



Original Research Article

PREVALENCE OF PHYSICAL ACTIVITY IN UNDERWEIGHT, OVERWEIGHT AND OBESE YOUNG ADULTS STUDYING IN DIFFERENT INSTITUTIONS IN SOUTH KERALA, DURING THE COVID -19 PANDEMIC.

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ABSTRACT

Background: The prevalence of overweight and obesity has increased substantially across the globe over the last decades especially in the youth. One third of the world's population can now be categorised as being overweight. Another category of young adults that are going unnoticed are those who are underweight. They should be made aware about the health implications as a result of being physically unfit. Physical inactivity is an established risk factor for cardiovascular disease, cancer, and diabetes etc. Hence it becomes a matter of immense importance to find out the prevalence of physical activity among young adults especially during the pandemic. The purpose of this study is aimed to assess the prevalence of physical activity in underweight, overweight and obese young adults and also to inculcate this routine in their daily lives.

Material and Methods: A cross sectional study was done on 260 participants(selected based on inclusion and exclusion criteria) falling in the age group 18-25 years studying in different institutions in a district in South Kerala. Physical activity was being assessed using GPAQ version 2 questionnaire. The level of physical activity referred in the questionnaire in each domain was presented as metabolic equivalent (MET). Height, weight, and BMI, of each student along with demographic details was collected.

Results: It was found that there was a 40% of study participants follow an almost sedentary lifestyle. It is seen that those who were obese were seen to be highly active (32.4%) compared to other groups. A large percentage individuals falling under the normal BMI category was seen to be either inactive (35.9 %) or following a lifestyle of low activity (29.1%). There was statistically significant association between BMI and physical activity. **Conclusion:** Almost 40% of the study participants fell in the inactive group while only 24% was found in the highly active group and 13.8% in the moderately active group. Amongst the inactive group majority were female participants. Significant association with inactive group and their BMI was found. Hence our study proves the need to make the youth enlightened about the need to be physically active and encouraging them to improve their activity levels for a healthy future

Keywords: MET, GPAQ, BMI, Physical activity

INTRODUCTION

Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure. Physical activity can be as a result of occupation, sports, household, or other activities. Exercise is just a part of physical activity that is planned and aims for the improvement or

maintenance of physical fitness.^[1] World Health Organization (WHO) defines physical activity as “any bodily movement produced by skeletal muscles that requires energy expenditure”. WHO recommends that an individual should have a minimum of 150 minutes of moderate to vigorous physical activity per week for the maintenance of health.^[2] A study shows that in

India more than half of the population does not meet these recommendations due to lifestyle changes.^[3]

Several factors like urbanization, technology, the globalization of food markets, etc have led to lifestyle changes. India, being a developing, is facing evident lifestyle changes. Physical activeness is cutting down rapidly and people are seen to be having a more sedentary lifestyle, especially the University students.^[4]

To worsen the situation, came the pandemic. Due to the global pandemic caused by the corona virus, restrictions were imposed which led to physical inactiveness in everyone's life. Total lockdown was one of the measures taken for preventing spread of COVID 19. Although imposing lockdown or quarantine has been one of the widely used measures across the world to stop the rapid spread of COVID-19, it came along with severe consequences too. It affected the life of every person around the world.

"Work from home" became a norm and a luxury for many. Students had no choice but to restart classes virtually. It led to changes in daily life like the level of, daily physical, mental activity etc. Unlimited screen time, erratic food patterns and disturbances to circadian rhythm took over everyone's lives and began to be a normality. Although these abrupt changes have influenced every individual, many people who were religiously following their fitness activities by going to gyms, or other places before the lockdown were affected intensely. Closure of fitness centres and public parks forced people to stay at home which over the time made people get used to it. Even after lockdown, things did not get back to normal easily. Infact people got used to inactiveness.

Young adulthood is an important and critical period of development. The pandemic is the first global event of this type encountered by the young population. This pandemic has lead millions of young people into a crisis where access to education, skill-development and physical activity, was limited and inadequate for young people who are demanding and deserve more.^[5,6]

In short the youth of today are seen to be getting more comfortable with a sedentary lifestyle and unhealthy habits due to the pandemic.

Physical inactivity causes a lot of health hazards. Being overweight and obese is just the physical aspect. Decrease in muscle strength endurance, decrease in bone quality, altered lipid and carbohydrate metabolism, poor immunity, hormonal imbalance etc etc are few of the many health hazards that can occur as a result of physical inactivity. Physical inactivity is an established risk factor for cardiovascular disease, cancer, and diabetes.^[7]

W.H.O states that 3.2 million deaths and 32.1 million DALYs (representing about 2.1% of global DALYs) each year is attributed to insufficient physical activity.^[8]

Studies show the prevalence of overweight and obesity has increased substantially across the globe over the last decades especially in the youth.^[9] One third of the world's population can now be

categorized as being overweight. A steadily increasing trend of obesity among young adults, especially college and university students, is becoming evident.^[10]

Another category of young adults that are going unnoticed are those who are underweight. Underweight children and adolescents are seen to have considerable public health problem. In studies it was seen that those who were underweight presented with scoliosis, osteoporosis, pubertal delay, and psychiatric disorders.^[11] Hence the youth should be made aware of the health implications as result of being physically unfit too. Indulging in physical activities is seen to improve the psychological health. The healthy lifestyle of today's young adults will not only pave a pathway for their healthy future, but also is more likely to give them confidence to provide effective preventive counselling to the upcoming generation. Adoption of healthy lifestyle, which includes physical activity, is recommended by many health organizations across the globe as a prevention and treatment for non-communicable diseases.^[12,13,14] Hence it becomes a matter of immense importance to find out the prevalence of physical activity among young adults especially during the pandemic.

The purpose of this study is aimed to assess the prevalence of physical activity in underweight, overweight and obese young adults and also to inculcate this routine in their daily lives.

Objectives

- 1) To assess and compare the prevalence of physical activity in underweight, overweight and obese young adults in south Kerala.
- 2) To find out the barriers faced by young adults during the pandemic to do physical activity.

MATERIAL AND METHODS

Study Design: The study is a cross-sectional analytical study

Sample Size: A minimum sample size of 260 young adults between the age group 18-25 years studying in different institutions in a district in South Kerala.

Physical activity was being assessed using GPAQ version 2 questionnaire.³⁶

Height, weight, and BMI, of each student along with demographic details was collected.

Inclusion Criteria: All subjects literate enough to understand the questionnaire and in the age group 18years to 25 years were included in the study.

Exclusion Criteria: Physically disabled or those with underlying health conditions and those who were not willing to give consent were excluded from the study.

Consent: All the participants were briefed about the objectives of the study and informed that their participation is voluntary and was also assured of anonymity and confidentiality of the data. Written informed consent was obtained from those students willing to take part in the study.

Study period -The data collection was done during the period from 24th July 2022 to 24th September, after receiving ethical clearance.

Study tool and Data analysis

Physical activity was assessed using Global Physical Activity Questionnaire³⁶ (GPAQ version 2) developed by World health organization. GPAQ consisted of sixteen questions. It covered several components of physical activity, such as intensity, duration, and frequency of activity. Questionnaire was administered on an interview basis.

The participants were explained about different activities helping them to interpret which type of physical activity falls under vigorous and moderate. Using this questionnaire three domains of activity (activity at work, travel, and recreation) were assessed. The response of participants to each domain was noted. The level of physical activity referred in the questionnaire in each domain was presented as metabolic equivalent (MET).

MET is defined as the amount of energy consumed while sitting at rest and is equivalent to a caloric consumption of 1 kcal/kg/hour. The MET level was estimated using the formula: (MET level × minutes of activity/day × days per week) and the values were assigned to each domain.^[37]

Following this the physical activity was classified based on MET minutes. For the calculation of a person's overall energy expenditure using GPAQ, MET values were assigned as per the WHO guidelines. Moderate activities in work, travel and recreation consume 4 METs whereas Vigorous activities consume 8 METs. A person is said to be having sedentary lifestyle if the total activities performed by a person in a week are less than any of the following:^[37,38]

1. 150 minutes of moderate-intensity physical activity OR
2. 75 minutes of vigorous-intensity physical activity OR
3. An equivalent combination of moderate- and vigorous-intensity physical activity achieving at least 600 MET-minutes.

The following was applied to classify the levels of physical activity

- Inactive - < 600 MET-min/week
- Moderately Active - 600 MET-min/week to 3000 MET-min/week
- Highly Active - > 3000 MET-min/week

Height, weight, of the participant was taken for calculation of BMI. Demographic details of each participant was collected too. BMI was calculated using the formulae weight divided by height in meter square. Classification of BMI was done based WHO Asian classification .³⁹

- Underweight - BMI < 18.5 Kg/m²

- Normal – BMI 18.5 Kg/m² to 22.9 Kg/m²
- Pre-obese – BMI 23.0 Kg/m² to 24.9 Kg/m²
- Obesity class I – BMI 25 Kg/m² to 29.9 Kg/m²
- Obesity class II - BMI ≥ 30.0 Kg/m²

Statistical Analysis: Data was entered in Microsoft Excel and analysis was done using appropriate statistical software. Categorical variables were represented using frequency, percentage and continuous variables using mean and standard deviation. Categorical data between the BMI was compared using Pearson's Chi squared test. Continuous variables was compared using ANOVA if data was found to be normal otherwise Kruskal Wallis test was used.

RESULTS

The study was conducted on 260 adults studying in a district in South Kerala with the mean age group in our study being 25.83 ± 12.225. [Table 1]

Table 2 shows that in our study 117(45%) of study participants were within normal, 42 (16.2%) fell in the overweight and 74(28.5%) participants fell in the obese category. The least number fell in the underweight category which is 10.4%. [Table 2]

The participants were further divided based on the MET score of their physical activity as shown in Table no. 3 in which the higher percentage fell in the inactive (31.9%) not so far away following were those belonging to low active group (30%). [Table 3] It was found that there was a 40% of study participants follow an almost sedentary lifestyle (Table 4) based on the MET score calculated for the whole week. (this includes those who answered no in the questionnaire). [Table 4]

The study participants were further distributed based on their BMI and categorically based on their MET score for further clarity to see any association. [Table 5]

It is seen that those who were obese were seen to be highly active (32.4%) compared to other groups. A large percentage individuals falling under the normal BMI category was seen to be either inactive (35.9 %) or following a lifestyle of low activity (29.1%).

Table 6 shows that there was statistically significant association between BMI and physical activity. This analysis was done using Kruskal test which gave a p value less than 0.05 (0.003). [Table 6]

To further substantiate any demographic variation MET score association with gender was done using Chi square test. It proved to be statistically significant as shown in table no.7. [Table 7]

There was no association seen between the mean age groups and the MET categories as shown in table no 8. It is was assessed using Kruskal wallis which was more than 0.05. [Table 8]

Table 1: Descriptive Statistics of baseline variables

N	Valid	Age	Weight (kg)	Height (cm)
	Missing	260	260	260
		0	0	0
	Mean	25.83	62.97	164.83
	Median	21.00	60.50	164.00
	Std. Deviation	12.225	12.787	9.717
Percentiles	25	20.00	54.00	157.00
	75	23.00	70.00	172.00

Table 2: The BMI was divided and the categorical variables were calculated

BMI	Frequency	Percent
Underweight	27	10.4
Normal	117	45.0
Overweight	42	16.2
Obese	74	28.5
Total	260	100.0

Table 3:

	Frequency	Percent
Highly active	63	24.2
Moderately active	36	13.8
Low active	78	30.0
Inactive	83	31.9
Total	260	100

Table 4:

Total Physical Activity MET minutes per week	Frequency	Percent
≥600	177	68.1
<600	83	31.9
Total	260	100

Table 5: Distribution of study participants based on BMI groups and categories MET minute/week

BMI	Categories based on MET minute/week				Total
	Highly active	Moderately active	Low active	Inactive	
UW	5(18.5)	1(3.7)	8(29.6)	13(48.1)	27(100)
Normal	23(19.7)	18(15.4)	34(29.1)	42(35.9)	117(100)
OW	11(26.2)	4(9.5)	17(40.5)	10(23.8)	42(100)
Obese	24(32.4)	13(17.6)	19(25.7)	18(24.3)	74(100)
Total	63(24.2)	36(13.8)	78(30.0)	22(31.9)	260(100)

Table 6: Comparison of MET categories and BMI

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Chi square	P value
				Lower Bound	Upper Bound		
Highly active	63	24.3248	4.41451	23.2130	25.4366		
Moderately active	36	23.5499	3.40598	22.3975	24.7023		
Low active	78	23.1425	3.74331	22.2985	23.9865	13.832	0.003*
Inactive	83	22.0284	3.78406	21.2021	22.8547		
Total	260	23.1297	3.96140	22.6460	23.6135		

*shows statistical significance

Table 7: Comparison of MET categories and Gender

Sex	Categories based on MET minute/week				Total	Chi square	P value
	Highly active	Moderately active	Low active	Inactive			
Female	25(15.2)	19(11.6)	50(30.5)	70(42.7)	164(100)		
Male	38(39.6)	17(17.7)	28(29.2)	13(13.5)	96(100)	32.588	*<0.001
Total	63(24.2)	36(13.8)	78(30)	83(31.9)	260(100)		

* P value <0.001 showed statistical significance.

Table 8: Comparison of MET categories and Age

	N	Mean	Std. Deviation	95% Confidence Interval for Mean		Chi square	P value
				Lower Bound	Upper Bound		
Highly active	63	30.44	15.386	26.57	34.32		
Moderately active	36	27.19	13.707	22.56	31.83	7.175	0.067
Low active	78	23.44	8.414	21.54	25.33		
Inactive	83	23.99	10.971	21.59	26.38		
Total	260	25.83	12.225	24.34	27.32		

DISCUSSION

Our study was to evaluate the prevalence and level of physical activity among today's youth especially with impact of COVID -19 on them. Our study showed that majority of the study participants were mostly inactive or had low activity. Another finding was the majority were females who were in the above mentioned categories. More males were seen to spend time in vigorous activities than females. This finding was similar to that of Veer B et al [21] The vigorous activities involved sports activities like basketball ,football etc. Few were into moderate activities like brisk walking.

Walking was done only rarely for travel purpose by very few students to and fro from home to college. Majority stayed in the hostel while the others used other modes of transportation. In our study, physical activity of the participants was calculated in three domains work, travel and leisure time .Only 68% of study participants were found to meet the energy consumption criteria regarding physical activity as recommended by WHO. At Universities, the study participants were inactive for majority of the time as it involved more of sitting and listening to lectures. Most of the physical activity acquired was during recreational time. The study participants were further divided into inactive, low active, moderately active and highly active on the basis of MET minutes where it was found that 31.9% and 30% fell in the inactive and low active group respectively with only 24% in highly active. The numbers reflected proved how physical fitness is not one of the habits the youth have made part of their daily routine.

In all the four categories females were found to be less active compared to the males. We found that 42.7% were inactive, 11.6% were moderately active and only 15.2% was highly active compared to 39.6 % of males. These were similar to the results found in few studies where gender association with physical activity was done.^[40,41] These results hint the need for more gender-oriented programs in order to improve the physical activity in females and encourage their participation to increase activity levels of the female population .

The current paper has further categorized physical activities into highly active, moderate low and inactive to find the correlation with BMI. Our study does not show a significant correlation between BMI and level of physical activity for every category except those who were falling under low active category. Many studies have been done to find the relationship between anthropometric parameters and physical activity.^[42,43] But there were no consistent findings. Some studies have shown no or positive associations between activity measures and BMI.

There was no statically significant correlation found with age related physical activity in our study which was consistent with the findings of another study too.^[44]

During the course of interview it was further understood that many participants spent less time performing regular physical activity once the lockdown came into place. Once the lockdown was lifted, many have found it difficult in getting back to the normal physical activity/exercise routine. They were affected as for them being with their friends or family, helped them to be more involved in physical activity. During the COVID-19 lockdown, staying at home had disrupted this routine. We feel that our study would have gained more significance if we had done an evaluation with the same GPAQ questionnaire during and after lockdown to understand, compare and document the gravity of the situation. Studies show that lockdown and staying at home have affected the level of physical activity of individuals who participated in physical activity before the COVID-19 lockdown. The findings of this study indicate them becoming insufficiently physically active when compared to before the lockdown.^[45,46,47]

It was found that individuals who engaged in sufficient physical activity had a significantly reduced risk of death compared to individuals who were inactive.^[48] Increasing the levels of physical activity during the COVID-19 outbreak will not only help avoid respiratory tract infections but also motivate individuals to improve their overall health-related quality of life.⁴⁹ Recently, a study found the relationship between depression/health-related quality of life and levels of physical activity in 3,947 Vietnamese adults who were having COVID-19 symptoms .Vietnamese adults who had more physical activity had a significantly lower levels of depression and a significantly higher health-related quality of life.^[50]

Sedentary behaviour is defined as time spent sitting or lying with low energy expenditure, while awake, in the context of occupational, educational, home and community settings and transportation' as given by WHO.⁵¹ A study states that there is high quality evidence for a significant relationship between greater time spent in sedentary behaviour and mortality, and incidence of cardiovascular disease and Type 2 diabetes.^[52]

Non communicable diseases can develop over a long period of time as a result of physical inactiveness; therefore, there are interventions that can be done to alter this. Obese and overweight individuals can lower their risk of developing cardiovascular diseases by improving their level of physical activity. People could start by engaging in some form of physical activities or sports of their interest in their leisure time.^[53]

According to WHO people in the age group of 5-17 years should perform at least 60 minutes of moderate to vigorous intensity activity per day. Those between 18-64 years should perform 150 minutes of moderate intensity physical activity each week or 75 minutes of vigorous intensity physical activity each week or a combination of moderate and vigorous intensity

activity each week.^[54] Whether the youth of today are aware of these guidelines is a big question.

CONCLUSION

To summarize, in view of the effects of Covid pandemic on everyone's lifestyle and health, we wanted to assess the physical activity levels of young adults (18-25years) studying across different institutions in South Kerala. 260 participants were taken for the study based on inclusion and exclusion criteria. GPAQ questionnaire was used and data was collected on interview basis. The intensity of physical activity was given MET score and statistical analysis was done. Almost 40% of the study participants fell in the inactive group while only 24% was found in the highly active group and 13.8% in the moderately active group. Amongst the inactive group majority were female participants. Significant association with inactive group and their BMI was found. Hence our study proves the need to make the youth enlightened about the need to be physically active and encouraging them to improve their activity levels for a healthy future.

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