



## Assessment of Physical Activity Level and Body Mass Index of Female Students in Pondicherry University

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### Abstract

The purpose of the study was to assess the physical activity level and BMI of female students in Pondicherry University. For the study a total of 100 female subjects between the age group 17-24 years were selected from Pondicherry University. The inclusive criterion was female who were not regularly participating in sports. International Physical Activity Questionnaire (IPAQ) was administered to the subjects and questions were explained as per their state local language for avoiding the data error. Collected data were analyzed using descriptive statistics that is Mean, Median, Skewness and percentile for each physical activity domains and the body mass index. Coefficient of correlation was used for finding the relationship between BMI and physical activity level among female students. All the analysis was done with the help of SPSS version 22.0. The study revealed high level of physical activity strongly correlates with lower BMI. As there were significant relationship was seen between physical activity and BMI of female students in Pondicherry University.

**Keywords:** Physical activity, Body Mass Index, Metabolic Equivalent (MET)

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### Introduction

The physical activity is defined as “any bodily movements produced by skeletal muscle those results in energy expenditure (Caspersen et al. 1995). This broad term means that physical activity includes almost everything a person does and that inactivity is time doing things that do not markedly increase energy expenditure. It is positively associated with longevity and may prevent or help manage diabetes, metabolic syndrome, overweight, hypertension, cardiovascular disease, and colon cancer (Blair et al. 1995). Among adolescents, lack of physical activity is associated with higher body mass index. It is also associated with positive mood, self-esteem, and decreased anxiety. The physical inactivity is the fourth major risk factor accounts for about 6% of the global death (WHO 2012). The term physical inactivity is used to identify people who do not get the recommended level of physical activity. The current levels of physical inactivity are partly due to insufficient participation in physical activity during leisure time and increases in sedentary behavior. Physical activity has decreased among young people, especially in adolescent girls (Taymoori et al. 2010). There are strong observational and experimental

evidence that physical inactivity plays a significant role in the development of cardio vascular disease in female, and the habitual physical activity at least a moderate level of cardio respiratory fitness offers protection from these diseases in female as well as in men the benefits of physical activity include lowering blood pressure and cholesterol and maintenance of healthy weight. College students have been found to have poor physical activity habits leading to unhealthy body mass indexes (Brevard et al. 1996).

### Methodology

For the study, 100 female students between the age group 17-24 years were selected from Pondicherry University. The inclusive criteria were female who were not regularly participating in sports. 100 female students were selected from different departments using a purposive random sampling method the qualitative data were collected through questionnaires. To measure the physical activity level of subjects International Physical Activity Questionnaire (IPAQ, developed in Geneva, 1998) was administered. The IPAQ is suitable for adults between 15 and 69 years of age and is primarily used for population surveillance of physical activity levels. The collected data were treated according to the IPAQ scoring protocol, version 2.0. The IPAQ questionnaire consists of 25 items that identify the frequency (times per week) and duration (minutes or hours per day) of physical activity performed in the activity domains of

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occupation (7 items), transportation (6 items), house work, house maintenance, and family care (6 items), leisure recreation, sports and (4 items) and time spent sitting (minutes or hours per day) in a weekday and a weekend say (2 items), during the seven days prior to the questionnaire administration. For all physical activity domains, participation in vigorous and moderate intensity physical activity is obtained. The BMI was calculated through anthropometric measurements such as height was measured in meters using a stadiometer and body weight of the students measured in kilograms using a standard weighing machine. The WHO's grading of

body mass index was taken to classify the students based on the ratio of weight in kilogram by height in meter<sup>2</sup>.

**Statistical Analysis**

Descriptive statistics and percentile analysis were used as summary statistics. Coefficient of correlation was used for finding the relationship between BMI and physical activity level of female students. A P - value of less than 0.005 is considered to be statistically significant.

**Result**

**MET Values of Each domains**

Table 1. MET Values of Each domains according to Questionnaire results

MET Values of Each domains according to Questionnaire Results				
N=100	A.M±SD	Skewness	Minimum	Maximum
Work (MET)	240.68 ± 562.57	3.330	0	3186
Transport (MET)	952.57 ± 1283.27	3.131	0	7560
Domestic (MET)	837.88 ± 1574.09	4.236	0	10800
Leisure (MET)	768.21 ± 1501.74	3.896	0	9918
Total .PA (MET)	2799.35 ± 3452.74	3.830	0	25248

From table 1 we can analyze the values of physical activity domains. Arithmetic Mean (A.M), Standard Deviation (S.D), Skewness, Minimum (Min.) and Maximum (Max.) values of MET parameters calculated for the work, transportation, domestic, leisure and total of all physical activity domains according to questionnaire data of all participant subjects. The average of each domain score is 240.68, 952.57, 837.88, 768.21 and 2799.35 minutes/week. The work domain score of female students varies from 0 MET to maximum

3186 MET- minutes/week. The transport domain score of female students varies from 0 MET to maximum 7560 MET- minutes/week. The house/ yard work domain score of female students varies from 0 MET to maximum 10800 MET- minutes/week. The leisure time domain score of female students varies from 0 MET to maximum 9918 MET- minutes/week. The total PA domain score of female students varies from 0 MET - minutes/week to maximum 25248 MET- minutes/week.

Figure I. Descriptive statistics of the Work domain

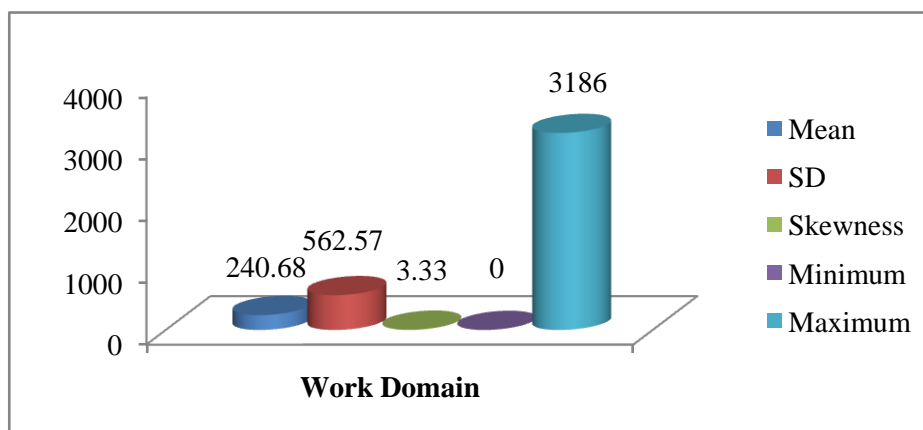


Figure II. Descriptive statistics of the Transport domain

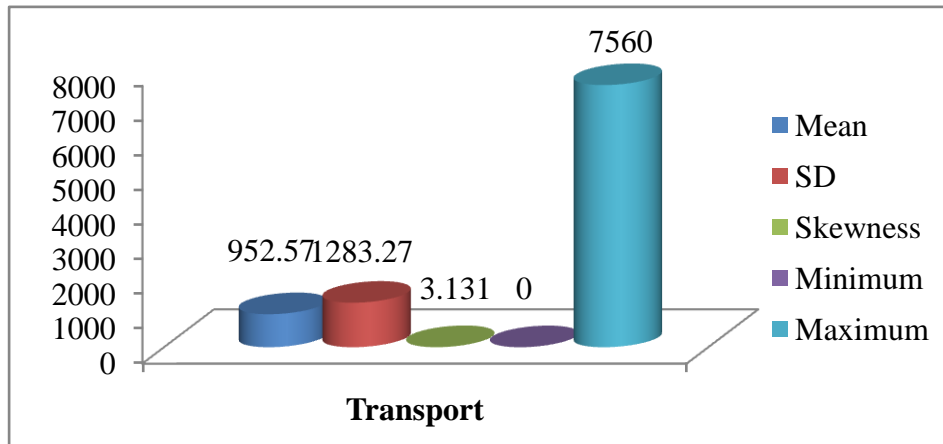


Figure III. Descriptive statistics of the Domestic or Yard domain

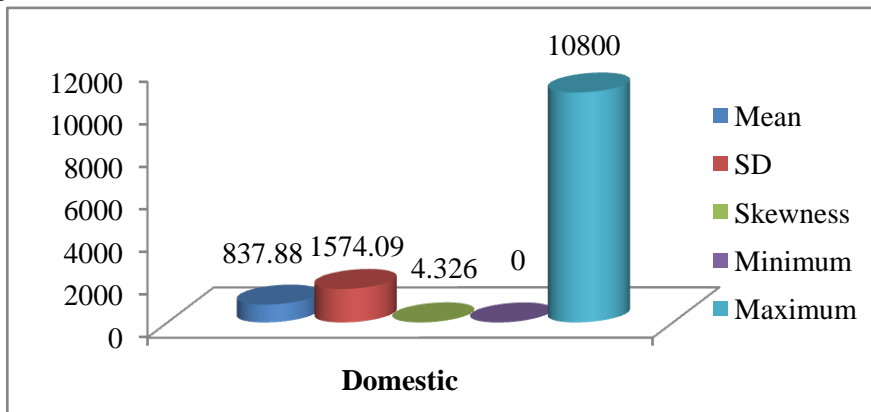


Figure IV. Descriptive statistics of the Leisure time domain

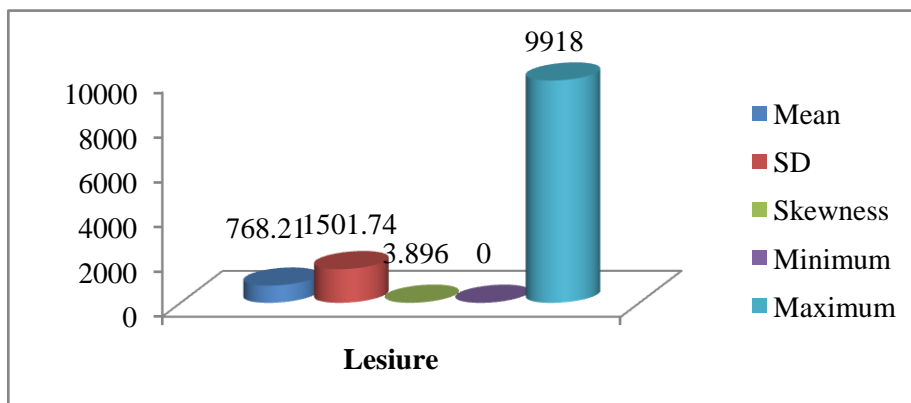
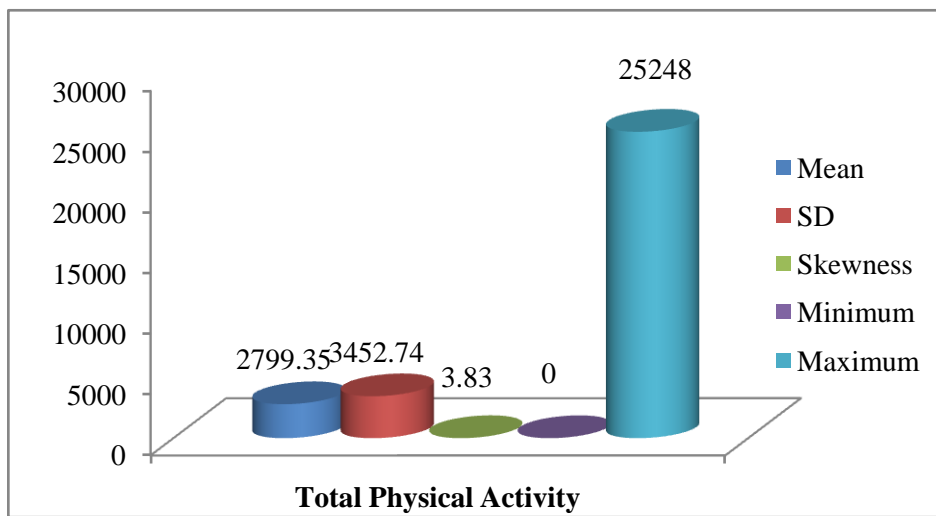


Figure V. Descriptive statistics of the Total of Physical Activity domains



From diagram 1,2,3 and 4 we can observe that the standard deviation 562.57 MET minutes/week with positive skewness 3.330, the standard deviation 1283.27 MET - minutes/week with a positive skewness 3.131, the standard deviation 1574.09 MET- minutes/week with positiveskewness4.236 and the standard deviation

1501.74 MET- minutes/week with positive skewness 3.896 respectively. In figure 5 we get the total physical activity domains which show the standard deviation is 3452.74 MET- minutes/week with positive skewness 3.830. Since the skewness is positive majority of the female students reported lower domain score.

**MET values of Walk, Moderate, Vigorous and Total physical activity**

Table 2. MET Values of Walk, Moderate, Vigorous activities and Total physical activity level

MET Values of walk, Moderate, Vigorous Activities and Total physical activity level				
N=100	A.M±SD	Skewness	Minimum	Maximum
Walk(MET)	1232 ± 1380	3.555	0	11088
Moderate (MET)	866.8 ± 1090	2.21	0	6000
Vigorous (MET)	449.7 ± 1523.7	4.927	0	9600
Total PA (MET)	2799.35 ± 3452.74	3.830	0	25248

From table 2 we can observe the Arithmetic Mean (A.M), Standard Deviation (SD), Skewness, Minimum (min.) and Maximum (Max.) times of walking, moderate level, vigorous level activities (VPA)

and total of physical activity of all participant students. The average of each physical activity level is 1232, 866.8, 449.7 and 2799.35 minutes/week.

Figure VI. Descriptive statistics of the Total of all walking score

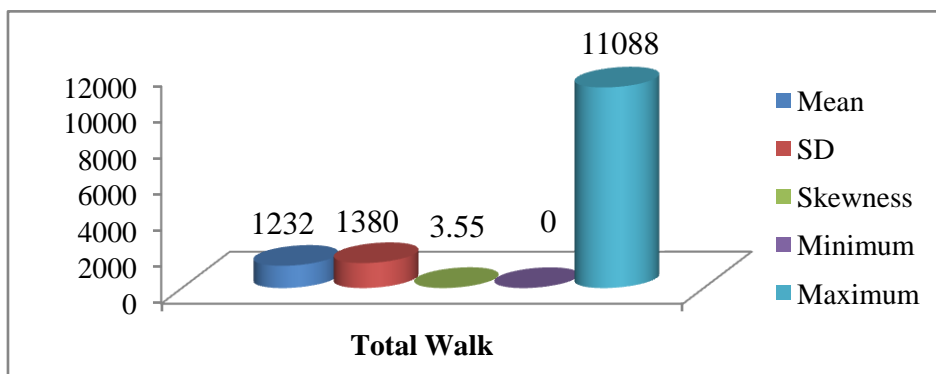


Figure VII. Descriptive statistics of the Total Scores for all Moderate Physical Activities

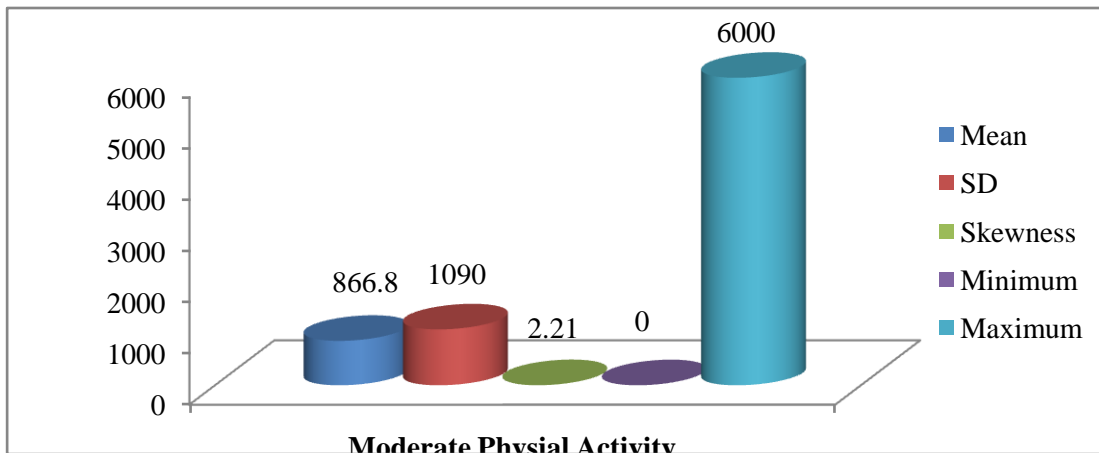


Figure VIII. Descriptive statistics of the Total Scores for all Vigorous Physical Activities

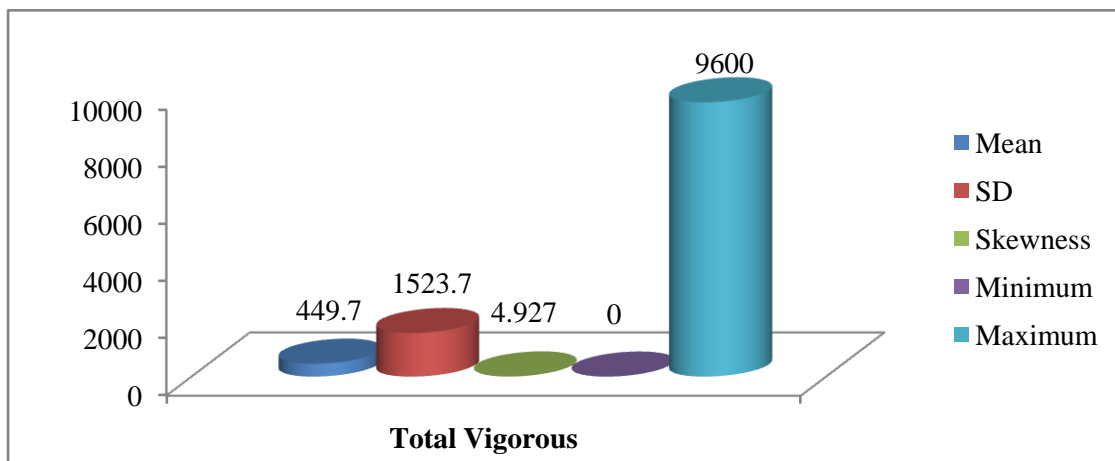
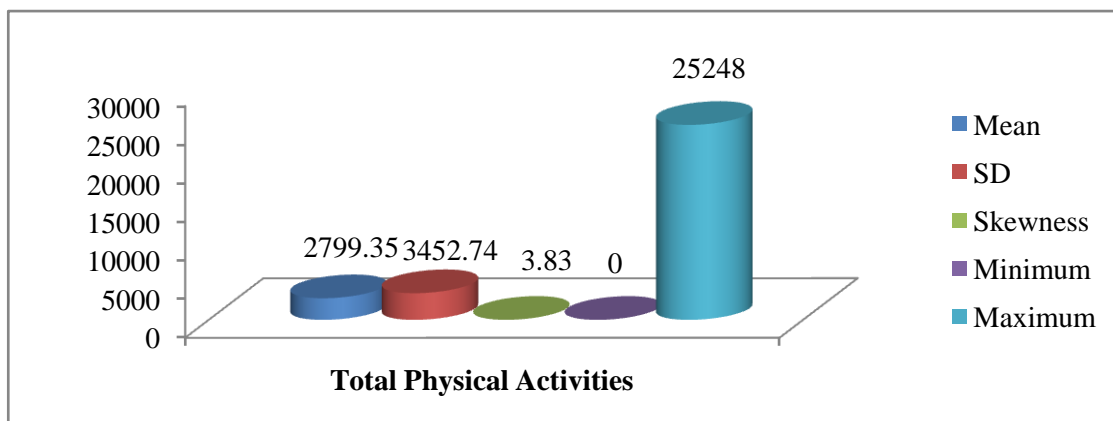


Figure IX. Descriptive statistics of the Total Physical Activities



From diagram 6, 7 and 8 we can observe that the standard deviation 1380 MET minutes/week with positive skewness 3.555, the standard deviation 1090 MET - minutes/week with a positive skewness 2.21, the standard deviation 1523.7MET- minutes/week with

positive skewness 4.927 respectively. In figure 9 we get the total physical activities which show the standard deviation is 3452.74 MET- minutes/week with positive skewness 3.830. Since the skewness is positive majority of the female students reported lower physical activity in

walk, moderate, vigorous and total physical activity scores.

### Body Mass Index (BMI)

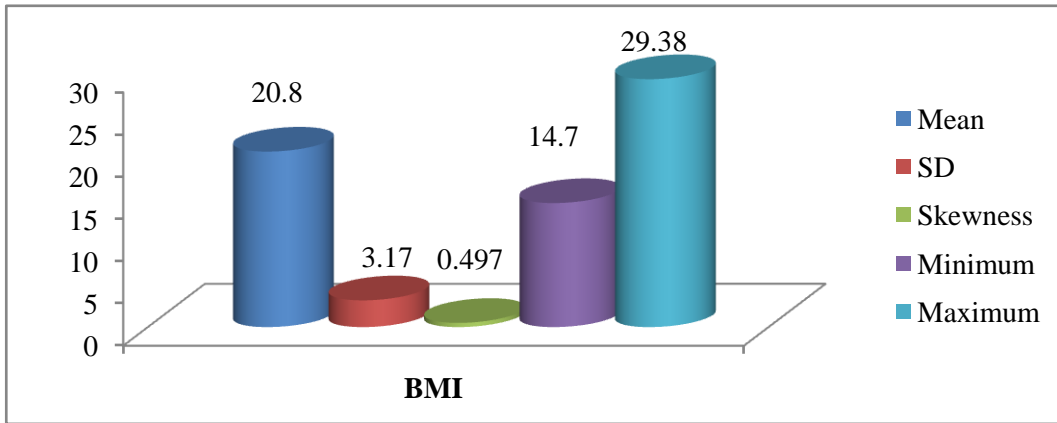
Table 3. Descriptive statistics and percentiles relating to BMI

Statistics	BMI	Percentiles	Value (MET-minutes/Week)
Mean	20.80	P <sub>5</sub>	16
SD	3.17	P <sub>10</sub>	17.2
Skewness	.497	P <sub>15</sub>	17.7
Minimum	14.70	P <sub>20</sub>	18.1
Maximum	29.38	<b>P<sub>25</sub></b>	<b>18.6</b>
		P <sub>30</sub>	19
		P <sub>35</sub>	19.2
		P <sub>40</sub>	19.53
		P <sub>45</sub>	19.9
		<b>P<sub>50</sub></b>	<b>20.5</b>
		P <sub>55</sub>	20.6
		P <sub>60</sub>	21.0
		P <sub>65</sub>	21.7
		P <sub>70</sub>	22.34
		<b>P<sub>75</sub></b>	<b>22.9</b>
		P <sub>80</sub>	23.24
		P <sub>85</sub>	24.5
		P <sub>90</sub>	25.6
		P <sub>95</sub>	26.8

The above table shows the 25 percentile of BMI score is 18.6 kg/m<sup>2</sup> indicating that 25% of female students reported BMI score ≤ 18.6 kg/m<sup>2</sup>. The 50% of BMI score 20.5 kg/m<sup>2</sup> indicating that, more than half of the female students reported the BMI score ≤ 20.5

kg/m<sup>2</sup>. The 75<sup>th</sup> percentile 22.9 kg/m<sup>2</sup> to showing that 25% of the female students reported more than 22.9 kg

Figure X. Descriptive statistics of the BMI



In figure 10, the BMI score of female students varies from a minimum of 14.70 kg/m<sup>2</sup> to a maximum of 29.38 kg/m<sup>2</sup>. The average BMI score is 20.80 kg/m<sup>2</sup> and the standard deviation is 3.17 kg/m<sup>2</sup> with

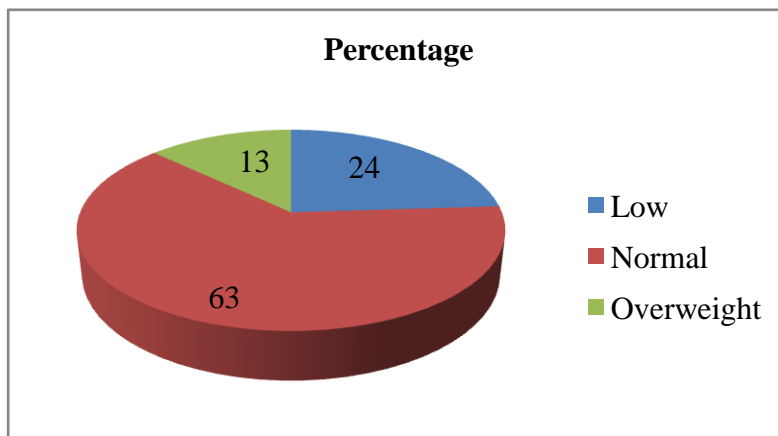
positive skewness .497. Since the skewness is positive, a majority of the female students reported lower BMI scores.

Table 4. Percentage analysis of BMI of female students

BMI	Frequency	Percentage (%)
Low	22	22
Normal	63	63
Overweight	13	13

From the table 4 it is seen that 22% have low BMI, 63% have normal BMI and 13% have over weight.

Figure XI. Percentage analysis of BMI



From the above diagram we can understand that a majority of the female students reported normal BMI value.

**Physical Activity Level**

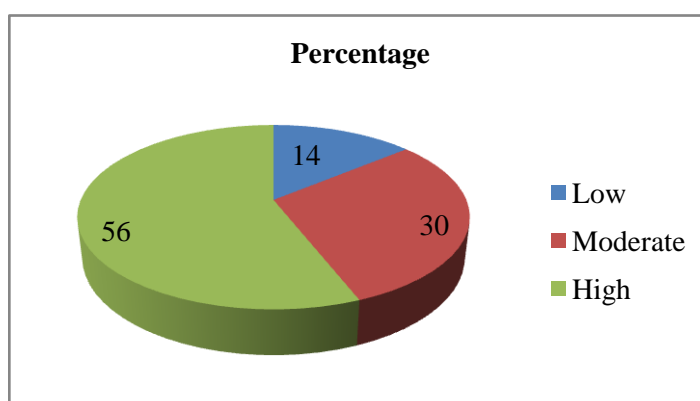
Table 5. Percentage analysis of physical activity level of female students

Physical Activity	Frequency	Percentage (%)
Low	14	14
Moderate	30	30
High	56	56

From table 5 it is seen that 14 % of female students have low physical activity level, 30 % have

moderate physical activity level and 56 % have high physical activity level.

Figure XII. Percentage analysis of physical activity level



From the above diagram we can understand that

majority of the female students are in the high category.

**Physical activity and BMI**

Table 6. Relation between physical activity and BMI

r	BMI	PHYSICAL ACTIVITY
BMI	1	-0.063*
Physical Activity	-0.063*	1

\*, significant (P< 0.05)

This table helps to find out the significant relation between BMI and physical activity of female students, correlation coefficient has been calculated. The coefficient correlation obtained is -0.063 which is significant at 5% level (P<0.05). Thus there exist significant negative relation between BMI and physical activity level of female students. That is, as physical activity increases BMI of female student’s decreases significantly.

**Discussion**

The aim of the study was to assess the Physical Activity level in female students in Pondicherry

University. The IPAQ (International Physical Activity Questionnaire), which can be considered as an acceptable instrument for monitoring population levels of Physical Activity among 18-65 years old adults in different settings (Craig CL et al 2003). Results show that the majority of respondents (98%) reached the levels of at least 30 minutes of moderate Physical Activity 5 days a week, which could be considered as the maximum level of Physical Activity for achieving health benefits, according to the recommendations (ACSM). The total Physical Activity level of female students in Pondicherry University was 2799 MET-min/week, which clearly reveals that female students in Pondicherry University



were moderately active.

Additionally, it was important to note that patterns of Physical Activity were also considerably different for the four domains (work, transportation, domestic and leisure). Female students reported more Physical Activity in transportation (952.57 MET-min/week) followed by domestic and garden, leisure time and least in work domain. This might be probably due to the increased academic demand being placed on students in the college education system. In the case of BMI, 63% of the female students had normal BMI (18.5-24.99 kg/m<sup>2</sup>), while 22 % were found to be underweight (below 18.5 kg/m<sup>2</sup>), 13% of the female were found to be overweight (25.00-29.99 kg/m<sup>2</sup>). Being underweight possess threat for the health of female students, research needs to be taken up to know the causes for underweight.

Generally, girls are more likely to hold to a sedentary Lifestyle during an adulthood in comparison with boys. Studies in different societies have shown that the physical activity is less among female students. Due to cultural barriers opposing them from exercising in public places. The lifestyle of female in Pondicherry is different from other states in India. Normally female feel less comfortable for actively taking part in the physical activities. Due to domestic activity or attending distant place of study, female students find no time to spend for physical activities and sports etc. The study revealed negative relationship between BMI and physical activity, thus high levels of physical activity strongly correlates with lower BMI.

### Conclusion

The results of the study seem to permits the following conclusions. The findings indicate that majority (86 %) of the females had high as well as moderate level of physical activity. Among them, 56 % of female had reported high level of physical activity and 30 % reported moderate level of physical activity, only 14 % of students were found to have low level of physical activity. Thus it was clearly shown that majority of the female students in Pondicherry University were

highly physical active. On average female students in Pondicherry University had normal BMI level (63%), while 22% of females were found to be underweight and 13% were overweight. As the physical activity level increases BMI decreases. The results of the study under taken by Polito and Zaccaria in 2016 also agree the findings of this study.

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