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Original Research Article

Patterns of physical activity and its correlation with gender, body mass index among medical students

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ABSTRACT

Background: The public health burden of a sedentary lifestyle has been recognized globally. Physical inactivity has been identified as the fourth leading risk factor in global mortality. Medical professionals have a significant role in counselling patients so as to reach the public health goals. The objectives were to evaluate patterns of physical activity comprising work, transport, domestic and leisure domains and its correlation with gender and body mass index (BMI) among medical students.
Methods: A cross-sectional study was conducted in 128 medical students. The international physical activity questionnaire (IPAQ) long form was used to measure total physical activity (PA) and metabolic equivalent (MET). BMI was calculated using height and weight. Data analyzed by SPSS version 20.
Results: It was observed that the PA was low among medical students. As per MET score, 80.5%, 58.6%, 67.2% and 39% of students had a low PA pattern in domains of work, transport, domestic and leisure time respectively. The practice of domestic and leisure activity was significantly lower among female students compared to males with p-values of <0.009 and 0.005. The association between PA score and its domains with BMI of students was found to be not significant. In female students a significant positive relationship was observed between domestic and BMI scores with r =0.3459, p<0.005.
Conclusions: Medical students in this study were insufficiently physically active. The practice of activity was intensely lower in females compared to males. These results reflect us the crucial need for intervention on students' health promotion strategies.

Keywords: Body mass index, Healthy lifestyle, Medical students, Physical activity

INTRODUCTION

The public health burden of a sedentary lifestyle has been recognized globally. Physical inactivity has been identified as the fourth leading risk factor for global mortality and is the main cause for approximately 21–25% of breast and colon cancers, 27% of diabetes and 30% of ischemic heart disease burden. Regular and adequate levels of physical activity are essential to reduce the risk of non-communicable diseases.[1] Yet populaces have not achieved sufficient levels of activity.

Physicians are ideally placed for health promotion. They consider lifestyle counselling and promotion of physical activity as part of their everyday work.[2-4] Hence medical students play an important role in promoting health

education to the patients starting with their clinical training years. Several studies have reported that medical students do not meet the recommended level of physical activity.[5,6] Other studies have also observed the prevalence of obesity among medical students.[6,7]

METHODS

We conducted a descriptive cross-sectional study during September 2015 and October 2016. The sampling frame comprised of 128 (39 males and 89 females) first year Malaysian medical students of age group between 19-21 years of Universiti Sains Malaysia – Karnataka Lingayat Education International medical programme, Belagavi, Karnataka. Ethical clearance was obtained by the institutional ethics committee for human subject research. Written informed consent was obtained from all the students.

Self-completion questionnaire using IPAQ long form was chosen in this study to calculate physical activity score.[8] IPAQ has reasonable measurement properties for monitoring population levels of physical activity (PA) among adults in diverse settings.[9] Participants were given about 15 to 20 minutes to complete the questionnaire. Self-estimation was made by the respondents the number of days (frequency) and the average time (duration) that, he/she spent being physically active over the past one week. These questionnaires measured total PA and domains of activity practices like work, transport, domestic and leisure-time. The specific information was asked about the types of activity such as walking, moderate-intensity activities and vigorous-intensity activities. Subsequent calculation of total PA and metabolic equivalent (MET minutes/week) was done. Based on the MET score, the participants were categorised into low, moderate and high intensity level of activities for each domain as follows.[10]

Category	MET- minutes/week
Low	<600
Moderate	≥600 to <3000
High	≥3000

BMI was calculated using height and weight (BMI=weight (kg)/height $(m)^2$). Height was measured to the nearest 0.1cm with stadiometer and weight was measured to the nearest 0.1kg on an electronic scale. Based on the WHO guidelines the respondents were classified as overweight and obese if their BMI was 25–29.9 and ≥30, respectively.[11]

Data analysis was done by using Statistical Package for Social Studies (SPSS), Version 20. The analysis was done by using the chi-square test to see the association between two qualitative variables. The Kolmogorov-Smirnov test was used to assess the normality assumption, then the parametric tests like t-test was used to compare between males and females. The Karl–Pearson's correlation coefficient was performed to assess the relationship between the quantitatively measured variables. The multiple linear regression analysis was carried out to find out the significant predictor of outcome variable BMI. The statistical significance was set at 5% level of significance ($p<0.05$).

RESULTS

Test of normality was conducted and proved all parameters following a normal distribution in males and females as shown in Table 1.

Table 2 shows levels of physical activity domains and its association with gender. Out of 128 respondents, it was observed that the PA was low in medical students. As per MET score calculated in each domains of total PA, showed 80.5% had low work, 58.6% had low transport, 67.2% had low domestic and 39% had low leisure activities. Further the practice of domestic and leisure activity was significantly lower among female students compared to males ($p<0.009$, $p<0.005$).

Table 3 gives data on comparison of males and females with different variables by t test. Total PA and its domains domestic and leisure scores were significantly higher in males as compared to females ($p<0.005$). Other parameters like total work, transport and BMI were similar in both groups.

Table 1: Normality assumption in male and females in all variables by Kolmogorov-Smirnov test.

Variables	Males		Females	
	Z-value	P value	Z-value	P value
Total physical activity	1.1550	0.1390	1.9230	0.0010*
Total work	2.2990	0.0000	3.5130	0.00001*
Total transport	1.0020	0.2680	1.5330	0.0180*
Total domestic	1.3710	0.0470	2.5660	0.00001*
Total leisure	0.8520	0.4620	1.7650	0.0040*
BMI	1.4650	0.0270	1.2390	0.0930

*p<0.05.

Table 2: Association between levels of different variables with gender.

Variables	Males	%	Females	%	Total	%	Chi-square	P value
Total work								
Low	30	76.92	73	82.02	103	80.47	0.6645	0.7173
Medium	6	15.38	12	13.48	18	14.06		
High	3	7.69	4	4.49	7	5.47		
Total transport								
Low	21	53.85	54	60.67	75	58.59	1.6527	0.4377
Medium	18	46.15	33	37.08	51	39.84		
High	0	0.00	2	2.25	2	1.56		
Total domestic								
Low	20	51.28	66	74.16	86	67.19	9.4091	0.0091*
Medium	17	43.59	23	25.84	40	31.25		
High	2	5.13	0	0.00	2	1.56		
Total leisure								
Low	8	20.51	42	47.19	50	39.06	12.4422	0.0020*
Medium	18	46.15	37	41.57	55	42.97		
High	13	33.33	10	11.24	23	17.97		
BMI								
Normal	30	76.92	64	71.91	94	73.44	4.2638	0.1186
Over weight	5	12.82	22	24.72	27	21.09		
Obese	4	10.26	3	3.37	7	5.47		
Total	39	100.00	89	100.00	128	100.00		

*p<0.05.

Table 3: Comparison of males and females with different variables by t test.

Variables	Males		Females		t-value	P value
	Mean	SD	Mean	SD		
Total physical activity	4354.62	2492.84	2915.70	2219.22	3.2506	0.0015*
Total work	832.81	1127.65	711.73	1213.67	0.5306	0.5967
Total transport	548.92	349.27	591.99	497.52	-0.4898	0.6251
Total domestic	1054.09	1216.01	584.98	718.05	2.7209	0.0074*
Total leisure	1918.79	1595.56	1028.12	940.64	3.9400	0.0001*
BMI	22.59	4.19	22.14	3.29	0.6562	0.5129

*p<0.05

Table 4: Correlation between BMI with other variables by Karl Pearson's correlation coefficient method.

Variables	Correlation between BMI with other variables								
	Total samples			Males			Females		
	r-value	t-value	P value	r-value	t-value	P value	r-value	t-value	P value
Total physical activity	0.0468	0.5264	0.5995	-0.2388	-1.4959	0.1432	0.1993	1.8975	0.0611
Total work	-0.0351	-0.3939	0.6943	-0.2988	-1.9044	0.0646	0.0948	0.8880	0.3770
Total transport	-0.0012	-0.0135	0.9893	-0.0673	-0.4104	0.6839	0.0279	0.2607	0.7949
Total domestic	0.1692	1.9267	0.0563	-0.0358	-0.2177	0.8288	0.3459	3.4388	0.0009*
Total Leisure	-0.0016	-0.0182	0.9855	-0.1199	-0.7349	0.4670	0.0685	0.6405	0.5236

*p<0.05.

Table 4 shows the correlation between BMI with other variables. Of the 128 students, 73% were with normal BMI, 21% were overweight and 5% were obese. The association between PA score and its domains with BMI of students was found to be not significant (p>0.05), but surprisingly in female students a significant positive relationship was observed between key domestic and BMI scores (r=0.3459, p<0.005). It means that total domestic and BMI scores of female students are depending on each other. Further, multiple linear regression analysis was performed showed that total domestic scores were significantly and positively influencing on BMI scores of total students as shown in Table 5.

Table 5: Multiple linear regression of BMI with other variables.

	Reg. coefficient	SE of reg. coefficient	t-value	p-level
Intercept	21.1357	0.6300	33.5488	0.00001*
Total work	0.0004	0.0003	1.2169	0.2270
Total transport	0.0001	0.0007	0.0836	0.9336
Total domestic	0.0017	0.0005	3.5273	0.0007*
Total leisure	-0.0003	0.0004	-0.7566	0.4514

R=0.3714, R^2=0.1379, F(4,84)=3.3604 p<0.05, S, Std. error of estimate: 3.1223; *p<0.05.

DISCUSSION

To support regular physical activity WHO recommended at least 150 minutes of moderate intensity activity or 75 minutes of vigorous-intensity aerobic physical activity throughout the week; which outweighs the health benefits in preventing non communicable diseases resulting from overweight and obesity.[12] The "WHO Global Strategy on Diet, Physical activity and Health'' calls upon stakeholders to improve physical activity patterns at all population levels.[13] A review study concludes that doctor's health matters, which influences their clinical attitudes towards physical activity. As medical students have knowledge about the benefits of physically active, they have an ethical obligation to care for the patient's health.[14]

In our study medical students did not reach the recommended level of physical activity which is in accordance with several other studies.[4-6,15] In the present study the practice of domestic and leisure activity were significantly low in females compared to males, as reported by other studies.[16-18] This substantially low physical activity observed among females, is explained by the influencing psychosocial variables among females like self-efficiency, attitudes, perceived barriers, and social support.[19-22]

Our results are inconsistent with the findings of other researchers who have reported that there is no significant association between physical activity score and its domains with BMI of students.[23-27] The combined effect of only total domestic activity was the most significant predictor of BMI of our study students.

CONCLUSION

Physically active medical students will have an impact on the quality of one's own health. All medical professionals have a significant role in counselling patients so as to reach the public health goals. In our study medical students were insufficiently physically active. Low PA was predominantly observed in domains of domestic and leisure time. The practice of activity was intensely lower in females compared to males. These results reflect us the crucial need for intervention on students' health promotion strategies and distinctive encouragement for female students. It is integral to cogitate provision of physical activity electives in the medical curriculum.

Limitations

As the study was conducted in one university, sample size was small to generalise for all medical students. Further questionnaires could have been included to explore low physical activity pattern among female students.

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