



COMPARISON OF LEVEL OF PHYSICAL ACTIVITY AMONG COLLEGE GOING STUDENTS DURING AND BEFORE COVID-19 PANDEMIC

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Abstract

Background: The covid-19 pandemic, also known as the corona virus pandemic, is an ongoing global pandemic of corona virus disease 2019(covid-19), caused by severe acute respiratory syndrome corona virus 2(SARS-CoV-2). The outbreak was first identified in December 2019 in Wuhan, China. The relationship between physical activity and physical fitness, and the relationship between the latter and several cardiovascular risk factors cannot be analyzed without taking into account several confounding factors, particularly adiposity and genetic determinants high intensity physical exercise has any effect on CRC (cardio respiratory capacity) in obese adolescents, and that both moderate and high intensity physical exercise modifies adiposity.^[4]

Method: The International Physical Activity Questionnaire (IPAQ) which sought information on age, gender experience past medical history. This study was conducted on 81 individuals of students between age group 18-to-25-year college students who fulfil the inclusion criteria.

Result: Total physical activity levels during and before lockdown with mean of 6141.269 during lock down 6141.269 and, before lockdown t value is -5.562 which is statistically significant at 0.0001.

Conclusion: The study accepts Alternative hypothesis- there is significant difference between PA level in college students during covid-19 lockdown and before lockdown. During the course of this study, it has been concluded that during lockdown students have less PA level compared to before lockdown.

Keywords: Covid-19, Lockdown, Physical Activity.

Introduction

Physical activity

Physical activity is defined as any bodily movement produced by contraction of skeletal muscles that result in substantial increase over resting energy expenditure. It is movement produced by skeletal muscles that requires energy expenditure including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits.^[1] Physical activity encompasses all activities, at any intensity, performed during any time of day or night.^[2] It includes exercise and incidental activity integrated into daily activity. This integrated activity may not be planned, structured, repetitive or purposeful for the improvement of fitness, and may include activities such as walking to the local shop, working, active transport, cleaning etc. Lack of physical activity is associated with a range of negative health outcomes whereas increase physical activity can improve physical as well as mental health.^[3]

Physical fitness

It is defined as “a set of attributes that people have or achieve that related to the ability to perform physical activity. It also refers to person’s physically fit as well as mental state fitness. Physical fitness is the ability to carry out daily tasks with vigor and alertness without undue fatigue and ample energy to enjoy leisure time pursuits and meet unforeseen emergencies. One of the founders in the field of Physical fitness Leroy Bud, defines, Physical fitness is the capability of the heart, blood vessels, lungs and muscles to perform at optimal efficiency. These characteristics are usually separated into either health related or skill related components.

Health related physical fitness components are

- **Cardiovascular endurance:** the ability of the circulatory and respiratory system to supply oxygen during sustained physical activity like walking, running, swimming, cycling for more than 2 minutes
- **Body composition:** The relative amounts of muscle, fat, bone and other vital parts of the body.
- **Muscular strength:** The ability of muscle to exert force
- **Muscular endurance:** The ability of muscle to continue to perform without fatigue
- **Flexibility:** The range of motion available at joint



Skill-Related Physical Fitness components

Agility: The ability to change the position of the body in space with speed and accuracy

Coordination: The ability to use the senses, such as sight and hearing, together with body parts in performing tasks smoothly and accurately

Balance: The maintenance of equilibrium while stationary or moving

Reaction Time: The time elapsed between stimulation and the beginning of the reaction to it.

Speed: The ability to perform a movement within a short period of time.

Power: The ability or rate at which one can perform work.

International Physical Activity Questionnaire

Physical inactivity is a global concern, but diverse physical activity measures in use prevent international comparisons. The International Physical Activity Questionnaire (IPAQ) was developed as an instrument for cross-national monitoring of physical activity and inactivity.

Initial pilot testing occurred during 1998–1999, and eight versions of the International Physical Activity Questionnaire (IPAQ) were developed, with four short and four long versions of the questionnaire. These could be administered by telephone interview or self-administration. There were two different reference periods under investigation, either the “last 7 d” or a “usual week”.

To determine the measurement properties of these questionnaires, a reliability and validity study was carried out in 14 centres in 12 countries during 2000. This paper reports on the international reliability and validity study of the IPAQ instruments, in an effort to determine the suitability of different forms of the IPAQ instrument for international physical activity surveillance.^[16]

Scoring protocol

There are two forms of output from scoring the IPAQ. Results can be reported in categories

- Low activity level
- Moderate activity level
- High activity level

Or as continuous variables – MET minutes a week

MET minutes represents the amount of energy expended carrying out PA.

- Walking – 3.3 METS
- Moderate PA – 4 METS
- Vigorous PA- 8 METS

– Convert all activities into minutes

– Each category a maximum of 21 hrs. of activity are permitted a week

PA performed in three intensities: - light, moderate, and vigorous

- **Light:** It requires the least number of efforts, compared to moderate and vigorous activities. It is defined as an activity that is < 3 METS. Walking slowly, sitting at your computer, making the bed, eating, preparing food and washing dishes etc.
- **Moderate:** Activity ranging between 3-<6 MET activity requires more oxygen consumption than light activities. e.g., includes brisk walking, dancing, gardening, housework, active involvement in games, sports activity, and carrying/moving moderate loads < 20kg.
- **Vigorous:** Vigorous intensity activities are defined as activities > 6 METS. It requires highest amount of oxygen consumption to complete the activity. Running, climbing briskly up a hill, fast cycling, aerobics, swimming, sports and games (e.g., volleyball, football), carrying or moving heavy loads > 20kg.

Covid -19 Pandemic: Lockdown Effects

The covid-19 pandemic, also known as the corona virus pandemic, is an ongoing global pandemic of corona virus disease 2019(covid-19), caused by severe acute respiratory syndrome corona virus 2(SARS-CoV-2). The outbreak was first identified in December 2019 in Wuhan, China. The WHO declared the outbreak a public health emergency of international concern on 30 January 2020 and a pandemic on 11 March. As of 9 August 2020, more than 19.5 million cases of covid-19 have been reported in more than 188 countries and territories. The virus is primarily spread between people in proximity, most often via small droplets produced by coughing, sneezing and talking. The first covid-19 positive case has been reported in India (Kerala) on 30 January 2020. Currently,



India has been experiencing speedy growth in covid-19 cases. On 22 March 2020, the government of India ordered a nationwide lockdown limiting movement of the entire 1.3 billion population of India.^[20] While corona virus continues to spread across the globe, in Indian government decided to close the school and colleges as part of a social distancing policy in order to slow transmission of the virus.

The pandemic has caused global social and economic disruption, including the largest global recession since the great depression and global famines affecting 265 million people. It has led to the postponement or cancellation of sporting, religious, political and cultural events, widespread supply shortages exacerbated by panic buying, decreased emissions of pollutants and greenhouse gases. School, Universities and colleges have been closed either on a nationwide or local basis in 161 countries, affecting approximately 98.6 percent of the world's student population.

In India, on 22 march 2020, the government of India ordered a nationwide lockdown limiting movement of the entire 1.3 billion population of India. While corona virus continues to spread across the globe, in India government decided to close the school and colleges as part of a social distancing policy in order to slow transmission of the virus. However, these closure of colleges, has affected the education and physical activity of youth worldwide due to the corona virus pandemic. Due to the lockdown government asking people to stay safe and stay at home. This of course means that most of the students spend much of their time at home.

Methodology

- **Research Design:** Observational Study
- **Study Setting:** Parul Institute of Physiotherapy, Vadodara
- **Study Population:** Subjects with age group 18-to-25-year college students who fulfill the inclusion criteria.
 - **Inclusion Criteria**
 1. Willingness of the subjects to participate in the study.
 2. All the subjects are in age group 18-25 years college students.
 3. Both Male and Female.
 - **Exclusion Criteria**
 1. Age above 25 year
 2. Subject with any deformity
 - **Material Use**
 - Pen
 - Pencil
 - Eraser
 - Sharpener
 - Paper
 - Calculator
 - Google Form
 - Laptop and Computer
 - Mobile Phone
- **Sample Size:** 81 college students were participated in study.

Procedure

- Generated Google form with the help of IPAQ (Short) questionnaire.
- Circulate & send this Google form with the help of social media.
- After finding the suitability as per inclusion & exclusion criteria.
- Data collected through Google forms from various types of activities the individual had perform during lockdown period
- In this research 81 subjects were included.
- Calculation was done with the help of IPAQ scoring protocol & master chart were prepared.
- Data analysis was done on the basis of the response received individuals' activities are analysis, separated, calculated and recorded carefully.

Statistical Analysis

Statistical analysis was done by using paired t-test, for comparing the physical activity levels during and before lockdown, for moderate and vigorous physical activity and also for walking activity using IBM SPSS Statistics version20, whereas mean, SD and graphical presentation was made by using Microsoft Excel 2010.

Result

Results would be obtained by comparing physical activity levels before and during lockdown among college students using paired t-test, mean and SD as shown in tables and graphs below:

Table 1: Statistics of Age

| Variables | Female | | Male | | Total | |
|-----------|---------|---------|---------|--------|---------|---------|
| | Mean | SD | Mean | SD | Mean | SD |
| Age | 22.1395 | 1.14604 | 21.6316 | 1.6509 | 21.9012 | 1.41955 |

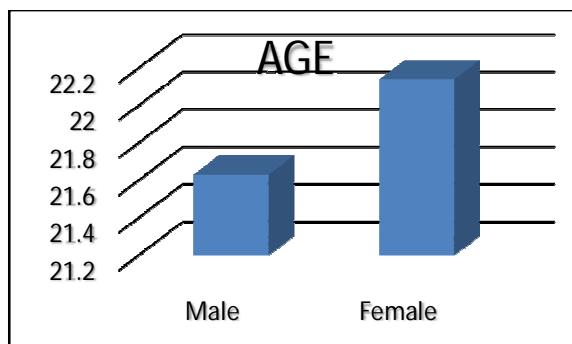


Table 1 shows average age of participants of both gender that is 22.13 with SD 2.24 in females and 21.63 with SD ± 1.65 in males; which shows no significant difference of age in both gender groups.

Table 2: Statistics of Vigorous Physical Activity

| Paired Samples Statistics | | Mean | N | Std. Deviation | T Value | P Value |
|----------------------------|--------|---------|---|----------------|---------|---------|
| Vigorous Physical Activity | During | 1337.77 | 8 | 2066.13 | -5.000 | <0.001 |
| | Before | 3491.85 | 8 | 4140.33 | | |

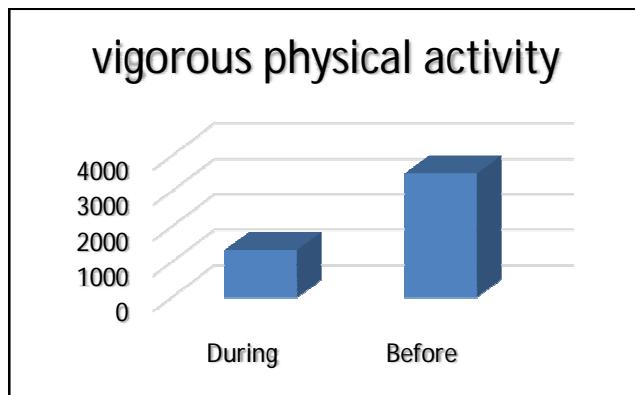


Table-2. Shows vigorous physical activity levels during and before lockdown with mean of 1337.77 during lock down and 3491.85 before lockdown, t value is -5.00 which is statistically significant at 0.0001.

Table 3: Statistics of Moderate Physical Activity

| | | Paired Samples Statistics | | | | | |
|----------------------------|--------|---------------------------|----|----------------|-----------------|---------|---------|
| | | Mean | N | Std. Deviation | Std. Error Mean | T Value | P Value |
| Moderate Physical Activity | During | 714.0741 | 81 | 1298.123 | 144.2359 | -5.466 | <0.0001 |
| | Before | 1913.741 | 81 | 2111.469 | 234.6076 | | |

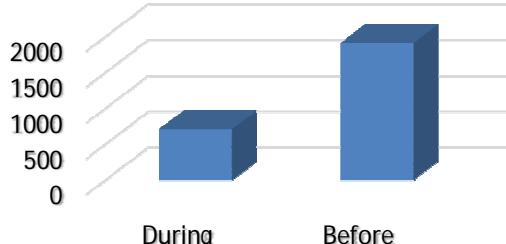
moderate physical activity


Table-3. Shows moderate physical activity levels during and before lockdown with mean of 1913.741 during lock down and 714.0741, before lockdown t value is -5.466 which is statistically significant at 0.0001.

Table 4: Statistics of Walking

| | | Paired Samples Statistics | | | | | |
|---------|--------|---------------------------|----|----------------|-----------------|---------|---------|
| | | Mean | N | Std. Deviation | Std. Error Mean | T Value | P Value |
| Walking | During | 522.7346 | 81 | 442.6929 | 49.1881 | -2.928 | <0.0001 |
| | Before | 744.5741 | 81 | 695.7695 | 77.30773 | | |

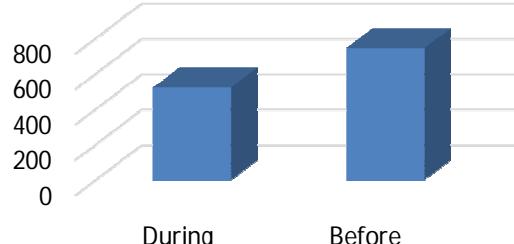
walking


Table-4. Shows walking physical activity levels during and before lockdown with mean of 744.5741 during lock down 522.7346 and, before lockdown t value is -2.928 which is statistically significant at 0.0001.

Table 5: Statistics of Total Physical Activity

| Paired Samples Statistics | | Mean | N | Std. Deviation | Std. Error Mean | T Value | P Value |
|---------------------------|--------|----------|----|----------------|-----------------|---------|---------|
| Total Physical Activity | During | 2574.14 | 81 | 3071.597 | 341.2886 | -5.562 | <0.0001 |
| | Before | 6141.269 | 81 | 5926.2 | 658.4667 | | |

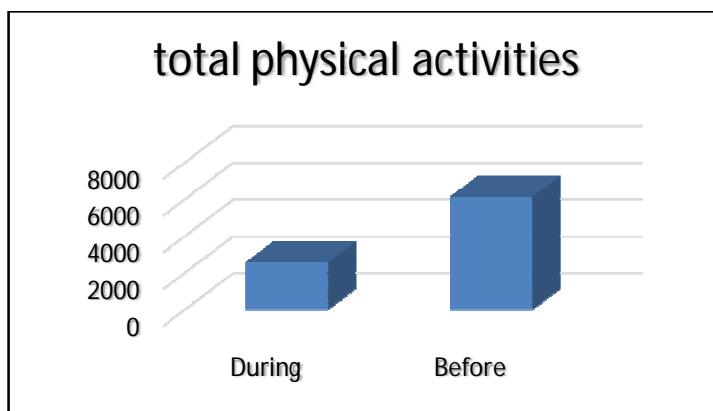


Table-5. Shows total physical activity levels during and before lockdown with mean of 6141.269 during lock down 6141.269 and, before lockdown t value is -5.562 which is statistically significant at 0.0001.

Discussion

The result of this study showed that the average physical activity level of 81 college students before covid-19 lockdown which is total 497443 and mean is 6141.3, greater than the during lockdown physical activity which is 208505 and mean is 2574.1. The aim of the study was to compare the physical activity level in college students during covid-19 lockdown and before lockdown period. The result of this study supported the alternative hypothesis that there is significant difference between physical activity level in college students during lockdown and before lockdown with the help of Google form by using IPAQ (international physical activity questionnaire - short form) the data was calculated with the help of scoring protocol in METs (metabolic equivalent of task) which is amount of oxygen consumption while sitting at rest. The PA level during lockdown is decreased due to less or no exposure of outdoor activities like gym, running in garden etc., while before Lockdown College students were regular to their college and had enough exposure to gym, garden and outdoor activities. during lockdown students attend their classes through online lectures, digital open books, online examination, teleconferencing and interaction at virtual environment, so due to prolong sitting in one position continuously they have become lethargic and find difficulty in performing activities quicker than before. Students have far fewer opportunities to be physically active, especially if activities such as walking or cycling as transportation or taking part in a leisurely activity (e.g., walking the dog, jogging, going to the gym) are being restricted, so due to all this college students PA level might be decreased compare to before lockdown.

Michael Antonius Lim and Raymond Pranata had done similar kind of study on sports activities during any pandemic lockdown in 2020 in which they concluded problems caused by the Covid-19 pandemic, consequences of physical inactivity of detraining, goals during lockdown, isolation and quarantine, health risks for normal activities during Covid-19 recommendations for transitioning to normal activities during Covid-19 in athletes, healthy individuals and high-risk individuals. They found that in athletes there is reduced access to training facilities and they can train at home without supervised and in health individuals risk of sedentary behaviour and physical inactivity, unfavourable body mass composition and developing chronic health problems and individuals with high risks have risk of sedentary behaviour and physical inactivity, unfavourable body mass composition, deteriorated mobility, decreased performance of all daily living activities, maintain quality of life etc.(17)

Melanie Deschasaux-Tanguy, Nathalie Druesne-peccollo, YounesEassedik at al. had also done similar kind of study on Diet and Physical activity during the covid-19 lockdown period (march -May 2020), the result suggest that the lockdown led, in a substantial part of the population, to unhealthy nutritional behaviours' that, if maintained in the long term, may increase the nutritional related burden of disease and also impact immunity. Yet, the lockdown also created an opportunity for some people to improve their nutritional behaviours', with high stakes to understand the leverages to put these on a long-term footing. During the lockdown trends



for unfavourable nutritional behaviours were observed with weight gain, decreased physical activity, increased sedentary time, increased snacking, decreased consumption of fresh food products yet opposite trends were also observed. (18)

Conclusion

The study rejects the Null hypothesis- there is no significant difference between PA level in college students during lockdown and before lockdown. The study accepts Alternative hypothesis- there is significant difference between PA level in college students during covid-19 lockdown and before lockdown. During the course of this study, it has been concluded that during lockdown students have less PA level compared to before lockdown.

Limitations

- The population was collected in college students only.
- The study consisted of smaller number of subjects.
- The study is collected in 18-25 years age group only.

Future recommendations

- Future studies can be done using large sample size
- Future studies can be done using different age group
- Future studies can be done in other population, different than college students.

Summary

The main objective of this study was to find the PA level by comparison of physical activity level in college students during covid-19 lockdown pandemic month and before lockdown month.

According to inclusion criteria 81 subjects were included in the study. there was a significant difference in PA level in students during covid-19 lockdown pandemic and before lockdown period. PA level was assessed by generating Google form with the help of IPAQ (short form). Paired T-test was used with the help of IBM SPSS statistics (version 20) software. Being physically active throughout the day; it required exposure to the gym, garden and outdoor activities which is not possible during lockdown.

From the result it is concluded that physical activity level of college students is decreased during lockdown pandemic as compared to before lockdown month.

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As of Last Complete Printing
Number of Pages: 8
Number of Words: 3,740 (approx.)
Number of Characters: 21,320 (approx.)