



## **A qualitative study to identify the prevalence of obesity, habit of physical activity and the barriers of physical activity among college women students in Tamil Nadu, India**

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### **Abstract**

The prevalence of obesity is escalating day by day and deteriorating the quality of life of people. To lead a healthier life, it is essential to develop good eating habits and to develop the practice of physically active environment among the public. A descriptive research has been carried out in the selected districts of Tamil Nadu to explore the prevalence of obesity, the habit of physical exercising habit of the students, prevailing accessibility conditions to undergo physical activity in the selected student's educational and residential area, to identify the barriers of physical activity among the students and to bring out the remedial measures to make the students to be physically active. The findings of the study revealed the dual burden of both underweight and overweight among the female student population in Tamil Nadu. The major findings of the study revealed that the majority of the students doesn't have regular physical activity habit and are physically inactive. The habit of physical activity was found to have influenced by the presence of PT classes, gym, and preferred place of physical activity. By implementing appropriate strategies and overcoming the identified barriers of physical activity, there are bright chances for the students to increase their level of physical activity.

**Keywords:** obesity, physical activity, barriers, quality of life

### **Introduction**

Each life cycle of human beings is comprised of many challenges and handling those challenges in the right sense is more important to lead a good quality of life. Parenthood is one of the important phase in the life cycle of both men and women, this is not only for human beings, but also for all living creatures. And at this phase the role of parent and the cooperation of the offspring is a joint venture for inculcating good habits, behaviours and is a preparation for their rest of life. To lead a good quality of life, it is important to have the basic requirements such as food, clothing, shelter and good health. Though money can get you the first three basic requirements, good health can be only achieved by the individual's own interest. It is a well-established fact that when the health is lost then, everything is lost and there is only meagre chance for good quality of life.

In the first phase of the human life, the child solely depend upon their parents and almost adhered to the choices of their parents. As the child grows and completes year by year they develop their individuality and tend to reflect their own preferences, choices and their tastes.

The transition from adolescent to the adult stage is much more important for better understanding, to learn, gain knowledge and to develop healthier habits to run the rest of the life successfully. Due to increase in independency, the students have more chances to go for unhealthy practises <sup>[1, 2, 3]</sup>. It is an accepted fact that due to recent technical innovations and advancement, both the choices for faulty food habits and inactive life style choices were increased in recent years and the impact of these advancements were well relieved through

several research studies, globally with escalation of prevalence of obesity <sup>[4]</sup> and development of non-communicable diseases all around the world <sup>[5]</sup>. Hence, it becomes essential for all health professionals, policy makers and voluntary health organizations to promote healthier life style practices. To lead a healthier life, it is essential to develop good eating habits and to develop the practice of physically active environment among the public.

Several research studies points out the increase in the prevalence of obesity among young adults during their higher education and they tend to continue the same in the adulthood and these acquired habits may pave path way for various non-communicable diseases in the future <sup>[6]</sup>. Further, studies have revealed the physical activity level of the younger generation is decreasing day by day and endangers the life of the upcoming generation <sup>[7]</sup>. This necessitates the need to identify the barriers of physical activity among the younger generation and to assess the accessibility towards physical activity practices. Hence, this research work has been carried out among the college women students to explore the prevalence of obesity, the possibility and accessibility means to be physically active and to identify the barriers of physical activity. Furthermore, through this research work the students were asked for their suggestions to improve their level of physical activity and possible strategies to combat and overcome the problem of obesity among the younger generation to lead an active healthy life.

### **Methodology**

This is a descriptive research and an attempt has been made to

explore the prevalence of obesity, the habit of physical exercising habit of the students, prevailing accessibility conditions to undergo physical activity in the selected student's educational and residential area; to identify the barriers of physical activity among the students and to bring out the remedial measures to make the students to be physically active.

### Research Area and The study participants

To complete the task, a multistage stratified sampling technique was used to select the study participants and female students undergoing Higher Education has been purposively selected in Chennai, Thirunelveli, Erode, Namakkal, Madurai, and Kancheepuram districts of Tamil Nadu. Educational institutions and libraries were identified as major hub to locate the study participants and obtained consent from the authorities and from the study participants for conducting the research study.

### Collection of data

Collection of data was done through a mixed method of survey, the group administered interactive semi structured questionnaire. The study participants in small groups (4 – 6 members at a time) were requested to gather inside the college or library premises and were explained about the significance of the study. Assurance for confidentiality of information was ensured. Initially, the respondents were given with a semi structured Questionnaire that comprised of both close ended and open ended questions to collect the general information, quantitative and qualitative information from the respondents with regard to the income, education, employment status of the student's parents, type of family, student's knowledge on obesity, physical activity pattern of the students, accessibility to do physical activity pattern of the students, accessibility towards physical activity practices in the educational institutions and in their residential area, barriers of physical activity and suggestions to overcome physical inactivity and then, each of the individuals were interviewed to get in-depth information related with the barriers of physical activity and their suggestions to overcome physical inactivity.

### Anthropometric Measurements

Anthropometric measurements such as height and weight of the respondents were measured using standard weighing

machine and stature meter to find out the nutritional status of the respondents. BMI of the students were calculated and were categorised according to the WHO classification.

Approximately it took around 60 minutes to collect information and to complete the survey of a group. The collected data were checked for completion and were coded with numbers. The collected data were coded and entered in an Excel spread sheet and were transferred to SPSS software for further analysis.

### Results and Discussions

The results obtained after the analysis were presented and discussed below. Table 1, represents the basic information of the study participants. Among the study participants, it is noted that about 40% of the students belonged to Autonomous Colleges, 20% Government Arts and Science College, 20% belonged to Government Professional College and 20% of the students belonged to Private Professional College. It was also observed that majority of 52.6% of the students were undergoing second year of college education, 25.5 % in first year, 19.8% in the third year and 2.1% in the fourth year of under graduation. The educational status of the student's parents were studied and it was observed that a majority of 43% of the student's mother were in the category of 6<sup>th</sup> to 10<sup>th</sup> standard of education, 19.5% were in the category of 11<sup>th</sup> to 12<sup>th</sup> standard of education, 12.2% had primary level of education and the 11.5% were illiterates. About 13.8% of the student's mother were graduates. Further, the education level of father shows that a majority of 32.9% were studied between 6<sup>th</sup> to 10<sup>th</sup> standard, 12% had primary level of education, 3.8% of them were illiterates and nearly 22% were graduates and above. When compared the education level of the father and the mother, male persons were well educated than the female counterparts. The financial level among the student's father and mother showed that about 25.2% and 11.7% of the student's mothers and fathers earning was less than Rs.4809 per month, 18.9% and 21.8% of them were earning between Rs.4810 and Rs.8009 and a majority of 53.3 % of the student's fathers income is between Rs.12020-RS.16019. The results obtained revealed that the student's father contribute more to the economic condition of the family than their counter parts. Among the selected student population about 75.4% of them were in nuclear family system and the rest of 24.5 % lead a joint family system.

**Table 1:** General characteristics of the selected students

Type of Institution		
Autonomous	250	20.0
Autonomous I	250	20.0
Government Arts College	250	20.0
Government veterinary College	250	20.0
Private professional College	250	20.0
Year of study		
First year	319	25.5
Second year	657	52.6
Third year	248	19.8
Fourth year	26	2.1
Educational status of the mother		
Not attended school/illiterate	144	11.5
1-5 Standard	153	12.2

6 <sup>TH</sup> -10 <sup>TH</sup> Standard	537	43.0
11 <sup>TH</sup> – 12 <sup>TH</sup> Standard	244	19.5
Degree	119	9.5
Post Graduation	51	4.1
Professional	2	.2
Educational status of the Father		
Not applicable	61	4.9
Not Attended School / Illiterate	47	3.8
Not attended school/illiterate	150	12.0
1-5 Standard	411	32.9
6 <sup>TH</sup> -10 <sup>TH</sup> Standard	300	24.0
11 <sup>TH</sup> – 12 <sup>TH</sup> Standard	185	14.8
Degree	75	6.0
Post Graduation	21	1.7
Income Level of Mother		
Not Aplicable	308	24.6
Greater than Rs.32050	54	4.3
Rs.16020-Rs.32049	74	5.9
Rs.12020-Rs.16019	96	7.7
Rs.8010-Rs.12019	167	13.4
Rs.4810-Rs.8009	236	18.9
Rs.1601-Rs.4809	212	17.0
Less than Rs.1600	103	8.2
Income level of father		
Not applicable	24	1.9
Greater than rs.32050	5	.4
Rs.16020-rs.32049	33	2.6
Rs.12020-rs.16019	666	53.3
Rs.8010-rs.12019	103	8.2
Rs.4810-rs.8009	273	21.8
Rs.1601-rs.4809	91	7.3
Less than rs.1600	55	4.4
Type of family		
Nuclear	943	75.4
Joint	307	24.6

The anthropometric measurements (Table 2) of the students were measured and the Body Mass Index was calculated to assess the nutritional status of the students and were categorised according to the WHO categorization. It was observed through the results that about 31% of the students were underweight with BMI less than 18.5 kg/m<sup>2</sup>, 60.3% were

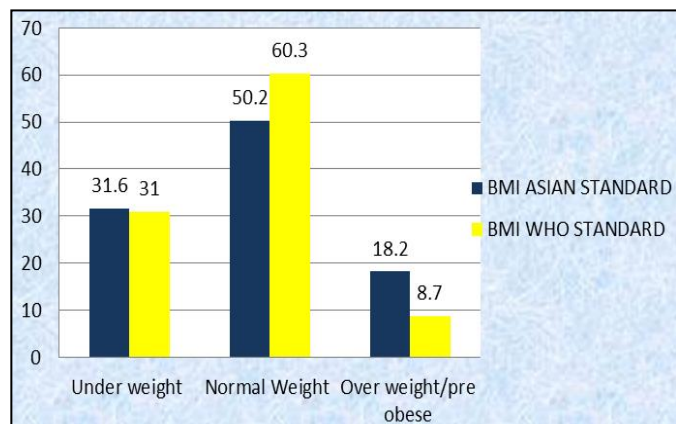
normal weight with BMI between 18.5 and 22.9kg/m<sup>2</sup>and about 8.7% were found to be overweight with BMI above 25 kg/m<sup>2</sup>. The obtained results were found to be similar with that of prevalence of obesity among US student population where the obesity prevalence is about 7.1% to 12.1 % aged between 18-29 years [8].

**Table 2:** Anthropometric measurements of the selected students

<b>Who BMI Classification of the Students</b>		
Under weight (<18.50 kg/m2)	387	31.0
Normal Weight (18.50-24.99 kg/m2)	754	60.3
Over weight (>25.00 kg/m2)	109	8.7
<b>BMI Classification According to Asian BMI Classification</b>		
Under weight (<18.50 kg/m2)	395	31.0
Normal Weight (18.5-22.9 kg/m2)	627	50.2
Over weight/pre obese (>23 kg/m2)	228	18.2
<b>Classification OF Knowledge Score</b>		
Poor	75	6.0
Fair	641	51.3
Good	534	42.7

Though the percentage of prevalence of over weight is read as 8.7 in the above table, it is surprising to note that according to the BMI standard which has been designed by the WHO for the use of Asian population, it was found that about 50.2% of

the students belonged to normal weight BMI between 18.50 and 22.9 kg/m<sup>2</sup>and about 18.2 % of the students were in the overweight or pre obese category with BMI greater than 23 kg/m<sup>2</sup>.



**Fig 1: BMI Classification of the Students**

The obtained results, revealed that the selected students were facing the burden of mal nutrition that is both under nutrition and over nutrition. Most probably the reasons for over weight among the students may be due to physical inactivity and the same has been proved through several studies [9-12]. It was observed through the findings of Multiple Regression analysis that that BMI was influenced by certain independent factors such as income level of father, educational level of the father, type of family, household activity involved by the students, mode of reaching college, preference of physical activity, regular checking for weight, Institutions contribution in improving the physical activity. Hence, these factors tend to determine and influence the BMI of the selected students.

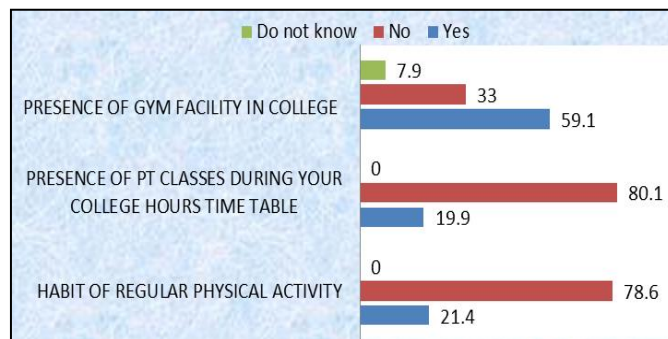
The knowledge of the students pertaining to obesity was assessed and the obtained scores was categorised and represented in the Table 2. It was observed that about 42.7 % of the students knowledge level was good, 51.3% of the student’s level of knowledge was fair and only 6% of the student’s knowledge level was poor. Though, the students have good knowledge regarding the risk factors and the impact of obesity, they doesn’t follow the strategies to make themselves healthy and the findings of the study reveals their negligence towards their own health.

The knowledge of the students (Table 2) with respect to obesity, risk factors and the preventive strategies were found to be influenced with year of study of the students, educational status of the mother, employment status of the mother, income level of the father and mother, accommodation of the student, participation in extracurricular activity, presence of physical training class and gym facility in the college.

Physical activity contributes more to an active and healthy life style [13], but in recent years physical activity was found to be declining [14] among the adolescent, young adults and the adults [15-17].

The physical activity (Table 3) of the students revealed that only 21.4 % have regular physical activity habit and the rest of 78.6% of the students doesn’t do physical exercise. It was reported through other studies that only 7% of the students were leading a very active life style among the under graduate students of Michigan University [18]. It is observed from other

studies that globally, there is a decline in the habit of physical activity and the level of physical activity, for instance, about half of US university student population has not met with the recommended level of physical activity [19], in Australia about 66.9% were sedentary [20], in the United Kingdom about 73% male and 79% female university students does not met with the recommendations of physical activity [21].



**Fig 2: Physical activity of the students and accessibility to do physical activity**

The regularly physically active students opted to do walking (14%), Jogging (2.5%), Yoga (1.9%) and playing sports and games (4.1%). It was also revealed through this study that the selected students opted to go by walk (63%) and through bicycle (13.8%) to reach the nearest places of less than one kilometre, and 23.2% mostly depend on motor vehicle transportation either private or public to reach the nearest places. The study further revealed that due importance was not paid in imparting physical training to the students as 80.1% of the participating students have reported that they don’t have PT classes during their college hours and 20% of the students have reported that they do have physical Training hours during the college hours. But, only 14.6% of the students were found to utilise the PT class for its purpose and use that particular hour in doing physical activity or by playing games and sports. Nearly 60% of the student’s reported to have gym facility in their college campus and the utilization of the gym is not fair on the part of the students as there are certain restrictions laid down by the college authorities for using the facility. All the selected institutions have play ground in their premises and were open to the students to utilize the play ground before and after the college working hours, but as the students are time bounded and due to certain restrictions they were unable to use the availability of the play ground. Only about 6.7% of the students reported that they used to play for at least three days in week in the play ground along with their friends, about 16.6% of the students play one or two days in a week and the rest doesn’t play or play on very rare occasions inside the college premises. In a study conducted among medical college students, Mangalore has revealed that nearly 40% of the students reported to do physical activity less than once a week [22]. This reveals that the students were not very much serious about the impact of over weight and obesity at the earlier stage.

**Table 3:** Physical Activity pattern of the selected students and the accessibility towards physical activity

<b>Habit Of Regular Physical Activity</b>		
Yes	267	21.4
No	983	78.6
<b>Preference Of Physical Activity</b>		
Not Applicable/ Do Not Know	969	77.5
Walking	175	14.0
Jogging	31	2.5
Playing Sports And Games	51	4.1
Yoga	24	1.9
<b>Frequency Of Doing Physical Activity In A Week</b>		
Not Applicable / Do Not Know	910	72.8
Daily	120	9.6
2-3 Days In A Week	56	4.5
4-5 Days In A Week	65	5.2
Rarely	99	7.9
<b>Mode Of Reaching Your Nearest Places</b>		
By Walk	788	63.0
By Bicycle	172	13.8
By Motor Vehicles (Like Scooter, Car, Bike, Etc..)	290	23.2
<b>Presence Of Pt Classes During Your College Hours Time Table</b>		
Yes	249	19.9
No	1001	80.1
<b>Utilization Of Pt Classes</b>		
Not Applicable / Do Not Know	985	78.8
Will Go Regularly To Gym Or Play Ground And Play	183	14.6
Will Chat With Friends And Do Not Do Physical Activity	23	1.8
Will Go To Library	35	2.8
<b>Will Be Occupied By Other Faculties To Take Classes Or To Conduct Class Test</b>	24	1.9
<b>Presence Of Gym Facility In College</b>		
Yes	739	59.1
No	412	33.0
Do Not Know	99	7.9
<b>Permitted Time To Use Gym Facility</b>		
Not Applicable / Do Not Know	384	30.7
Pt Hours Only	39	3.1
Any Time During College Working Hours	71	5.7
Before And After Working Hours	385	30.8
During Leave Days	110	8.8
Not Allowed To Use Gym	261	20.9
<b>Utilization Of Gym Facility</b>		
Not Applicable / Do Not Know	381	30.5
Pt Hours	60	4.8
Free Hours During The College Working Hours	13	1.0
During Break Timings	91	7.3
Before Or After College Hours	166	13.3
Will Not Use Gym	539	43.1
<b>Permission To Use Of Play Ground Before And After College Hours</b>		
Yes	1234	98.7
No	16	1.3
<b>Habit Of Playing With Friends Before And After College Hours</b>		
Yes, For More Than 3 Days In A Week	84	6.7
Yes, One Or Two Days In A Week	207	16.6
Yes, Rarely	541	43.3
No	418	33.4
<b>Place Of First Preference To Do Physical Activity</b>		
Not Applicable / Do Not Know	78	6.2
At Home With Self Supervision	567	45.4
At Home Under The Supervision Of Parents Or Siblings	102	8.2
In Gym Under The Supervision Of An Instructor	73	5.8
At Public Parks	32	2.6
Road Side/Streets Vacant Place	46	3.7
At College Ground / Gym	221	17.7
Only During College Pt Classes	131	10.5

The regular physical activity of the students were influenced by the presence PT classes during working hours, presence of gym facility in the college and the preference of place to undergo physical activity and are found to be significantly associated ( $P < 0.05$ ).

It was also revealed from the study that about 94% of the students were willing to do physical activity to maintain their health in good condition and about 45% of the students preferred to do physical activity at home with self-supervision, 8.2% at home under the supervision of the family members, 5.8% preferred to go to gym, 28% preferred to use college grounds and gym to do physical activity and 6% preferred public parks, roads to carry out their physical activity. Hence, proper physical exercising work places has to be created in all the educational institutions and separate work places has to be created by the government in the public places through identifying public parks along with walking tracks in the residential area and make them accessible for the public to increase their physical activity level. Further, enough motivations has to be done by the parents, teachers, sibling to

improve the physical activity of the students.

**Barriers of Physical Activity**

The students were asked for the barriers of physical activity (Table 4) in order to improve their habit of physical activity and nearly 40% of the students reported that they do not have enough time to play, 32% reported that they do not have enough accessibility like play ground or walking tracks in their locality, 11% reported that they are not allowed by the parents to play in the public areas, about 6% reported to feel shy to play in the public places and the rest of 6% doesn't showed any interest in revealing the barriers of physical activity. During the discussion session students have reported that absence of PT hours during the college hours as one the major barrier of physical activity. In a similar study, conducted among UK students it was identified that university environment and systems, transition to new life, lack of gym facility and academic pressure as barriers of physical activity (Ref 6). Among Saudi Arabian female students the barriers of physical activity was identified as time constraint, lack of suitable place, lack of company [23].

**Table 4:** Barriers of Physical Activity

<b>Not Applicable / Do not know</b>	<b>78</b>	<b>6.2</b>
No Public play ground nearby residential area	265	21.2
No walking tracks nearby residential area	130	10.4
No time to do physical activity	498	39.8
Parents not allowing to play in the public places	138	11.0
Myself feel shy to play or go for a walk in public places	74	5.9
Not allowed to play with friends in the college campus	67	5.4
<b>Suggestions To Improve The Physical Activity Inside College</b>		
PT classes during working hours	337	27.0
Gym facility	115	9.2
PT class, Gym and clean Play ground	449	35.9
Cleanliness of ground	11	.9
Awareness on Physical activity	204	16.3
Yoga training	134	10.7
<b>Suggestions To Improve The Physical Activity In Residential Area</b>		
Not Applicable / Do not know	3	.2
Play ground / Walking Track / Park	275	22.0
Gym facility for women	48	3.8
Gym and Play ground / Park	353	28.2
swimming pool	6	.5
Awareness on Physical activity / Park and Gym	565	45.2
Presence of Play ground in the college premises		
Provided with play ground facility to play	1250	100.0
<b>Institutions Contribution In Improving The Physical Actiivty</b>		
Not Applicable / Do not know	395	31.8
Provided with GYM facility to work out	521	41.7
Conducts health education programmes to impart health knowledge	45	3.6
Provided with PT classes to increase the physical activity	283	22.6
Monitoring the weight regularly	6	.5

Institutions also have a major role in increasing the physical activity of the students and it was observed from the study that about all the selected colleges had enough space in their premises to conduct sports and games. About 22.6% of the students reported that their institution provides time for PT class during the working hours to improve their physical activity, 41% of the students reported that their institution have provided them with gym facility that can be utilised

before and after the college working hours, but conducting health awareness programmes and monitoring of weight of the students is found to be still lacking. It is sad to know that majority of the students doesn't aware of what has been provided by their institutions to improve the Physical activity of the students.

Very few studies have been conducted in India to explore the physical activity level of the college students and they were

limited to find out the barriers, but in the present research work the possible ways to improve the physical activity of the college students were identified through the students and were presented. This is one such rare research work among studies conducted so far, in India.

The better ways of accessibility (Table 4) to improve the physical activity was assessed through the suggestions of the students and the results revealed that the students were feeling secured to do physical activity inside the college campus rather than in the residential area and has suggested to include compulsory physical training classes in the curriculum and to allot physical exercise classes during the college working hours. About 73% urged the need for physical Training classes during the college working hours and to provide them with clean play ground and separate gym facility inside the campus for women students, about 16.3 % of the students suggested to give enough awareness about the health benefits of physical activity through conducting awareness programmes and about 10.7% suggested to give yoga training apart from regular sports and games during the physical training hours (PT hours) on alternate basis. Implementing the suggestions put forth by the students, will help to develop regular physically active routine habits and will remain as a part and parcel of rest of their life. It is also observed from the study that though play ground facility is available in all the selected colleges, the usage is very minimal. Hence, proper steps has to be set forth by the department of Higher Education to implement compulsory and regular physical Training hours during the working hours in the welfare of the students health and help in inculcating good life style habit that will remain with them through their entire life. Always “prevention is better than cure”.

Further, majority of the students also suggested to initiate steps to provide more accessibility to be physically active in their residential area by creating public parks with walking tracks and gym facility, and thereby to improve the physical activity of the public.

### Conclusion

The present study had explored the dual burden of both underweight and overweight among the student population in Tamil Nadu, India. The major findings of the study revealed that the majority of the students doesn't have regular physical activity habit and are physically inactive. The findings of the study was consistent with the studies conducted in other countries [24-27]. Low levels of physical activity practices were identified as major contributing factor for overweight. Though the WHO has issued recommendations for physical activity levels for the promotion of good health among the population [28], enough attention has not been paid both by the government and at the level of the individual. WHO recommends aerobic PA of structured or unstructured character at moderate-intensity for 150 min, 75 min of vigorous-intensity aerobic PA or an equivalent combination of moderate-intensity and vigorous-intensity activity throughout the week as a means of health enhancement [28, 29]. Since, the habit of physical activity was influenced by the presence of PT classes, gym, and preferred place of physical activity, steps may be taken by the educational institutions to allow the students to play during the college working hours, so as to

ensure regular habit of doing physical activity and can also be monitored by the Physical Trainers. The findings of the study would also help the policy makers and health professionals in making the higher education curriculum to provide enough space for developing the habit of doing physical activity and to gain more knowledge to develop good habits that are required for a healthy living, by allocating separate time to do physical activity during the working hours and making physical exercise as compulsory for all students. By implementing appropriate strategies and overcoming the identified barriers of physical activity, there are bright chances for the students to increase their level of physical activity and will help to decline the prevalence and incidence of overweight among the student community.

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