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**Original Research Article**

# Level of physical activities among engineering students: a cross-sectional study

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## ABSTRACT

**Background:** Physical activity refers to any bodily movement produced by skeletal muscles that requires energy expenditure. Literacy rate of Kerala is 94%. Engineering courses account to 30 to 40% of total professional courses offered in Kerala. As engineering field continues to evolve, competition among students for achieving higher grades to reach a profession of their dreams have deviated the students from being physically fit. Being physically inactive and leading a sedentary life style are the risk factor of non-communicable disease.
**Methods:** A cross-sectional study was conducted at various 4 Engineering colleges in Trivandrum. 310 Engineering students aged 18 to 30 years were recruited for the study through convivence sampling. A semi structured questionnaire containing sociodemographic and SF-IPAQ questionnaire were prepared in Kobo tool box were used to collect data. Data was analysed using SPSS software 29.
**Results:** Among 310 study participants 95 (31%) were having low physical activity, 206 (66%) were having moderate physical activity and 9 (3%) were having high level of physical activity. The association between age with the level of physical activity were found to be statistically significant. Similarly, presence of non-communicable disease, doctors advise to reduce weight, counting of footsteps had a significant association with the level of physical activity.
**Conclusions:** The level of physical activity decreased as age increases. This could be because of more academic pressure and career development.

**Keywords:** Physical activity, Engineering students, Non-communicable diseases

## INTRODUCTION

Physical activity is essential" the prevention and treatment of disease".[1] CDC defines physical activity as any bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure.[2] Common ways to be physically active are walking, cycling, wheeling, sports, active recreation and play. Physical activity is a main aspect of sports. Sport can be defined as a subset of exercises undertaken individually or as a part of a team, where participants have a defined goal.[3] Sports play a very important role for maintaining and improving the physical health as well as in public health too. In twenty the century due to industrialization and with advancement in science and technology have led to retardation of health and fitness. which eventually led to the development of many non-communicable disease. According to WHO 1 in 4 do not meet the global requirement of being physically active.4 Physical inactive is a global pandemic.[5] Level of being physically inactive is twice higher in high income countries compared to low-income countries. An

increasing trend of obesity among adolescents and youth can be attributed to lack of physical activity. A study done in 2016 proved that the lowest level of physical inactivity is seen in South East Asia with a prevalence of 17.6%.[6] According to national non-communicable disease monitoring survey (NNMS) 54.5% of Indians do not engage in recommended physical activity.[7] In 2022 the direct health care cost attributable to non-communicable disease and mental health associated with physical inactivity is US $ 3,218,129,877. About 66% of all death in India were due to NCD. 8The prevalence of being physically inactive in South India is 28.6%.9 Physical inactivity in urban areas (63.3%) are more compared to rural area (40.6%).[10]

WHO recommends 150-300 minutes of moderate intensity aerobic physical activity.[4] People who do not meet the recommended level are termed as physically inactive or leading a sedentary lifestyle. Being physical inactive is a major risk factor for many non-communicable diseases such as coronary artery disease, hypertension, diabetes mellitus, breast as well as colon cancer.[11] Physically inactivity reduces one's lifespan by 3-4 years.[12] Moderate intensity exercise are found to improve the immune system and sports decreases alcohol consumption.[11,13] Because of strong association between physically inactivity and NCD, WHO have set a global target of 15% reduction in physical inactivity 9 and also have set forward a Global action Plan for physical Activity 2018-203014 to encourage and make society aware on benefits of being physically active.

Kerala has a high literacy rate of 94% and the professional courses have a high intake of students 41.3%.[15,16] Engineering courses amount to 30 to 40% of total professional courses offered in Kerala. Competition among students for achieving higher grades and scores to achieve a profession of their dreams have deviated the students from being physically fit. Being physically inactive and leading a sedentary life style is one of the major risk factors of non-communicable disease. The rising magnitude of Non communicable disease warrants the need to look into the level of physical activity and the attitude towards sports among the technologically and economically productive Engineering students

## METHODS

### *Study design*

It was a cross-sectional study done among Engineering students in four engineering colleges of Trivandrum district. The study was conducted from September 2023 to June 2024.

Sample size was estimated by using the formula n= 4pq/d 2. Where, prevalence (p)=23.8 (prevalence of level of physical activity among university students in Tamil Nadu)17, d=10% of 23.8=2.38. The estimated sample size was 308. The study was done using a convenient sampling. Engineering students of 18 to 30 years and who gave consent to participate in the study were included. Those students enrolled for three-year course (diploma) and who didn't give consent were excluded. A pretested semi structured questionnaire was prepared via Kobo Toolbox for humanitarian response platform, which included socio-demographic question The SF-IPAQ (International Physical Activity Questionnaire) containing 7 questions, which measures physical activity as vigorous physical activity, moderate physical activity and walking on 3-point Likert scale. The Data was entered in Microsoft Excel 2019 and analysed using SPSS software (version 29).

### *Ethical consideration*

Study was conducted after obtaining Institutional ethical clearance number 71/IEC/SUTAMS/2024, also informed consent from the Engineering students. Involvement was voluntary. Data collected was totally anonymous and no identifying features was incorporated. No expenses were incurred from the study participants.

## RESULTS

The study was conducted among 308 engineering students of Trivandrum district. Among 308 study participants majority 149(48.1%) were from 18 -20 years and 105 (33.9%) were from 21 to 23 years. About 56.8% (176) were male participants and 43.2% (134) were females. 73.9% (229) were belonging to APL and 26.1% (81) were from BPL category.

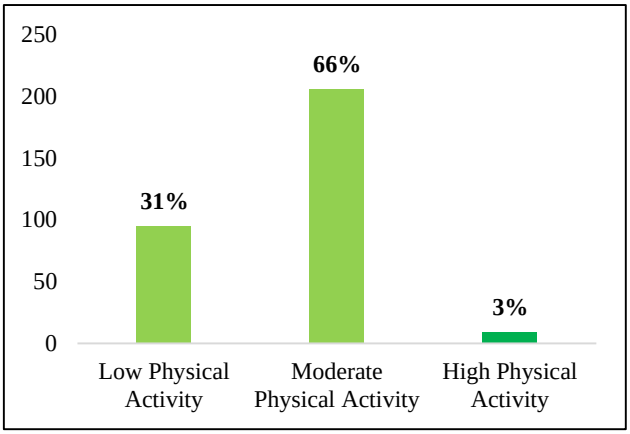


**Figure 1: Level of physical activity.**

About 75.2% (233) were from private engineering college and 77 (24.8%) were from government engineering college. 61% (189) were residing in on campus and 39% (121) were residing off campus. Among 310 study participants 95(31%) were having Low physical activity and majority 206 (66%) were having moderate physical activity and only 9 (3%) were having high physical activity. Among 310 study participants 22.6% (70) have got advice from doctors to reduce weight. Majority 54.5% (169) participants think that they are physically fit. 65%

(201) are tracking their footsteps daily. Among 310 study participants 119 (38.4%) suffers from mental disorders (depression, insomnia, anxiety) and 191 (61.6%) suffers from metabolic disorders like (obesity, poly cystic ovarian disorder). About 21% (64) have on screen time usage >6 hours and 20.6% (64) have duration of sleep <6 hours. Majority 70% (217) think that physical activity is important in academics. 66.1% (205) have facilities to engage in sports. But only 38.7% (120) engage in sports activities. Non communicable disease on screen time usage, duration of sleep, tracking of footsteps, participation in sports activities and membership in sports club) with the level of physical activity were found to be statistically significant.

**Table 1: Distribution of sociodemographic factors of study participants.**

| Variable | Frequency (%) |
|---|---|
| **Age (in years)** | |
| 18-20 | 149 (48.1) |
| 21-23 | 105 (33.9) |
| 24-26 | 52 (16.8) |
| 27-29 | 4 (1.3) |
| **Gender** | |
| Male | 176 (56.8) |
| Female | 134 (43.2) |
| **BMI** | |
| Underweight | 0 (0) |
| Normal weight | 134 (43.2) |
| Overweight | 139 (44.8) |
| Obese | 37 (11.9) |
| **Socioeconomic status** | |
| BPL | 81 (26.1) |
| APL | 229 (73.9) |
| **College** | |
| Government | 77 (24.8) |
| Private | 233 (75.2) |
| **Residency** | |
| Off campus | 121 (39) |
| On campus | 189 (61) |

**Table 2: Factors affecting the level of physical activity among engineering students.**

| Variable | Frequency (%) |
|---|---|
| **Advice by doctors to reduce weight** | |
| Yes | 70 (22.6) |
| No | 240 (77.4) |
| **Self -perception of fitness** | |
| Physically fit | 169 (54.5) |
| Physically unfit | 141 (45.5) |
| **Non communicable diseases** | |
| Mental disorders | 119 (38.4) |
| Metabolic disorders | 191 (61.6) |
| **On screen time** | |
| <2 hours/day | 122 (39.4) |
| 2-4 hours/day | 68 (21.9) |
| 4-6 hours/day | 56 (18.1) |
| >6 hours/day | 64 (20.6) |
| **Duration of sleep** | |
| <6 hours/day | 64 (20.6) |
| 6-8 hours/day | 181 (58.4) |
| >8 hours/day | 65 (21) |
| **Tracking of footsteps** | |
| Yes | 109 (35) |
| No | 201 (65) |

Continued.

| Variable | Frequency (%) |
|---|---|
| **Perception of importance of physical activity in academics** | |
| Important | 217 (70) |
| Not important | 93 (30) |
| **Participation in sports** | |
| Yes | 120 (38.7) |
| No | 190 (61.3) |
| **Membership in sports club** | |
| Yes | 71 (23) |
| No | 239 (77) |
| **Facilities to engage in sports activities** | |
| Yes | 205 (66.1) |
| No | 105 (33.9) |

**Table 3: Association between contributing factors with the level of physical activity.**

| Variable | Low physical activity | Moderate physical activity | High physical activity | P value |
|---|---|---|---|---|
| **Age (in years)** | | | | |
| 18-20 | 64 (43) | 82 (55 | 3 (2) | <0.001 |
| 21-23 | 17 (16.2) | 84 (80) | 4 (3.8) | |
| 24-26 | 11 (21.2) | 39 (75) | 2 (3.8) | |
| 27-29 | 3 (75) | 1 (25) | 0 | |
| **Gender** | | | | |
| Male | 46 (26) | 124 (71) | 6 (3) | 0.133 |
| Female | 49 (37) | 82 (61) | 3 (2) | |
| **Type of college** | | | | |
| Government | 16 (20.8) | 57 (74) | 4 (5.2) | 0.05 |
| Private | 79 (33.9) | 149 (63.9) | 5 (2.1) | |
| **Socioeconomic status** | | | | |
| BPL | 15 (18.5) | 64 (79) | 2 (2.5) | 0.01 |
| APL | 80 (34.9) | 142 (62) | 7 (3.1) | |
| **Advice by doctors to reduce weight** | | | | |
| Yes | 14 (20) | 49 (70) | 7 (10) | <0.001 |
| No | 81 (33.8) | 157 (65,4) | 2 (0.8) | |
| **Presence of non-communicable disease** | | | | |
| Mental | 21 (17.6) | 92 (77.3) | 6 (5) | <0.001 |
| Metabolic | 74 (38.7) | 114 (59.7) | 3 (1.6) | |
| **Onscreen time** | | | | |
| <2 hours/day | 57 (46.7) | 64 (52.5) | 1 (0.8) | <0.001 |
| 2-4 hours/day | 11 (16.2) | 49 (72.1) | 8 (11.8) | |
| 4-6 hours/day | 8 (14.3) | 48 (85.7) | 0 (0) | |
| >6 hours/day | 19 (29.7) | 45 (70.3) | 0 (0) | |
| **Duration of sleep** | | | | |
| <6 hours/day | 13 (20.3) | 51 (79.7) | 0 (0) | 0.003 |
| 6-8 hours/day | 69 (38.1) | 107 (59) | 5 (2.8) | |
| >8 hours/day | 13 (20) | 48 (74) | 4 (6.2) | |
| **Tracking of footsteps** | | | | |
| Yes | 19 (17.4) | 86 (78.9) | 4 (3.7) | <0.001 |
| No | 76 (37.8) | 120 (59.7) | 5 (2.5) | |
| **Participation in sports** | | | | |
| Yes | 19 (6.13) | 95 (30.65) | 6 (1.94) | <0.001 |
| No | 76 (24.52) | 111 (35.81) | 3(0.97) | |
| **Membership in sports club** | | | | |
| Yes | 6 (1.94) | 58 (18.71) | 7 (2.26) | <0.001 |
| No | 89 (28.71) | 148 (47.74) | 2 (0.65) | |
| **Facilities to engage in sports** | | | | |
| Yes | 76 (24.52) | 125 (40.32) | 4 (1.29) | 0.002 |
| No | 19 (6.13) | 81 (26.13) | 5 (1.61) | |

## DISCUSSION

The present study found that the level of physical activity among engineering students in Trivandrum district were31% (91) had low level of physical activity, 66% (206) had moderate level and only 3% (9) had high level of physical activity. Our findings are in accordance with the study done among medical students were 63.2% (141), 27.8% (62) and 9% (5) were having low, moderate and high level of physical activity. Gender is one among the major predictor of physical activity. Several studies have demonstrated that level of physical activity varied among gender where the males represented a higher level of physical activity than females.[18] Similarly majority 56.8% of our study participants were males and 43.2% (134) were females.

Our study proved that the observed difference between gender and level of physical activity is statistically significant, so there is need for interventions aimed at increasing the level of physical activity levels that can be applied to both genders, with a focus on encouraging more participants to move from low to moderate and high level of physical activity. Only 54.5% (169) perceive that they are physically fit and 38.7% (120) are engaged in sports activities. The association between physical fitness and sports participation was proved by a study done by Kolunsarka.[19] The duration of sleep had a significant association with the level of physical activity. Our findings are in accordance with other studies.[20] Our study demonstrated that the facilities to engage in sports with the level of physical activity was statistically significant. Our results are in contrary to studies made by Abdulla et al.[21]

Limitation of our study is the data was collected through online platform. From our study we recommend there is need for age-appropriate targeted interventions to promote physical activity across different age groups. Regular health checkup and close monitoring of vital screening markers for NCD can be performed to reduce the prevalence of NCD among Engineer students.

## CONCLUSION

The present study concludes that that the level of physical activity among Engineering students of Trivandrum district is that 31% (95) were involved in low level of physical activity, 66% (206) in moderate level of physical activity and 3% (9) in high level of physical activity. Engaging in sports and having facilities in college for physical activity were important contributors of the level of physical activity.70% of the study participants believe that engaging in physical activity have a beneficial effect on academic achievement.

The association between age with the level of physical activity were found to be statistically significant. Similarly having non communicable diseases, doctors' advice to reduce weight and counting of steps while walking was also found to have a significant association with the level of physical activity. Duration of sleep and time spend on watching TV/Laptop also had a significant association with the level of physical activity among Engineering students. Regular health check-up and close monitoring of vital screening markers for NCD can be performed to reduce the prevalence of NCD among Engineer students

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