

Pattern of physical activity and overweight among the undergraduate medical students in a Government Medical College of Kolkata

Sajib Chakraborty, Nivedita Das*, Fasihul Akbar and Supantha Chatterjee

Department of Community Medicine, College of Medicine & Sagore Dutta Hospital, Kamarhati, Kolkata-700058 West Bengal, India

Abstract: *Background:* Regular moderate physical activity is a very cost-effective way of improving and maintaining people's health and well-being. Modern way of living has largely eliminated physical activity from our lives as one of the fundamental stimuli. Present study was conducted among undergraduate medical students to assess the physical activity pattern, prevalence of obesity/overweight and relationship of these with socio-demographic characteristics. *Methods:* A descriptive cross-sectional study was conducted using Global Physical Activity Questionnaire (GPAQ) to assess physical activity pattern among 150 students. Metabolic Equivalents (MET) were used to express the intensity of physical activity. Individuals were considered in high risk group with low/ insufficiently activity if energy expenditure was <600 MET min/week. Overweight/ Obesity was measured using BMI category and waist circumference cut-offs for South-East Asian Population. *Results:* Forty six percent students were highly active, 23.3% were moderately active and the rest were insufficiently active. It was found that 40% were obese and 15.3% were overweight as per BMI category. More than half of the students (52.7%) have abdominal obesity. Except for gender (p= 0.005) no other socio-demographic characteristics of the students had significant association with level of Physical activity. *Conclusions:* Although around seventy percent medical students were moderately/ highly active nearly thirty percent were insufficiently active, which was 40% among females making them more prone to risk of several NCDs. The risk is much more in this population as more than half of the students had overweight/abdominal obesity at this age. Promotion of active lifestyles in young adults should be encouraged particularly during leisure time and in commuting.

Keywords: Physical Activity, GPAQ, Overweight/ Obesity, Medical Students.

Introduction

Physical activity is defined as “any force exerted by skeletal muscles that results in energy expenditure above resting level” and it may vary widely in intensity according to the types of activity and the capacity of the individual [1]. Regular physical activity is well recognized lifestyle behaviour for the development and maintenance of the individual and population health & well-being [2-3]. Our modern way of living has largely eliminated physical activity from our lives as one of the fundamental stimuli [4-5]. Epidemiological research has proven that 15-20% of the overall risk for coronary heart diseases, type 2 diabetes, colon cancer, breast cancer, musculoskeletal diseases and psychological disorders is attributable to physical inactivity [6]. Physical inactivity is also related to poor self-esteem and a lower health-related

quality of life [4]. In 1997, World Health Organization (WHO) declared obesity a global epidemic with major health implications. Physical activity is one of the keys to counteract the current epidemic of overweight and obesity.

Regular moderate physical activity is a very cost-effective way of improving and maintaining people's health [7]. The World Health Organization (WHO) recommends that individuals perform at least 150 minutes of moderate to vigorous intensity physical activity per week for the maintenance of optimum health [8-9]. The promotion of physical activity should therefore be a fundamental component of public health work. Monitoring of the population levels of physical activity using standardized protocol is a part of a public health response to current

concerns regarding levels of physical inactivity and obesity. The Global Physical Activity Questionnaire (GPAQ) was developed by WHO for standardized surveillance of physical activity in various countries [10].

In India at the present time, more than half of the population does not meet the WHO's recommendations for physical activity [11]. It is believed that adolescents and youths pick up sedentary habits due to their lifestyle during their college years [12]. The extensive academic curriculum and peer pressure makes them to adopt lifestyles that are more sedentary rather than an active one [13]. As future physicians and health care providers, the medical students are a precious working force of the country. So, it is important to assess the level of physical activity among the medical students, necessary to keep the fit and healthy. Against this background, the present study was planned to assess the pattern of physical activity and sedentary behaviour using GPAQ among the MBBS students of College of Medicine & Sagore Dutta Hospital, located in the outskirts of Kolkata.

Objectives:

1. To assess the pattern of physical activity among undergraduate medical students
2. To assess the prevalence of obesity and overweight among study subjects
3. To find out the relation of pattern of physical activity with overweight and various socio-demographic characteristics of the study population.

Material and Methods

A descriptive cross-sectional study was conducted among undergraduate medical students in College of Medicine & Sagore Dutta hospital, Kamarhati, Kolkata during January to march 2016. Among the five semester batches of student in the college, two batches were chosen randomly. They were students of 1st and 3rd semester of MBBS course. Ethical clearance was obtained from the appropriate authority. Three consecutive visits were made to each batch to include all enrolled students. Students absent in those days were excluded from the study. After explaining the purpose and methods of the present study, confidentiality and anonymity of the information, informed written consent was

obtained from each of the study participants. A semi-structured, self-administered questionnaire was distributed to the participants to fill up on the days of data collection. Anthropometric measurements i.e. height, weight and waist circumference (W.C.) were collected for each participant following standard procedure by the researchers and recorded in their respective questionnaire sheets before distributing the questionnaire to the participants.

Weight was measured with a digital weighing scale with a precision of 0.01 Kg and height was measured with a portable anthropometric rod with a precision of 0.1 cm. A metallic, non-stretchable tape was used to measure waist circumference with a precision of 0.1 cm. Overweight and obesity were diagnosed based on body mass index (B.M.I.) criteria and abdominal obesity was diagnosed based on waist circumference for Indian population [14]. The questionnaire had two sections: first section was for collection of socio-demographic characteristics of the students and the second section was GPAQ. Semester of study, gender, religion, total monthly family income, original residence (rural, urban, semi-urban), current stay (home, hostel, paying guest) and state of origin (West Bengal, other) were collected. Socio-economic status was ascertained with the help of updated B.G. Prasad's scale [15].

Global Physical Activity Questionnaire (GPAQ): GPAQ is a valid and reliable tool developed by WHO for physical activity surveillance across different cultures. Physical activity is measured and expressed in terms of Metabolic Equivalents (MET) in GPAQ. It collects information on activity at work, travel and recreational activities along with their duration. Certain activities during work and recreation were termed as vigorous and moderate depending on the energy expenditure. Time spent in sedentary activities was also considered. The intensity of activities was expressed in metabolic equivalent (MET). MET is the ratio of a person's working metabolic rate relative to the resting metabolic rate. Thus, One MET is defined as the energy cost of sitting quietly and it is equivalent to a caloric consumption of 1 Kcal/Kg/Hour.

Similarly, 4 METs get assigned to the time spent in moderate activities and 8 METs to the time spent in vigorous activities. Total amount of energy expenditure is calculated by multiplying the METs assigned to the activity with the duration in minutes. The person with energy expenditure > 1200 MET-minutes per week was considered as highly active while those with 600-1200 MET-minutes per week was considered as moderately active. Those with total energy expenditure < 600 MET-minutes per week were considered inactive/ insufficiently active. Those who spent > 8 hours in sitting/ reclining during work/ travel/ recreation were considered to have high level of sedentary behavior.

Data were double entered in MS excel spreadsheet and checked for consistency. Proportion of students with different level of physical activities and overweight/ obesity were expressed in percentages. Relation of physical activity with socio-demographic variables and overweight/ obesity was examined with chi-square test.

Results

There were 100 and 93 students enrolled in 1st and 3rd semester registers respectively. 83

students of first semester and 86 students of 3rd semester were participated in the study. Thus, the response rate was 87.5%. Out of which ten students of 1st semester and 9 students of 3rd semester were excluded due to missing and incomprehensible data. Thus 73 students of 1st semester and 77 students of 3rd semester were included in analysis. Final the sample size was 150 in the present study.

Majority of the students were Hindus (85.3%) followed by Muslims (14.0%). Near about 55% of the subjects lived in urban and females (%) were slightly more in number. Hostel (%) followed by home (%) was the major type of accommodation - only a few male subjects (2.0%) stayed as paying guest. 70% of students belong to class II as per updated B.G Prasad’s scale. More than 52% of students had vernacular medium of schooling. Average energy expenditure in METs per week was higher in all three domains of physical activity in case of first semester students than third semester students. Average energy expenditure at work was higher in females while that at recreational activities was higher in male students (Table-1).

Table-1: Distribution of energy expenditure of study population expressed in mean MET minutes per week according to various domain of GPAQ according to Semester of study and gender (n=150)

Domains of Physical Activity	Mean MET- minutes per week			
	1 st Semester student	3 rd Semester student	Male	Female
Total activity at work	1222.83 (n=23)	502.35 (n=17)	885.12 (n=24)	1448.5 (n=16)
Total activity in travel	809.20 (n=43)	608.96 (n=23)	722.36 (n=44)	738.28 (n=28)
Total Recreational Activity	1266.8 (n =45)	1087.92 (n= 53)	1251.25 (n=65)	988.34 (n=33)

As noted in table-2, 46.0% students were highly active, 25.3% were moderately active and the rest were insufficiently active. There was little difference between first and third semester batches in proportion of highly active students while 30.1% of first semester and 27.3% of third semester were insufficiently active. Around 60% of male students and less than one-third female students were highly active while around one-fifth male students and more than one-third female students were found to be insufficiently

active. It was found that except for gender (p=0.005) no other socio-demographic characteristics of the students had significant association with the level of physical activities. Although proportion of students with high level of physical activity was lower among Hindus, students of Class-I socio-economic status, those with semi-urban residence of origin, those who are staying at home and students from West Bengal were higher than their counterparts.

Table-2: Distribution of levels of overall physical activity of the study subjects according to various socio-demographic variables (n=150)

Characteristics		Physical Activity Levels			Total	Test
		Low	Moderate	High		
Gender	Male	18 (21.7)	17 (20.5)	48 (57.8)	83 (55.3)	$\chi^2=10.54$ p = 0.005
	Female	25 (37.4)	21 (31.3)	21 (31.3)	67 (44.7)	
Semester of study	First	34 (46.6)	17 (23.3)	22 (30.1)	73 (48.7)	$\chi^2=0.35$ p = 0.838
	Third	35 (45.4)	21 (27.3)	21 (27.3)	77 (51.3)	
Religion	Hindu	37 (28.90)	35 (27.35)	56 (43.75)	128 (85.34)	$\chi^2=2.37$ p = 0.306
	Muslim	6 (27.27)	3 (13.63)	13 (59.09)	22 (14.66)	
Socio-Economic status (updated Prasad's scale)	Class I	11 (45.83)	5 (20.83)	8 (33.34)	24 (16.00)	$\chi^2=5.05$ p = 0.282
	Class II	28 (25.69)	27 (24.77)	54 (49.54)	109 (72.67)	
	Class III/IV	4 (23.54)	6 (35.29)	7 (41.17)	17 (11.33)	
Residence	Rural	7 (25.00)	5 (17.86)	16 (57.14)	28 (18.67)	$\chi^2=3.01$ p = 0.55
	Urban	24 (29.27)	20 (24.39)	38 (46.34)	82 (54.67)	
	Semi-urban	12 (30.00)	13 (32.50)	15 (37.50)	40 (26.66)	
Accommodation	Home	22 (34.92)	16 (25.39)	25 (39.69)	63 (28.00)	$\chi^2=2.425$ p = 0.67
	Hostel/ PG	21 (24.13)	22 (26.19)	44 (50.57)	87 (58.00)	
State of Origin	WB	38 (29.68)	33 (25.78)	57 (44.54)	128 (85.33)	$\chi^2=0.79$ p = 0.67
	Other	5 (22.73)	5 (22.73)	12 (54.54)	22 (14.67)	
Total		43 (28.7)	38 (25.3)	69 (46.0)	150 (100.0)	

It was noted that 40% (60/150) were obese and 15.3% were overweight as per B.M.I. category. More than half (52.7%) of the students had abdominal obesity. AS revealed in table-3, proportion of students who were moderately/highly active was highest among overweight

followed by those with normal B.M.I. or thinness and lowest among obese. This trend was found to be statistically significant (p=0.016). However, no significant association was found with abdominal obesity and level of physical activity.

Table-3: Distribution of the levels of overall physical activity (PA) of the study subjects according to BMI category & W.C. cut off value (n=150)

Anthropometric measurements		Level of PA		Total	
		Low Activity	Highly & Moderately Active		
		n (%)	n (%)	n (%)	
BMI Category	Thinness & Normal	17 (25.4)	50 (74.6)	67 (100.0)	χ^2 for linear trend = 5.802 p = 0.016
	Overweight	3 (13.0)	20 (87.0)	23(100.0)	
	Obese	23 (38.3)	37 (61.7)	60(100.0)	
Abdominal Obesity	Present	26 (32.9)	53 (67.1)	79(100.0)	$\chi^2= 1.47$ p= 0.225
	Absent	17 (23.9)	54 (76.1)	71(100.0)	
Total		43 (28.7)	107 (71.3)	150(100.0)	

Discussion

In the present study nearly half of the study participants were highly active and another one-fourth was moderately active. However, nearly 30% medical students in this early age were insufficiently active which may have serious consequences in later life. A study among university students also reported the similar findings [16]. In Maharashtra, around 40% medical students indulged in vigorous physical activity, the corresponding figure was 66.9% among university students in Ghana [17-18]. In a similar study in Bengaluru, more than 80% of medical students were found to indulge in moderate/ high physical activity [19]. Among female paramedical students in Surat, only 12% had low physical activity level [11].

More than half of the students were overweight both according to B.M.I. criteria and waist circumference. Based on B.M.I. two-fifths of medical students were obese. Prevalence of overweight/ obesity among medical students in Maharashtra was found to be one-fifth of the study participants [18]. Similar prevalence was also reported among university students [16] and health professionals [20]. Among female paramedical students, the proportion of overweight was reported to be 10% [11].

Average physical activity as expressed in METs-minutes per week was higher in first semester students than their senior group. Contrasting finding was reported by Singh et al. (2011) where average energy expenditure was higher in final year students than third year students [20-21]. Adaptation and internalization of relatively different life style at medical college might be the reason. Females expended more energy at educational institution, almost similar at work but much less in recreational activities. The overall proportion of girl students who were moderately/ highly active was significantly lower than male students. Similar finding was noted in other Indian studies in similar age group [16,18-19].

Lack of perceived importance of physical activity, societal norm restricting females from participating in physically active recreational activities, games, stereotypical gender role,

competing interest and lack of time might be the barriers preventing women to be physically active [22-24]. In spite of that it was interesting to note that around 60% girl students were moderately/ highly physically active.

Across the globe, the inverse relationship between physical activity and overweight/ obesity was well established. Paradoxically, the present study noted higher proportion of overweight students was moderately/ highly active. Overweight medical students in the present study might have started doing physical activity after recognizing the condition. As a limitation of cross-sectional study, the temporality of relation could not be established in this study. Similar finding was also found in several other Indian cross-sectional studies [18-19, 25].

Proportion of highly/ moderately active students was lowest among obese. It was evident from earlier research that children classified as obese were significantly less confident in their ability to overcome the barriers to physical activity and need support to do it [26].

Limitations: As for any self-reporting measure, recall bias leading to over- or under-reporting of physical activity in GPAQ could not be ruled out in the study. The study findings are needed to be interpreted considering the small size of sample and cross-sectional design.

Conclusion

Although around 70% medical students were moderately/ highly physically active, nearly 30% were insufficiently active, which was 40% in females, making them more prone to risk of several non-communicable diseases. The risk is much more in this population as more than half of the students at this young age had overweight and/ or abdominal obesity. A silver lining was that the proportion of overweight students who were moderately/ highly active is higher than students who are normal or underweight.

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*All correspondences to: Dr. Nivedita Das, Assistant Professor, Department of Community Medicine, College of Medicine & Sagore Dutta Hospital, Kamarhati, Kolkata-700058 West Bengal, India. E-mail: drnivedita2009@gmail.com