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Research Article

LEVELS OF PHYSICAL ACTIVITY AMONG MEDICAL STUDENTS IN KALABURAGI, NORTH KARNATAKA: A CROSS-SECTIONAL SURVEY

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ABSTRACT

Objective: Physical activity (PA) is associated with several health benefits. Level of PA among undergraduate medical students is less studied. The objective of the study is to assess the level of PA among medical students in a medical college in North Karnataka, Kalaburagi district.

Methods: A cross-sectional survey using Global Physical Activity Questionnaire version 2 developed by the WHO was done among 167 study participants. The ratio of male to female were 69:98. The total level of PA in three domains, namely, work-related PA, travel to and from places-related PA and leisure time PA were calculated and were expressed as MET-min per week.

Results: About 90% of the students have PA levels over 600 MET-min per week. 10% of students showed inactive PA levels (<600 MET-min per week). The level of PA during work was more than the travel to and from places-related PA and leisure time PA. Male participants were found to be significantly more active than female participants in work-related PA and leisure time vigorous PA. Travel-related PA was similar in both male and female participants.

Conclusion: The study provides MET-min per week score in undergraduate medical student which could provide baseline values for students of a medical college in North Karnataka. The data collected could be compared with the values obtained from other part of the state and our country.

Keywords: Global Physical Activity Questionnaire, Physical activity, Medical students, Physical inactivity, Sedentary behaviour, Body mass index.

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INTRODUCTION

Physical activity (PA) is defined as any bodily movement produced by skeletal muscles that require energy expenditure. It includes all activities that happen as a part of leisure, transport to and from places by means of cycling and walking, and part of an individual's work [1]. The common recreational activities include walking, cycling, jogging, swimming, any form of sport as part of recreation, and play. It can be done with any level of skill and proficiency and enjoyed by all [2]. The evidences have shown that adequate PA performed at moderate to vigorous intensity enhance quality of life, better health in terms of healthy body weight, sleep quality, and prevents non-communicable diseases such as diabetes, hypertension, obesity, cardiovascular and cerebrovascular accidents, and cancer [2-5]. PA also improves mental, social, and emotional well-being of the individual. Studies have shown that any form of PA is better than not having one and that people who are insufficiently active have 20–30% increased chance of death than to those who are sufficiently active [6].

The level of PA across globe is declining sharply because of economic development across the world. It is said that 25% of the world population is insufficiently active. Across globe one in three women and one in four men are insufficiently active to stay healthy. The PA levels in undergraduate medical students are declining. The estimated prevalence of insufficient PA in adults aged 18+ in India is 34.01% (22.34–47.7) an age-standardized estimate for both genders and it is much higher than the global estimate. The prevalence of insufficient PA for males aged 18+ is 24.7% (15.84–36.32) and that for female is 43.89% (29.21–59.73) [7].

The 1st year of undergraduate medical students is often considered a difficult transition in terms of adolescents to young adult and in terms of academic transition from schooling to demanding medical curriculum. The medical curriculum is highly demanding, as a medical student is expected to be sound in medical knowledge, skills, attitudes, and values. The time available for a medical student is constrained because of demanding schedule and curriculum which impose limitations in time for PA. Reports suggest that many medical students are insufficiently active physically which predispose them to added stress, burnout, decreased professional proficiency, and low health related quality of life [4,8,9]. The structure of medical curriculum by itself is likely to contribute to disturbance's in students' healthy habit.

PA promotes a healthy lifestyle in the students with proven benefits of improving academic, psychosocial, and physical benefits [6,10,11]. Moderate intensity PA has many benefits such as reducing cardiovascular diseases and lowering levels of obesity and overweight. PA also helps to improve mental well-being by reducing stress and anxiety levels, improving mood, and promoting social and emotional well-being [6]. PA is also associated with good quality sleep which is a key element in overall well-being of an individual [12].

The study was designed to assess the level of PA among the undergraduate medical students using self-administered Global Physical Activity Questionnaire (GPAQ)-questionnaire [13].

METHODS

The cross-sectional survey was conducted among the undergraduate medical students in a medical college in Kalaburagi, North Karnataka, India. The study was undertaken with 1st- and 2nd-year undergraduate medical students after obtaining Institutional ethical clearance.

Sampling and sample size

The earlier reports have shown the prevalence of high level of PA to be 41.3%. Assuming the prevalence to be 41.3%, sample size was calculated using the formula $n=4pq/d^2$ (p=41.3%, q=100-p, d=20% of p), the sample size was found to be 142. A total of 172 students in the age

group between 18 and 22 were included in the study. All participants were informed about the purpose of the study and were assured of anonymity and confidentiality. Informed consent was obtained from the willing participants.

Study tool

A semi-structured questionnaire was developed to collect the baseline demographic information of the participants that included age (years), gender, sleep duration ≥6 h, self-defined dietary preference (vegetarian/vegan or Non-vegetarian), and average time spent on screen (mobiles, computer, and Television). The weight in kilograms (kg) and height in meter (m) were also recorded using standardized techniques.

To assess the level of the PA, the GPAQ, version 2 developed by the WHO for PA surveillance in countries was used. The questionnaire consists of 16 questions which collects information on three domains of PA, namely, activity at work, travel to and from places, recreational activity and sedentary behavior. The questions in the GPAQ had been tested and validated on large scale population-based surveys on adult population. The questions are structured in GPAQ to provide the domain specific scores for vigorous and moderate intensity activity at work, transport activity, vigorous, and moderate intensity activity during leisure time as well as sedentary behavior or sitting. The results were presented as the energy expenditure in terms of metabolic equivalents (METs) MET- Minutes per week. In accordance with GPAQ scoring protocol, PA levels were calculated for total PA and scores for work related activity, transport activity, and leisure time activity were also computed. For the purpose of analysis, the three domains were further subdivided into six sub-domains, namely, vigorous work, moderate work, transport activity, vigorous recreation, moderate recreational activity, and sitting. The standard scoring criteria recommended by the WHO for adult population in the age group between 18 and 64 are used for analysis. The total time spent in a week doing a PA and the intensity of the PA is taken into account. In a week, PA for health in the three domains, namely, during work, transport, and leisure time in an adult should be at least 150 min of moderate-intensity PA or 75 min of vigorous-intensity PA or an equivalent combination of moderate and vigorous-intensity PA achieving at least 600 MET-minutes [14].

Based on standard scoring criteria, the study population where categorized into three PA levels: "high," "moderate," and "low or insufficiently active." The scoring criteria are as follows

High (should satisfy one of the two criteria)

Vigorous intensity activity on >3 days/week and at least 1500 MET-minutes/week or >5 days of combination of transport (by walk or bicycle), moderate, and or vigorous intensity activity of at least 3000 MET-minutes/week.

Moderate (should satisfy one of the following criteria)

Three days of vigorous activity for at least 20 min/day or 5 days of moderate-intensity activity/transport (by walk or bicycle) of >30 min/day for >10 min at a time or 5 days of any combination of transport walking/cycling, moderate-intensity, or vigorous-intensity activities achieving at least 600 MET-minutes/week.

Low (neither satisfy high or moderate level of PA)

The participants were classified as underweight if the body mass index (BMI) is <18.5 kg/m^2, normal weight ≥18.5–≤23 kg/m^2, overweight if the BMI is ≥23–≤27.4 kg/m^2 and obese if the BMI is ≥27.5 kg/m^2 [15,16].

In accordance with the data cleaning rules, five out of the total 172 participants were excluded [14]. The prevalence of PA was calculated as percentage of participants involved in PA. The variables were tested for normal distribution. The descriptive statistical analysis was done using mean and standard deviation and median was calculated for the level of PA in different domains and the for the total level of PA. The data for level of PA were analyzed for the total participants and the gender differences in PA levels were also analyzed. The non-parametric Mann–Whitney test was used to analyze the gender differences. $p<0.05$ was considered to be statistically significant. All the statistical analysis was performed using R statistical package version 4.2.2.

RESULTS

The basic demographic details of the participants are shown in Table 1. Our study population had a greater number of female participants than males. The average age of the study population was 19.1±0.85. The average height, weight, and the BMI of males were significantly higher than females. Table 2 shows the gender differences in the level of PA in different domains. The total PA levels in male were significantly higher than females. The levels of PA as part of recreation were significantly higher in males than females. The vigorous PA in recreation domain was significantly higher in males than females. The level of PA as part of the travel to and from work place were not different among both genders. The level of PA as part of the daily work was significantly higher in males than females. The level of PA in work place was more of moderate intensity which included walking and climbing the stair case. Total number of participants who did not meet the WHO recommended levels of PA were <10%. The time spent by being sedentary was in the range of

Table 1: Population characteristic

Population characteristics	n (%)
Gender (*n*=167)	
Male	69 (41.32)
Female	98 (58.68)
Age (years)	19.1±0.85
Height (cm)	p<0.05*
Male	173.23±6.12
Female	160.59±6.54
Weight (kg)	p<0.05*
Male	62.52±6.1136
Female	50.31±5.94
BMI	p<0.05*
Male	20.8±1.814
Female	19.6±2.41

BMI: Body mass index. *indicates statistical significance

Table 2: Prevalence of overweight and obesity among study population

BMI category	Total participants (n=167)	Male (n=69)	Females (n=98)
Underweight	9.58 (16)	7.24 (5)	11.22 (11)
Normal	80.24 (134)	81.16 (56)	79.60 (78)
Overweight	10.18 (17)	11.59 (8)	9.18 (9)
Obese	0	0	0

BMI: Body mass index

Table 3: Level of PA by gender in metabolic equivalent of task minutes per week

Level of PA	Male median (25^{th}–75^{th})	Female median (25^{th}–75^{th})	p
Work	960 (800–1200)	840 (720–960)	<0.05
Vigorous	0 (0–0)	0 (0–0)	Not significant
Moderate	960 (800–1200)	840 (720–960)	<0.05
Travel to and from places	240 (120–360)	220 (120–360)	Not significant
Recreation	600 (0–1200)	0 (0–480)	<0.05
Vigorous	480 (0–960)	0 (0–320)	<0.05
Moderate	0 (0–0)	0 (0–0)	Not significant
Total activity	1760 (1380–2440)	1320 (1080–1560)	<0.05

PA: Physical activity

6–16 h. The average time spent in being sedentary in males were 7 h 33 min±3 h 40 min. The average time spent by females by being sedentary was 7 h 20 min±3 h 25 min. There was no significant difference between males and females in time spent by being sedentary. Table 3 shows the prevalence of obesity and overweight among the study population. The total prevalence of overweight was 10.18% and is not different among males and females. The prevalence of underweight was more among females than males.

DISCUSSION

The level of PA among the medical students in the age group of 18–22 years was found to be adequate in over 90% of the total participants in meeting WHO recommendation of >600 MET minutes/week for good health [2]. However, the remaining students were insufficiently active physically. The prevalence of overweight among the study population was 10.18%. The prevalence of adequate PA reported in our study as per the WHO recommendations were greater than that of the Indian adults previously reported. The work-related domain energy expenditure was higher than transport and leisure-related PA which in in concurrence with the previous literature [17]. In other studies, the leisure time PA accounted for the predominant activity for the energy expenditure than the work-related or travel-related energy expenditure [18].

This difference in domain of predominant energy expenditure could be attributed to availability of recreational facility such as gymkhana and sport utilities, time demanding curriculum, and non-availability of physical trainers in most medical colleges and there is also no dedicated time incorporated in the daily curriculum for PA. The other factor which is of greater concern is increased availability and affordability of electronic gadgets in the form of smart phones, tablets, and laptops tend to increase the time spent on screen and decrease the time available for PA and adequate sleep. Both this factors negatively impact the health and academics [12]. The reports have shown that higher the screen time, lesser is the quality of the sleep and sleep duration. It is negatively correlated with level of PA [19].

The direct comparison of our study with other studies published in India could not be done because of the difference in the study methodology, the age group that is being studied and the time point at which the questionnaire was administered as this plays an important role in the data that would be collected. Another important limitation in our study is that it is limited to young adults in the medical college whose results cannot be generalized to general public or other medical college students as the level of activity directly correlates with the availability of good sports and recreational facility. PA also depends on sociocultural, demographic, and socioeconomic variables such as food and dietary habits, family income, parents' educational levels, access to the electronic gadgets, to name a few [20].

CONCLUSION

Physical inactivity is one of the key modifiable risk factors in preventing most of the non-communicable diseases. Although the medical students in our study have achieved the level of PA recommended by the WHO for the health benefit, most of the energy expenditure were in the domain of work-related PA. Our study exemplifies the fact that the leisure time PA energy expenditure was lesser than that of work-related PA which may impact the health negatively on a long run. We wish to conclude that measure must be initiated to ensure adequate resources and time for leisure time PA in medical student for their physical and mental well-being. Incorporation of PA and physical education program in the curriculum will benefit the medical students.

Limitation

The study was done in a single medical college and its results cannot be generalized to general public of same age group or student in other professional courses. The GPAQ questionnaire collects information on PA for the preceding 1 week and is limited by the student ability of recalling the events and facts related to their PA.

Future course

To ensure objectivity, PA tracker could be used. To have a multi-centric study with activity tracking and large study population will help to assess the level of PA in medical students more accurately.

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COMPETING INTERESTS

There is no competing interest declared by the authors.

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