seen in the normal weight category 169 (37.22%) of which all the individual belongs to the normal range. Followed by 122 participants in the obese category of which 119 (26.21%) are in normal range and 1 (0.22%) each in mildly abnormal, moderately abnormal and

moderate to severely abnormal category. Least participants are found in the overweight category of a total of 81 of which 78 (17.18%) are in the normal range and 3 (66%) in mildly abnormal range.

**Table VI.5: BMI wise classification of FEV1/FVC of male population**

| | Normal | | Moderately Abnormal | | Total | |
|---|---|---|---|---|---|---|
| Category | n | % | n | % | n | % |
| Underweight | 35 | 14.64 | 1 | 0.42 | 36 | 15.06 |
| Normal Weight | 95 | 39.75 | - | - | 95 | 39.75 |
| Over Weight | 54 | 22.59 | - | - | 54 | 22.59 |
| Obese | 54 | 22.59 | - | - | 54 | 22.59 |
| Total | 238 | 99.58 | 1 | 0.42 | 239 | 100 |

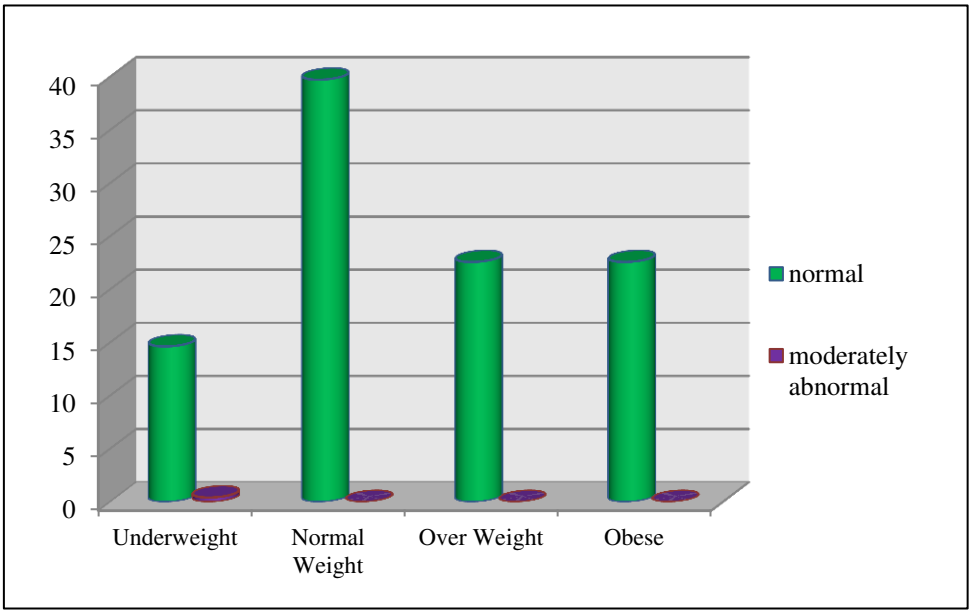



**Figure VI.5: Bar diagram showing the BMI of male in relation to FEV1/FVC**

The above table represents the BMI wise classification of FEV1/FVC of the male population. In the underweight category there are total 36 participants of which highest number of them are found in the normal range 35 (14.64%) and 1 (0.42%) is in the moderately abnormal range group. It is seen that in the normal weight, overweight and obese total participants are found in the normal range of FEV1/FVC i.e. 95 (39.75%), 54 (22.59%) and 54 (22.59%) respectively.

**Table VI.6: BMI wise classification of FEV1/FVC of female population**

| | Normal | | Mildly abnormal | | Moderately Abnormal | | Moderate to Severely Abnormal | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| Category | n | % | n | % | n | % | n | % | n | % |
| Underweight | 46 | 21.40 | - | - | - | - | - | - | 46 | 21.4 |
| Normal Weight | 74 | 34.42 | - | - | - | - | - | - | 74 | 34.42 |
| Over Weight | 24 | 11.16 | 3 | 1.40 | - | - | - | - | 27 | 12.56 |
| Obese | 65 | 30.23 | 1 | 0.47 | 1 | 0.47 | 1 | 0.47 | 68 | 31.63 |
| Total | 209 | 97.21 | 4 | 1.86 | 1 | 0.47 | 1 | 0.47 | 215 | 100 |

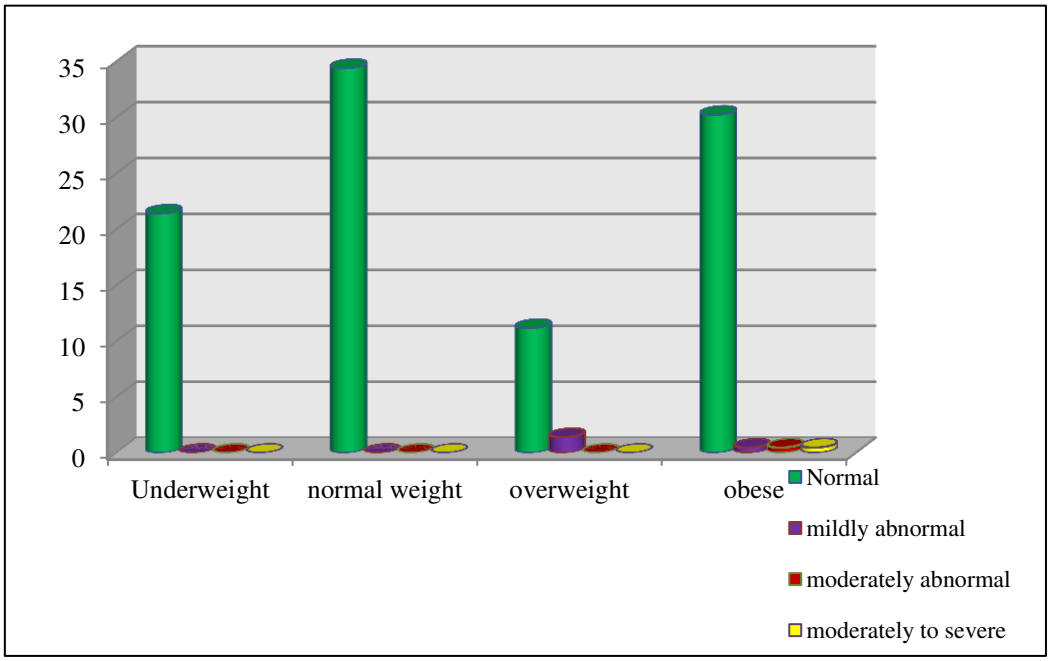



**Figure VI.6: Bar diagram showing the BMI of female in relation to FEV1/FVC**

The above table represents the BMI wise classification of FEV1/FVC of total female population. In the underweight and normal category 46(21.40%) and 74 (34.42%) participants respectively are found in the normal range. Followed by 68 participants in the obese category of which 65 (30.23%) are in normal range, 1 (0.47%) in mildly abnormal, moderately abnormal as well as in moderate to severely abnormal category. Least participants are found in the overweight category of a total of 27 of which 24 (11.16%) are in the normal range and 3 (1.40%) in mildly abnormal range.

**Table VI.7: Correlation between BMI classification and respiratory parameters of the population**

| BMI | FVC (r value) | FEV1 (r value) | FEV1/FVC (r value) |
|---|---|---|---|
| Male | 0.05 | -0.0762 | -0.0224 |
| Female | -0.044 | -0.044 | 0.109 |

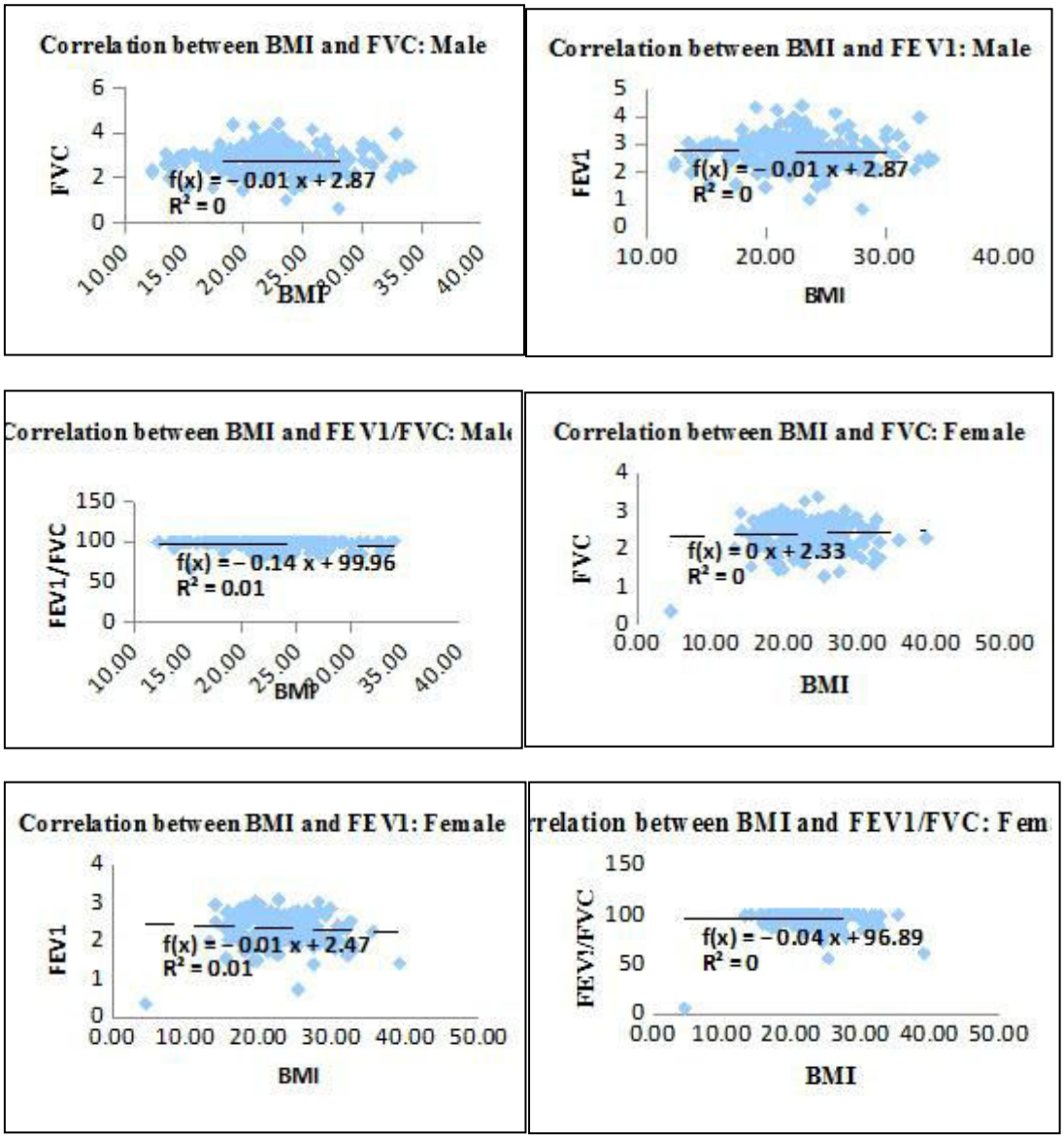



**Figure VI.7: Scatterplots showing the relationship between BMI and respiratory parameters of the population**

The figures depicts that a negative and significant correlation exist between BMI and the rest of the respiratory parameters among the female population group. While among the males a positive and significant correlation exists in between BMI and FVC whereas a negative and significant correlation exists between BMI and rest of the two parameters.

**Table VI.8: Correlation between height and weight with BMI of both the population**

| Variables | BMI of Male (r value) | BMI Female (r value) |
|---|---|---|
| Height | -0.071 | -0.273 |
| Weight | 0.894 | 0.931 |

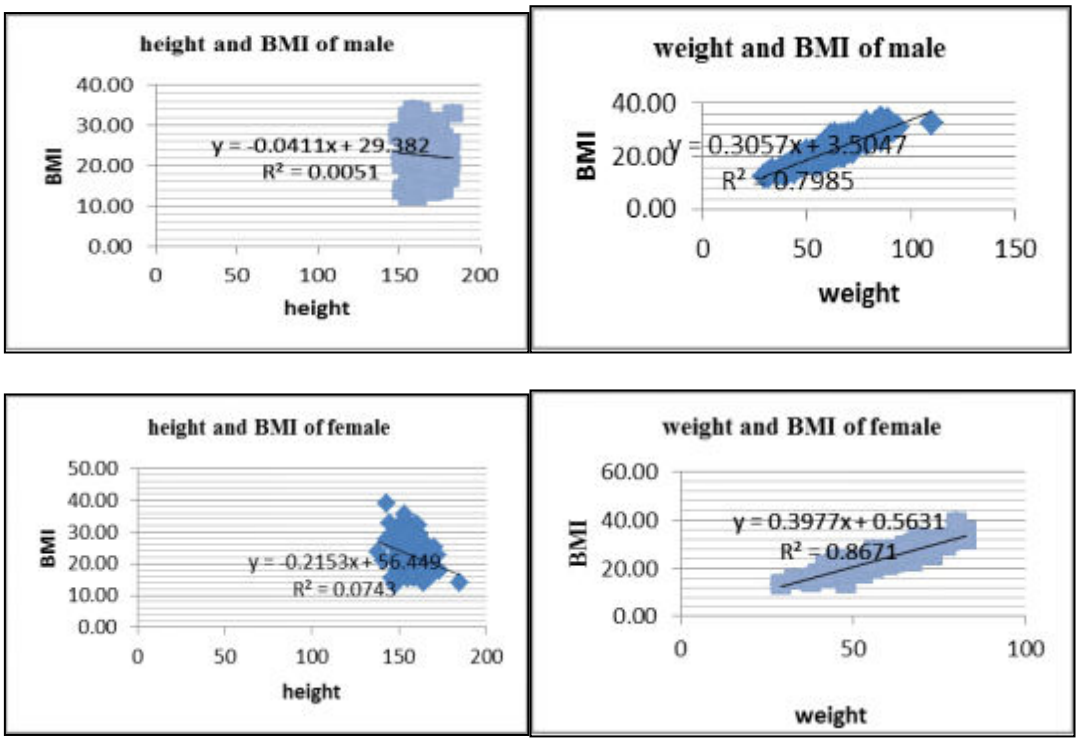



**Figure VI.8: Scatterplots showing the relationship between height and weight with BMI of both the population**

It is seen that there is a positive and significant correlation between weight and BMI of both male and female population while a negative correlation is seen in between the height and BMI of the group.

**Table VI.9: Correlation between height and weight with FVC, FEV1 and FEV1/FVC of both the population**

| Variables | Male | | Female | |
|---|---|---|---|---|
| | Height | Weight | Height | Weight |
| FVC | 0.2328 | 0.1166 | 0.2328 | 0.0283 |
| FEV1 | 0.2309 | 0.0686 | 0.2711 | -0.0812 |
| FEV1/FVC | -0.0447 | -0.133 | 0.1308 | -0.2492 |

Here in this table it is observed a positive correlation exist between height and weight with FVC and FEV1 among the male population. While a negative correlation exists between height and weight with FEV1/FVC in the same sex. Whereas in the female population there exist a positive correlation between height with FVC, FEV1 and FEV1/FVC and weight with FVC. But a negative correlation is seen in between weight and FEV1 and FEV1/FVC.

**TableVI.10: Age dependence of various parameters of both male and female**

| Parameters | Variables | |
|---|---|---|
| | Male | Female |
| Weight (kg) | 0.3643 | 0.6002 |
| Height (cm) | 0.0447 | -0.0860 |
| BMI (kg/m²) | 0.4314 | 0.6090 |
| FVC | -0.3691 | -0.0601 |
| FEV1 | -0.3277 | -0.0608 |
| FEV1/FVC | 0.2385 | -0.1418 |

The above table shows the correlation between age and other parameters like weight, height, BMI, FVC, FEV1 and FVC/FEV1. It is seen that in the male population there is a positive and significant correlation between weight, height, BMI and FEV1/FVC but a negative and significant correlation was observed between age and FVC and FEV1/FVC. While in case of female population there seems to be a positive and significant correlation between age, weight and BMI but a negative and significant correlation is observed between age and height, age and FVC, FEV1 and age and FEV1/FVC.

**F. CORRELATION BETWEEN BLOOD PRESSURE AND NUTRITIONAL PARAMETERS:**

Here in this section, the findings on relationship between blood pressure and nutritional studies have been made. Studies say that there is close relationship between blood pressure and nutritional status. The relationship between these two parameters is assessed through the help of the BMI, WC, WHR, WHtR and conicity index.

**Table VII: Systolic and diastolic blood pressure of the female participants in different BMI categories**

| BMI Category | Blood Pressure (mmHg) | | | | |
|---|---|---|---|---|---|
| | | S.B.P | | D.B.P | |
| | n | Mean | S.D | Mean | S.D |
| Underweight | 8 | 123.20 | 9.08 | 82.26 | 6.68 |
| Normal Weight | 67 | 120.84 | 7.55 | 81.61 | 7.49 |
| Over Weight | 48 | 121.67 | 7.84 | 81.46 | 6.75 |
| Obese | 134 | 126.99 | 10.55 | 84.36 | 7.45 |
| Total | 257 | 123.18 | 8.76 | 82.42 | 7.09 |

Minimum mean S.B.P were found in the normal weight category (120.84±7.55mmHg) and the maximum mean S.B.P were found among the obese (126.99±10.55mmHg) category. While minimum mean D.B.P were found in the overweight category (81.46±6.75mmHg) and the maximum mean D.B.P were found among the obese (84.36±7.45mmHg) category.

**Table VII.1: Systolic and diastolic blood pressure of the male participants in different BMI categories**

| BMI Category | Blood Pressure (mmHg) | | | | |
|---|---|---|---|---|---|
| | | S.B.P | | D.B.P | |
| | n | Mean | S.D | Mean | S.D |
| Underweight | 8 | 127.92 | 9.44 | 84.50 | 6.36 |
| Normal Weight | 79 | 124.81 | 8.65 | 82.58 | 6.43 |
| Over Weight | 54 | 128.89 | 7.90 | 85.19 | 5.89 |
| Obese | 126 | 131.86 | 10.36 | 86.94 | 6.84 |
| Total | 267 | 128.37 | 9.09 | 84.80 | 6.38 |

Minimum mean S.B.P were found in the normal weight category (124.81±8.65mmHg) and the maximum mean S.B.P were found among the obese (131.86±10.36mmHg) category. While minimum mean D.B.P were found in the normal weight category (82.58±6.43mmHg) and the maximum mean D.B.P were found among the obese (86.94±6.84mmHg) category.

**Table VII.2: Comparison of BMI with different stages of blood pressure of the total participants**

| BMI Category | Normal | | Prehypertension | | Stage I Hypertension | | Stage II Hypertension | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| Underweight | 3 | 0.57 | 12 | 2.29 | 1 | 0.19 | - | - | 16 | 3.05 |
| Normal Weight | 16 | 3.05 | 110 | 20.99 | 18 | 3.44 | 2 | 0.38 | 146 | 27.86 |
| Over Weight | 8 | 1.53 | 74 | 14.12 | 18 | 3.44 | 2 | 0.38 | 102 | 19.47 |
| Obese | 20 | 3.82 | 139 | 26.53 | 88 | 16.79 | 13 | 2.48 | 260 | 49.62 |
| Total | 47 | 8.97 | 335 | 63.93 | 125 | 23.85 | 17 | 3.24 | 524 | 100 |

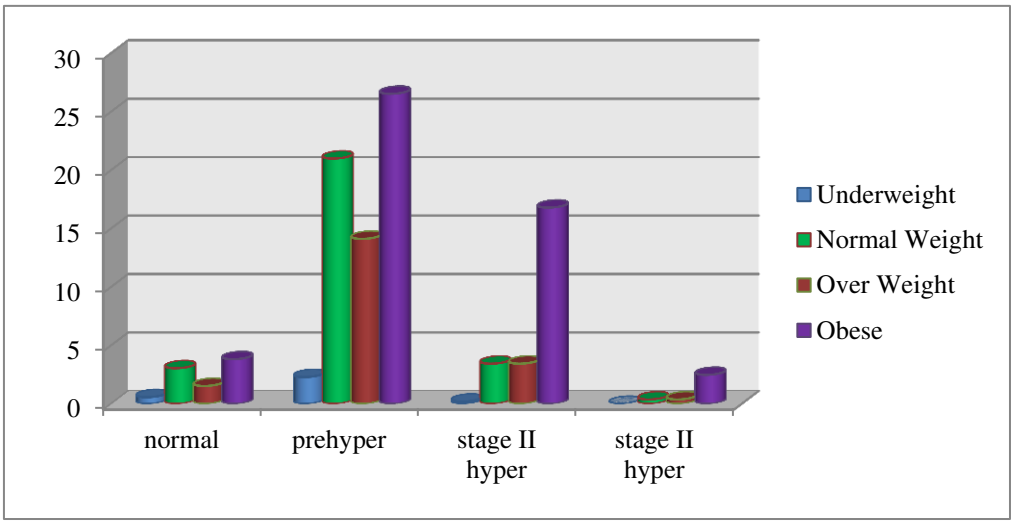



**Figure VII.2: Bar diagram showing the comparison of BMI with different stages of blood pressure of the total participants**

The table represents the comparison of BMI with different stages of blood pressure of the total participants. Out of the total participants (524), 260 are found in the obese category bearing the highest prehypertension level of 26.53%. Only 16

individuals are seen in the underweight category. It is observe from the above table that prehypertension level is most common among the total population while there is less occurrence of stage II hypertension among them.

**Table VII.3: Comparison of BMI with different stages of blood pressure of the male participants**

| BMI | Normal | | Prehypertension | | Stage I Hypertension | | Stage II Hypertension | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | n | % | n | % |
| Underweight | 2 | 0.75 | 5 | 1.87 | 1 | 0.37 | - | - | 8 | 3 |
| Normal Weight | 6 | 2.25 | 61 | 22.85 | 11 | 4.12 | 1 | 0.37 | 79 | 29.59 |
| Over Weight | 1 | 0.37 | 38 | 14.23 | 14 | 5.24 | 1 | 0.37 | 54 | 20.22 |
| Obese | 7 | 2.62 | 63 | 23.60 | 48 | 17.98 | 8 | 3.00 | 126 | 47.19 |
| Total | 16 | 5.99 | 167 | 62.55 | 74 | 27.72 | 10 | 3.75 | 267 | 100 |

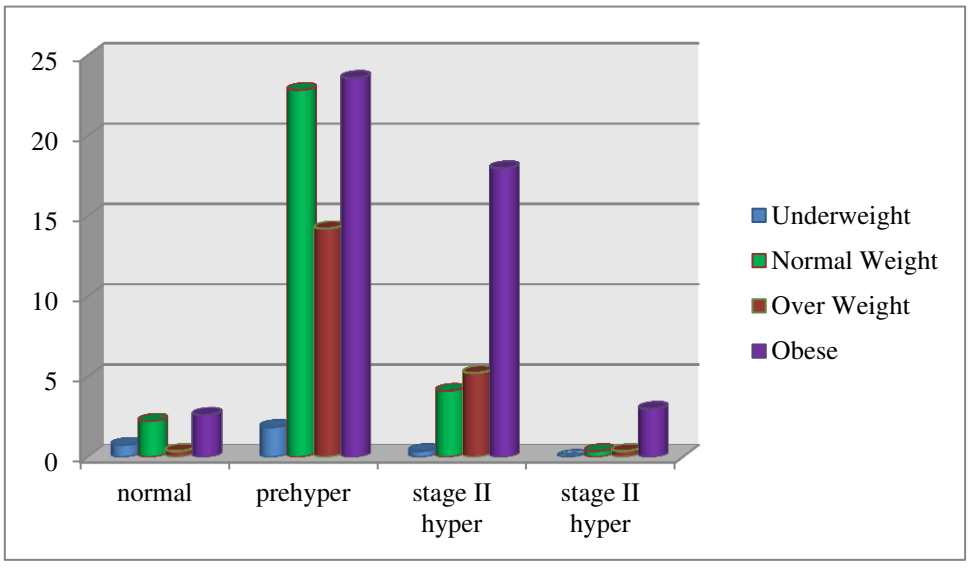



**Figure VII.3: Bar diagram showing the comparison of BMI with different stages of blood pressure of the male participants**

The table compares the distribution of BMI in various ranges of blood pressure level of the male participants. It is seen that highest numbers of male are in the obese category 126, out of which 63 (23.60%) individuals belongs to the prehypertension group followed by 48(17.98%) in stage I hypertension , 8(3.00%) in stage II hypertension and remaining 7(2.62%) in normal category And the lowest participants in the underweight category i.e 8 where 5(1.87%) individual occur in prehypertension, 2 (0.75%) in normal range and 1 (0.37%) in stage I hypertension.

**Table VII.4: Comparison of BMI with different stages of blood pressure of the female participants**

| BMI | Normal | | Prehypertension | | Stage I Hypertension | | Stage II Hypertension | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | n | % | n | % |
| Underweight | 1 | 0.39 | 7 | 2.72 | - | - | - | - | 8 | 3.11 |
| Normal Weight | 10 | 3.89 | 49 | 19.07 | 7 | 2.72 | 1 | 0.39 | 67 | 26.07 |
| Over Weight | 7 | 2.72 | 36 | 14.01 | 4 | 1.56 | 1 | 0.39 | 48 | 28.68 |
| Obese | 13 | 5.06 | 76 | 29.57 | 40 | 15.56 | 5 | 1.95 | 134 | 52.14 |
| Total | 31 | 12.06 | 168 | 65.37 | 51 | 19.84 | 7 | 2.72 | 257 | 100 |

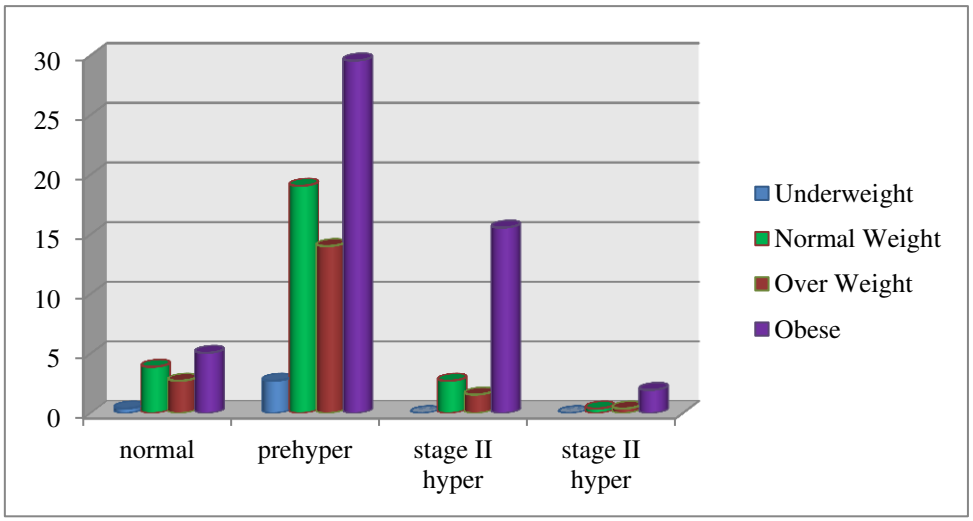



**Figure VII.4: Bar diagrams showing the comparison of BMI with different stages of blood pressure of the female participants**

The table compares the distribution of BMI in various ranges of blood pressure level. It is seen that highest numbers of female are in the obese category 134 (52.14%), out of which 76(29.57%) individuals belongs to the prehypertension group followed by 40 (15.56%) in stage I hypertension, 13 (5.06%) in normal range and remaining 5(1.95%) in stage II hypertension. And the lowest participants in the underweight category i.e. 8 where 7(2.72%) individual occur in prehypertension and only 1 (0.39%) in normal range.

**Table VII.5: Correlation between BMI Classification and blood pressure parameters of the population**

| BMI | S.B.P (r value) | D.B.P (r value) |
|---|---|---|
| Male | 0.327 | 0.2435 |
| Female | 0.3903 | 0.3363 |

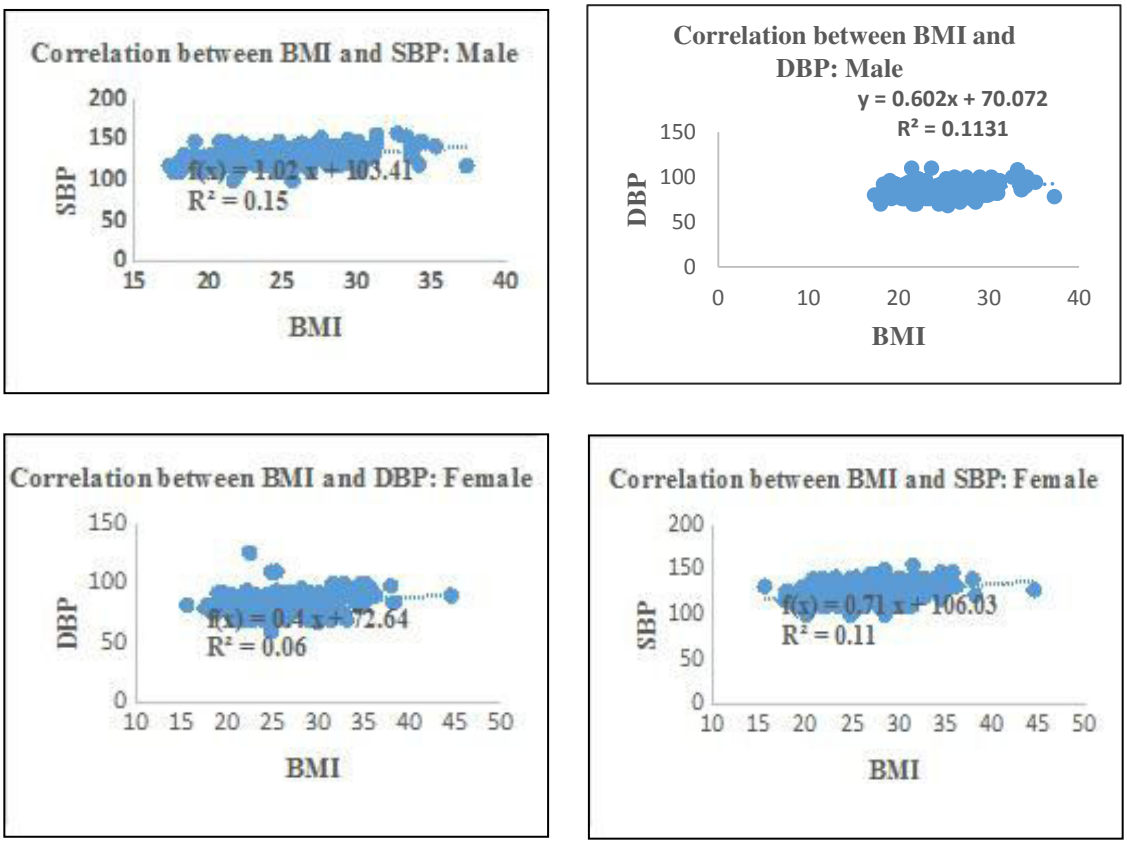



**Figure VII.5: Scatterplots showing the relationship between BMI with S.B.P and D.B.P of the population**

The association between BMI and blood pressure (both S.B.P and D.B.P) parameters suggest that a positive and significant correlation exist in between the two parameters in both the population group.

**Table VII.6: Distribution of blood pressure according to the ranges of Waist Circumference of the population**

| Category | Normal | | | | Obese | | | | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|
| | Male (267) | | Female (257) | | Male (267) | | Female (257) | | | |
| | Male | % | Female | % | Male | % | Female | % | | |
| Normal | 11 | 4.12 | 8 | 3.11 | 5 | 1.87 | 23 | 8.95 | 47 | 8.97 |
| Prehypertension | 89 | 33.33 | 35 | 13.62 | 78 | 29.21 | 133 | 51.75 | 335 | 63.93 |
| Stage I Hypertension | 28 | 10.49 | 3 | 1.17 | 46 | 17.23 | 48 | 18.68 | 125 | 23.85 |
| Stage II Hypertension | 1 | 0.37 | | 0.00 | 9 | 3.37 | 7 | 2.72 | 17 | 3.24 |
| Total | 129 | 48.31 | 46 | 17.90 | 138 | 51.69 | 211 | 82.10 | 524 | 100 |

Here in this table it shows the distribution of the categories of blood pressure according to the ranges of waist circumference of both the population. It is observed in the normal waist circumference that most of the male are present in prehypertension stage 89 (33.33%) and only 1 (0.37%) is found in the stage II hypertension. While of the total 46 numbers of females 35 (13.62%) numbers are found in prehypertension stage. Similarly in the obese category 78 (29.21%) numbers of male and 133 (51.75%) numbers of female are observed in prehypertension stage. While least numbers of male 9 (3.37%) and females 7 (2.72%) are found in the stage II hypertension.

**Table VII.7: Correlation between waist circumference with systolic and diastolic blood pressure**

| W.C | S.B.P (r value) | D.B.P (r value) |
|---|---|---|
| Male | 0.4089 | 0.2768 |
| Female | 0.2651 | 0.2452 |

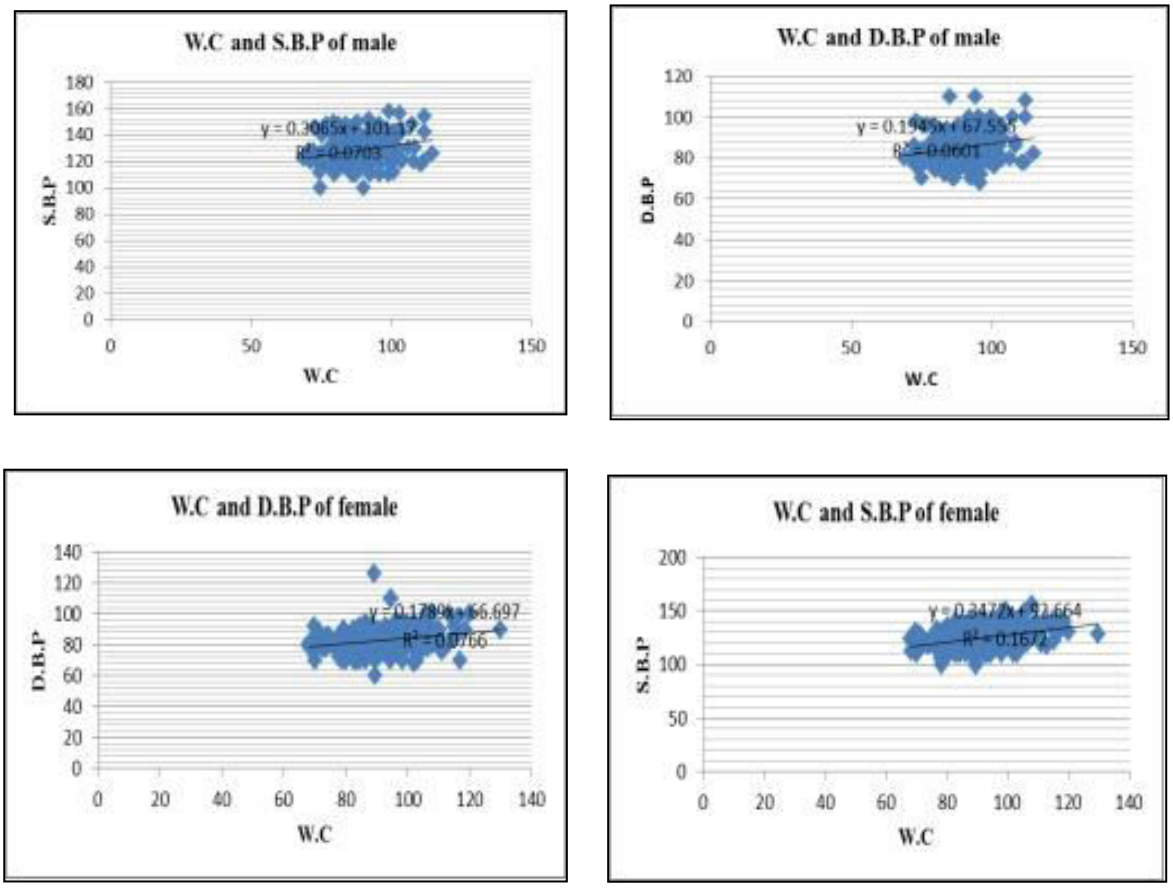



**Figure VII.7: Scatterplots plots showing the correlation between W.C with S.B.P and DBP of the population**

The above figures show that there is a positive and significant correlation between waist circumference with systolic and diastolic blood pressure for both the male and female population.

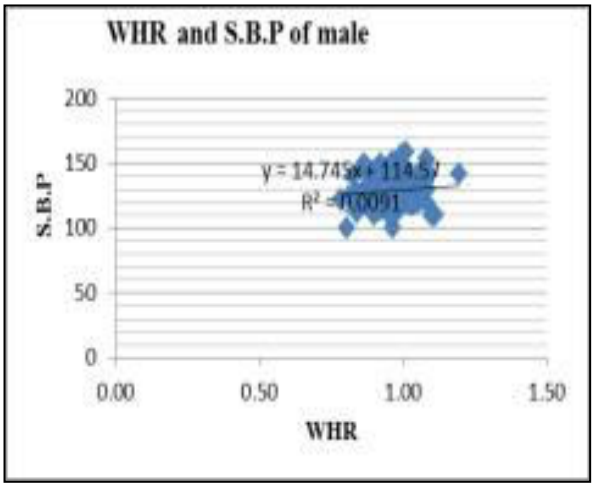
**Table VII.8: Distribution of blood pressure according to the ranges of WHR of the population**

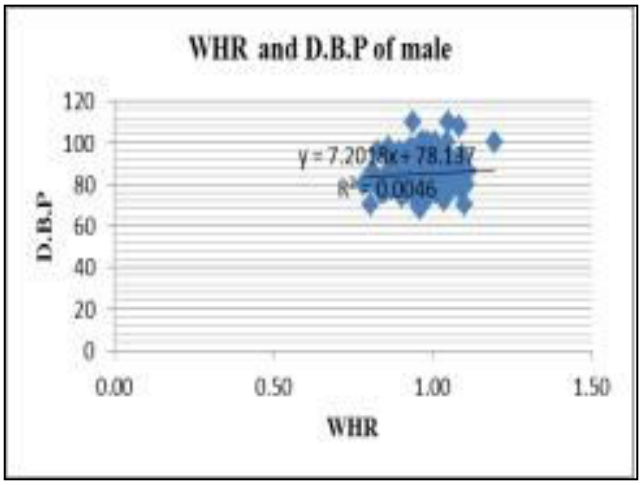
| | Normal | | | | Obese | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Category | Male (267) | | Female (257) | | Male (267) | | Female (257) | | Total | % |
| | Male | % | Female | % | Male | % | Female | % | | |
| Normal | 3 | 1.12 | 3 | 1.17 | 13 | 4.87 | 28 | 10.89 | 47 | 8.97 |
| Prehypertension | 21 | 7.87 | 6 | 2.33 | 146 | 54.68 | 162 | 63.04 | 335 | 63.93 |
| Stage I Hypertension | 10 | 3.75 | 1 | 0.39 | 64 | 23.97 | 50 | 19.46 | 125 | 23.85 |
| Stage II Hypertension | - | - | - | - | 10 | 3.75 | 7 | 2.72 | 17 | 3.24 |
| Total | 34 | 12.73 | 10 | 3.89 | 233 | 87.27 | 247 | 96.11 | 524 | 100 |

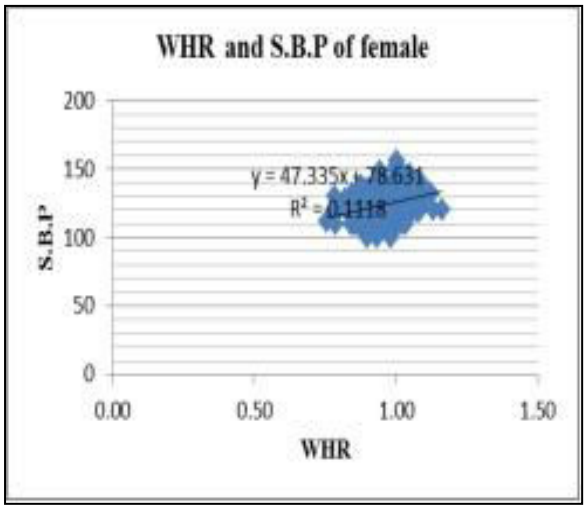
Here the table shows the distribution of the categories of blood pressure according to the ranges of waist to hip ratio (WHR) for both the population. It is observed that in the normal WHR most of the male are present in prehypertension stage 21 (7.87%). While among the females 6 (2.33%) numbers are found in prehypertension stage. No individuals are found in the stage II hypertension. Similarly in the obese category 146 (54.68%) numbers of male and 162 (63.04%) numbers of female are observed in prehypertension stage. While least numbers of male i.e 10 (3.75%) and females 7 (2.72%) are found in the stage II hypertension.

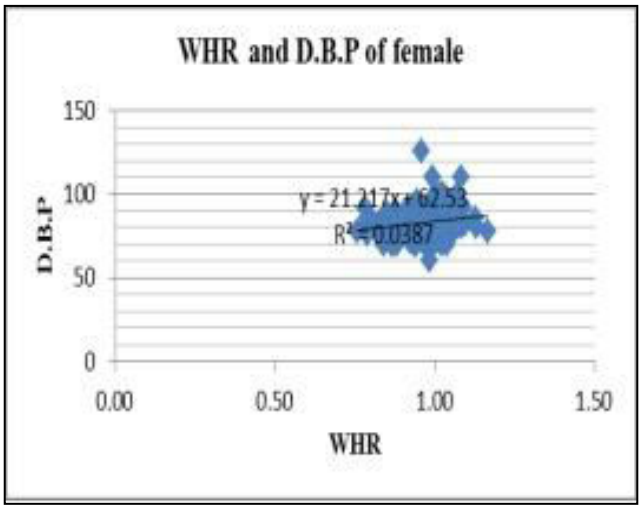
**Table VII.9: Correlation between WHR with systolic and diastolic blood pressure**

| WHR | SBP | DBP |
|---|---|---|
| Male | 0.095 | 0.068 |
| Female | 0.334 | 0.197 |




**Figures VII.9: Scatterplots showing the relationship between WHR with S.B.P and DBP of the population**

The above figures show that there is a positive and significant correlation between waist to hip ratio with systolic and diastolic blood pressure for both the male and female population.

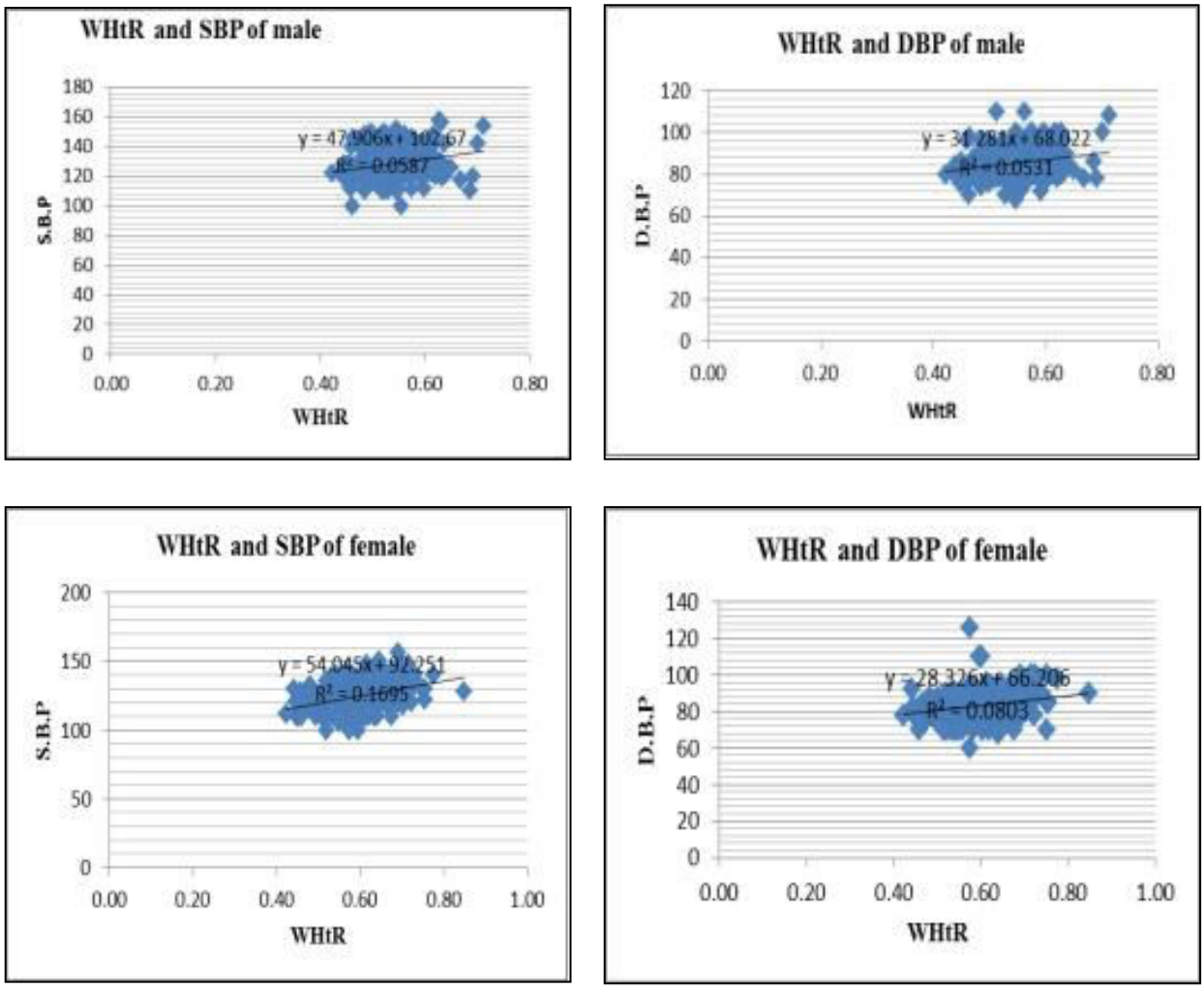
**Table VII.10: Distribution of blood pressure according to the ranges of WHtR of the population**

| Category | Normal | | | | Obese | | | | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|
| | Male (267) | | Female (257) | | Male (267) | | Female (257) | | | |
| | Male | % | Female | % | Male | % | Female | % | | |
| Normal | 4 | 1.50 | 4 | 1.56 | 12 | 4.49 | 27 | 10.51 | 47 | 8.97 |
| Prehypertension | 24 | 8.99 | 21 | 8.17 | 143 | 53.56 | 147 | 57.20 | 335 | 63.93 |
| Stage I Hypertension | 9 | 3.37 | 1 | 0.39 | 65 | 24.34 | 50 | 19.46 | 125 | 23.85 |
| Stage II Hypertension | - | - | - | - | 10 | 3.75 | 7 | 2.72 | 17 | 3.24 |
| Total | 37 | 13.86 | 26 | 10.12 | 230 | 86.14 | 231 | 89.88 | 524 | 100 |

The table shows the distribution of the categories of blood pressure according to the ranges of waist to height ratio (WHtR) for both the population. It is seen that in the normal WHtR most of the male are present in prehypertension 24 (8.99%). While among the females 21 (8.17%) numbers are found in prehypertension stage. No individuals are found in the stage II hypertension. Similarly in the obese category 143 (53.56%) numbers of male and 147 (57.20%) numbers of female are observed in prehypertension stage. While least numbers of male i.e. 10 (3.75%) and females 7 (2.72%) are found in the stage II hypertension.

**Table VII.11: Correlation between waist to height ratio and systolic and diastolic blood pressure**

| BMI | S.B.P (r value) | D.B.P (r value) |
|---|---|---|
| Male | 0.412 | 0.283 |
| Female | 0.242 | 0.23 |




**Figures VII.11: Scatterplots showing the relationship between WHtR with S.B.P and DBP of the population**

The above figures show that there is a positive and significant correlation between waist to height ratio with systolic and diastolic blood pressure for both the male and female population.

**Table VII.12: Distribution of blood pressure according to the ranges of conicity index of the male population**

| Category | 1st Quartile | | 2nd Quartile | | 3rd Quartile | | 4th Quartile | | Total (5) |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | |
| Normal | - | - | 6 | 2.25 | 1 | 0.37 | 9 | 3.37 | 16 (5.99) |
| Prehypertension | 4 | 1.50 | 16 | 5.99 | 35 | 13.11 | 112 | 41.95 | 167 (62.55) |
| Stage I Hypertension | 4 | 1.50 | 12 | 4.49 | 7 | 2.62 | 51 | 19.10 | 74 (27.72) |
| Stage II Hypertension | - | - | - | - | 2 | 0.75 | 8 | 3.00 | 10 (3.75) |
| Total | 8 | 3.00 | 34 | 12.73 | 45 | 16.85 | 180 | 67.42 | 267 (100) |

**Table VII.13: Distribution of blood pressure according to the ranges of conicity index of the female population**

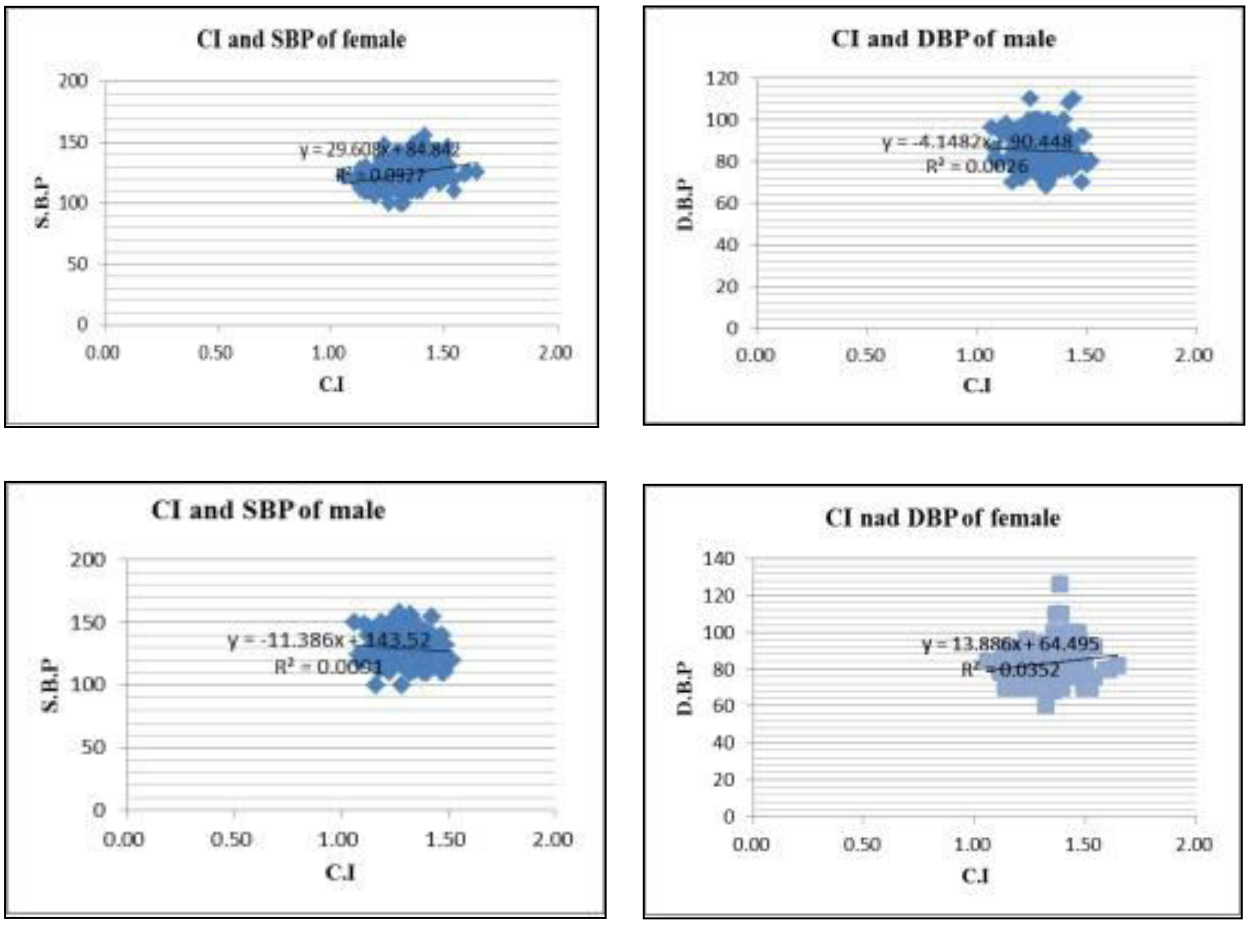
| Category | 1st Quartile | | 2nd Quartile | | 3rd Quartile | | 4th Quartile | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | |
| Normal | 5 | 1.95 | 8 | 3.11 | 4 | 1.56 | 14 | 5.45 | 31 (12.06) |
| Pre hypertension | 16 | 6.23 | 32 | 12.45 | 23 | 8.95 | 97 | 37.74 | 168 (65.37) |
| Stage I Hypertension | 1 | 0.39 | 3 | 1.17 | 10 | 3.89 | 37 | 14.40 | 51 (19.84) |
| Stage II Hypertension | - | - | - | - | - | - | 7 | 2.72 | 7 (2.72) |
| Total | 22 | 8.56 | 43 | 16.73 | 37 | 14.40 | 155 | 60.31 | 257 (100) |

The above table VII.12 and VII.13 shows the distribution of the categories of blood pressure according to the ranges of conicity index for both male and female population group. It is seen that highest number of the males are present in prehypertension stage which makes a total of 167 (62.55%) followed by stage I hypertension i.e. 74 (27.72%) of the population. While least number of individuals are found in the stage II hypertension i.e. only 10 (3.75%) individuals and in normal 16 (5.99%). Again among the female highest number of the females are present in prehypertension stage which

makes a total of 168 (65.37%) followed by stage I hypertension i.e. 51 (19.84%) of the population and in normal range 31 (12/.06%). While least number of individuals are found in the stage II hypertension i.e. only 7 (2.72%) individuals.

**Table VII.14: Correlation between conicity index and systolic and diastolic blood pressure**

| Conicity Index | SBP | DBP |
|---|---|---|
| Male | 0.095 | 0.051 |
| Female | 0.305 | 0.188 |




**Figures VII.14: Scatterplots showing the relationship between conicity index with S.B.P and DBP of the population**

The above figures show that there is a negative correlation between conicity index with systolic and diastolic blood pressure for the male population. While in case of female population it is quite different. Here it shows a positive and significant correlation between the conicity index and systolic as well as diastolic blood pressure.

**Table VII.15: Age dependence of various parameters of both male and female**

| Parameters | Variables | |
|---|---|---|
| | Male | Female |
| Weight (kg) | 0.1952 | 0.2982 |
| Height (cm) | -0.0316 | -0.1025 |
| Waist Circumference (cm) | 0.18 | 0.5345 |
| Hip Circumference (cm) | 0.1459 | 0.4276 |
| BMI (kg/m²) | 0.2419 | 0.3652 |
| WHR (cm) | 0.3895 | 0.4546 |
| WHtR (cm) | 0.4040 | 0.5697 |
| Conicity Index | 0.2753 | 0.5049 |
| Systolic Blood Pressure (mmHg) | 0.2869 | 0.4663 |
| Diastolic Blood Pressure (mmHg) | 0.3481 | 0.4136 |

The above table shows the correlation between age and other parameters like weight, height, waist circumference, hip circumference BMI, WC, WHR, WHtR, conicity index, systolic blood pressure and diastolic blood pressure. It is seen that in both the population there is a positive and significant correlation between age and all the other parameters besides height. In both male and female population there is a negative correlation between age and height.