

Impact of COVID-19 Pandemic on Physical Activity Level and Lifestyle Changes among Undergraduates of Faculty of Medicine, University of Colombo, Sri Lanka: A Cross Sectional Study

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ABSTRACT

Background: COVID-19 pandemic and related lockdown could prevent students from achieving the recommended levels of physical activity due to home confinement and it also could lead to changes in lifestyle related behaviour. University students are already known as a risk group for physical inactivity. Thus, the aim of this study was to identify physical activity levels and lifestyle changes during COVID-19 pandemic among undergraduate medical and physiotherapy students of University of Colombo, Sri Lanka.

Methods: A web-based survey was used, which consisted of questions from short form of International Physical Activity Questionnaire (IPAQ - SF) and lifestyle related behaviour questionnaire.

Results: A total of 349 participants (age=22.59±1.96, n =141; 40.4 % males and n=208; 59.6 % females) completed the questionnaire. According to the IPAQ categorical score 49.9% were physically inactive and the mean weekly total metabolic equivalent (MET) minutes of the population was 1018.20±1271.13. A significant increase in sitting and screen time during the COVID-19 pandemic were found in 68.5 % of participants. The mean sitting time and screen time were 7.50±5.21 and 7.09±3.43 hours per day. A slight increase in stress and anxiety levels and sleeping hours were reported by 32.4 % and 41.5% of participants respectively while

31.5% reported a slight decrease in consumption of junk food.

Conclusion: An overall increase in physical inactivity such as reduced exercises, increased sitting and screen time were observed among study participants. Promotional educational strategies should include the development and implementation of interventions that promote active lifestyle behaviors during the COVID-19 pandemic.

Keywords: Physical activity, COVID-19, lockdown, lifestyle, Sri Lanka, undergraduates

INTRODUCTION

COVID-19 pandemic, a global burden raised in 2020 caused a considerable public health burden worldwide. Not only the disease itself but also the social distancing measures established to minimize the transmission of the virus lead to several physical and psychological drawbacks among people at all ages.

As outdoor activities were limited, working from home and online classrooms became the new normal, leading to many difficulties in achieving the recommended levels of physical activity. It is reported that staying at home for prolonged periods of time might lead to sedentary behaviours such as spending more time on sitting activities like watching television and

playing games which might lead to an increased risk of chronic health conditions. [1] Studies have shown that physical inactivity could lead to several non-communicable diseases such as coronary heart diseases, type 2 diabetes, breast cancer, and colon cancer thus shortening the life expectancy [2].

Thus, the aim of this study was to assess the physical activity level, sedentary behaviour and changes in lifestyle among undergraduate medical and physiotherapy students of Faculty of Medicine, University of Colombo, Sri Lanka.

LITERATURE REVIEW

Recent evidence reported that there is a significant difference in physical activity levels and energy expenditure before and during COVID-19 pandemic. [1,3] Moreover it has been reported that during the COVID-19 pandemic the prevalence of overweight and obesity has been increased specially in the youth population. [4]

COVID-19 pandemic and social distancing measures affected not only the physical health but also the mental health as well. It is reported that people experience psychological stress, depression, anxiety and insomnia during the pandemic. [1] The significant impact that the pandemic brought to the lifestyle of people at all ages is drastic. Among those who are affected physically as well as mentally, youth is a vulnerable population to change their lifestyles either towards a positive direction or towards a negative direction. As University students are already known as a risk group for sedentary behaviours [5] and even in the non-pandemic period as they were prone to unhealthy habits and dietary patterns, [6] this global pandemic could drag them down even to a greater risk of sedentary behavior. Furthermore, as medical students and physiotherapy students are more prone to have sedentary behaviours due to their tight academic schedules, assessing the physical activity levels and lifestyle among them are beneficial in many ways. As future health care professionals,

they themselves should lead better life styles at this age and they can be role models to their patients in the future. Therefore, the impact that COVID-19 brought to the disruptions of daily routines can be seen as an opportunity to implement new habits leading to the development of a more active lifestyle in the future. [7]

MATERIALS & METHODS

A descriptive cross-sectional study was carried out among medical and physiotherapy undergraduates of Faculty of Medicine, University of Colombo, Sri Lanka. All participants who fulfilled the inclusion criteria and who consented were recruited for the study. Undergraduates who were affected by COVID-19 during the data collection period, students who did not use social networking sites such as Facebook, WhatsApp, Twitter, Instagram or a personal email address, those who did not have a smartphone, laptop or tablet to access the E-survey were excluded from the study.

Physical activity level was identified by the International physical activity questionnaire short form (IPAQ-SF) which is a validated tool [8,9] to measure the physical activity level. According to IPAQ-SF, physical activity was classified into four categories as vigorous activity, moderate activity, walking and sitting. For each of the above physical activity category, the total number of metabolic equivalent (MET) minutes per a week was calculated. Estimation of the MET minutes for each activity level was done according to the recommendations of the American College of Sports Medicine (ACSM). Therefore, 1.5 MET for sitting, 3.3 MET for walking, 4.0 MET for moderate activity and 8.0 MET for vigorous activity were considered. [10] Only vigorous, moderate physical activities and walking were considered for the total MET-minutes per week calculation. In addition to the sitting time, two more questions were included to identify the screen time and sleeping hours per day which enable to describe the sedentary behavior of undergraduates.

Changes in lifestyle related behaviour was assessed by the lifestyle related behaviour questionnaire which is a valid and reliable tool. [11] The questionnaire consists of questions related to changes in dietary habits, sedentary behaviour, and quality of sleep and anxiety and stress levels. It has been reported that this tool will help to provide valuable inputs to the public health policy makers in a short period of time which is important specially in pandemic situations. [11] Slight modifications to the scoring system were done. As recommended in the original questionnaire, item 3 was scored assuming that the person was having normal portion of meals and snacks before COVID pandemic and item 18 was scored assuming that the individual was having an adequate 6-8 hours sleep before pandemic.

English version of both questionnaires was used to avoid any errors in translating into local languages, assuming that all participants were comfortable in answering in English, as the medium of teaching of both the MBBS and B.Sc. (Honors) in Physiotherapy degree programs is English. After obtaining the approval from the Ethics review committee and the Dean of Faculty of Medicine, University of Colombo, a self-reported questionnaire was distributed among participants as a Google form along with the information sheet and the consent form via an e-link. The E-survey was administered using the online survey portal, Google forms (Online survey services). The questionnaire contained of 3 sections. First section composed of demographic related questions including age, gender height, weight, family type and residence. Other two sections of the survey were consisted of questionnaires to assess the physical activity level and changes in lifestyle. A time period of one month was given for participants to respond and reminders were sent weekly. Access to the survey was denied after the given time frame.

Statistical Analysis

Participants' demographic characteristics were described as mean \pm Standard deviation (SD) for continuous variables and percentages for categorical variables. We used the independent sample t test to evaluate the significance of differences in physical activity level and sedentary behavior between the genders and two academic programs. Level of significance was determined at 0.05 level. Statistical analysis was performed using the IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

RESULT

A total of 349 participants (40.4% males; 59.6% females) responded to the E – survey. The mean age of the sample was 22.59 ± 1.96 years. There were no missing data. The mean BMI of the participants was 22.33 ± 9.80 kg/m² with the prevalence of overweight and obesity being 15.2% and 12.0 % respectively. Socio-demographic characteristics of the study participants are shown in table 1.

Table 1: Socio-demographic characteristics of the study participants

Socio-demographic characteristics	Value
Age	22.59(\pm 1.96)
Gender	
Male n (%)	141(40.4 %)
Female n (%)	208(59.6%)
Degree programme	
MBBS n (%)	244 (69.9%)
B.Sc. (Hons) Physiotherapy n (%)	105 (30.1%)
Permanent residence	
Urban n (%)	215(61.6%)
Non-urban n (%)	134(38.4%)
Family status	
Nuclear family n (%)	285(81.7%)
Extended family n (%)	53(15.2%)
Joint family n (%)	11(3.2%)
Mean BMI (kg/m²)	22.33(\pm 9.80)
BMI Category	
Underweight	57(16.3%)
Normal	197(56.4%)
Overweight	53(15.2%)
Obese	42(12.0%)

Values are presented as mean \pm standard deviation or number (frequency%)

According to the IPAQ-SF categorical score, majority of participants were inactive (n=174; 49.9%) while 41.5% (n=145) were moderately active and 8.9% (n=30) were highly active. The mean

weekly total MET minutes of the study sample was 1018.20 ±1271.13. Male participants had significantly higher total MET-minutes/week compared to female

participants (p<0.05) determined by the independent sample t test. Physical activity levels and sedentary behavior of each gender are reported in table 2.

Table 2: Physical activity levels and sedentary behavior according to the gender

	Male	Female	Total	P value
	Mean±SD	Mean±SD	Mean±SD	
Physical activity level				
Vigorous PA (MET-minutes/week)	602.55±934.03	329.42±546.09	439.77±739.17	<0.05*
Moderate PA (MET- minutes/week)	322.13±546.87	198.17±355.22	248.25±446.18	<0.05*
Walking (MET-minutes/week)	382.75±768.19	294.54±563.33	330.18±654.25	>0.05
Total MET-minutes per week	1307.43±1480.54	822.14±1066.89	1018.20±1271.13	<0.05*
Sedentary behavior				
Sitting time (Hours per day)	7.80±6.06	7.30±4.55	7.50±5.21	>0.05
Screen time (Hours per day)	7.08±3.28	7.10±3.54	7.09±3.43	>0.05
Sleeping time (Hours per day)	6.98±1.50	7.47±3.64	7.27±2.97	>0.05

*Significance <0.05 determined by independent sample t test

Physical activity levels and sedentary behavior according to the degree programme are tabulated in table 3. Participants of the MBBS degree

programme had significantly higher sitting and screen time compared to the participants of the B.Sc. (Honors) Physiotherapy degree programme.

Table 3: Physical activity levels and sedentary behavior according to the degree programme

	MBBS	B.Sc.(Hons) Physiotherapy	Total	P value
	Mean±SD	Mean±SD	Mean±SD	
Physical activity level				
Vigorous PA (MET-minutes/week)	496.07±826.67	308.95±454.70	439.77±739.17	<0.05*
Moderate PA (MET- minutes/week)	212.05±336.28	332.38±625.86	248.25±446.18	<0.05*
Walking (MET-minutes/week)	331.60±629.54	326.89±711.53	330.18±654.25	>0.05
Total MET-minutes per week	1039.71±1234.96	968.22±1356.29	1018.20±1271.13	>0.05
Sedentary behavior				
Sitting time (Hours per day)	8.26±.51	5.76±7.59	7.50±5.21	<0.05*
Screen time (Hours per day)	7.49±3.38	6.17±3.40	7.09±3.43	<0.05*
Sleeping time (Hours per day)	7.17±1.47	7.52±4.94	7.27±2.97	>0.05

*Significance <0.05 determined by independent sample t test

Lifestyle related behavior of the study participants during the COVID -19 pandemic is reported in table 4. Majority of the participants (68.5%) reported that their sitting and screen time has been significantly increased during the pandemic and a slight increase in stress and anxiety

levels and sleeping hours were reported by 32.4 % and 41.5% of participants respectively. A slight decrease in consumption of junk food was reported by 31.5% and 34.4% reported a slight increase of daily intake of fruits and vegetables.

Table 4: Lifestyle changes of the study participants during the COVID -19 pandemic.

Question	Significantly increased n(%)	Slightly increased n(%)	Gross Similar n(%)	Slightly decreased n(%)	Significantly decreased n(%)
Probability of skipping one of the main meals (breakfast/lunch/dinner)	51 (14.6%)	65 (18.6)	129 (37.0%)	48 (13.8%)	56 (16.0%)
Habit of snacking between meals	65 (18.6)	129 (37.0%)	94 (26.9%)	35 (10.0%)	26 (7.4)
Quantity/portions of meals and snacks	22 (6.3%)	110 (31.5%)	141 (40.4%)	51 (14.6%)	25 (7.2%)
Daily intake of fruits and vegetables	67 (19.2%)	120 (34.4%)	111 (31.8%)	43 (12.3%)	8 (2.3%)
Intake of a balanced diet (including healthy ingredients such as whole wheat, pulses, legumes, eggs, nuts, fruits and vegetables)	61 (17.5%)	92 (26.4%)	142 (40.7%)	47 (13.5%)	7 (2.0%)
Consumption of junk food/fast food and fried food	17 (4.9%)	59 (16.9%)	53 (15.2%)	110 (31.5%)	110 (31.5%)

Table 4 Continued...

Intake of sugar-sweetened beverages (carbonated soft drinks, sugar-sweetened juices)	14 (4.0%)	52 (14.9%)	107 (30.7%)	79 (22.6%)	97 (27.8%)
Consumption of sweets/candies/chocolate	23 (6.6%)	67 (19.2%)	124 (35.5%)	88 (25.2%)	47 (13.5%)
Participation in cooking new/traditional recipes	69 (19.8%)	120 (34.4%)	145 (41.5%)	11 (3.2%)	4 (1.1%)
Consumption of unhealthy food when bored or stressed or upset	22 (6.3%)	66 (18.9%)	132 (37.8%)	87 (24.9%)	42 (12.0%)
Intake of immunity-boosting foods (lemon, turmeric, garlic, citrus fruits and green leafy vegetables) in the diet	85 (24.4%)	139 (39.8%)	114 (32.7%)	8 (2.3%)	3 (0.9%)
Intake of nutrition supplements to boost immunity	36 (10.3%)	116 (33.2%)	180 (51.6%)	13 (3.7%)	4 (1.1%)
Support of family and friends in eating healthy	71 (20.3%)	149 (42.7%)	111 (31.8%)	12 (3.4%)	6 (1.7%)
Interest in learning healthy eating tips from the media (Newspaper articles/magazines blogs/videos/TV shows/text messages)	46 (13.2%)	138 (39.5%)	152 (43.6%)	9 (2.6%)	4 (1.1%)
Participation in aerobic exercise	40 (11.5%)	88 (25.2%)	108 (30.9%)	63 (18.1%)	50 (14.3%)
Participation in leisure and household chores	56 (16.0%)	159 (45.6%)	90 (25.8%)	33 (9.5%)	11 (3.2%)
Sitting and screen time	239 (68.5%)	84 (24.1%)	13 (3.7%)	8 (2.3%)	5 (1.4%)
Hours of sleep	91 (26.1%)	145 (41.5%)	81 (23.2%)	21 (6.0%)	11 (3.2%)
Quality of sleep	73 (20.9%)	98 (28.1%)	110 (31.5%)	57 (16.3%)	11 (3.2%)
Stress and anxiety levels	52 (14.9%)	113 (32.4%)	90 (25.8%)	60 (17.2%)	34 (9.7%)

DISCUSSION

This study aimed to assess the level of physical activity (PA) and changes in lifestyle during the COVID-19 pandemic among undergraduate students of Faculty of Medicine, University of Colombo, Sri Lanka. Results revealed that the majority (49.9%) of participants were physically inactive. These findings are in line with other studies which showed significantly decreased PA levels among undergraduates during lockdown. A study done in undergraduates of southern Italy reported that more than 62% of participants were not sufficiently physically active.^[6] Most studies have reported that physical activity levels of undergraduates have significantly decreased during the COVID-19 lockdown compared to the pre lockdown period.^[1,4] A recent systematic review also reported that physical activity levels have significantly reduced during COVID-19 lockdown with concurrent increases in sedentary behaviour.^[12] The population had a mean total MET-minutes/week of 1018.20 ±1271.13. A study done in physiotherapy undergraduates of Sri Lanka, before the

COVID-19 pandemic has reported a mean total MET-minutes/week of 1791.25±3097, reporting that majority were inactive.^[13] This finding emphasizes that university students were a risk group for physical inactivity even in the non-pandemic period.

We found a gender difference in physical activity levels during the lockdown. Male participants had significantly higher PA levels compared to female participants. This finding could be due to different motivations, interests and environmental influences. A previous study reported that there are some factors that motivated men to engage in physical activities, but not women such as competition or social recognition while weight control was the main motivation for women.^[14] However an early systematic review done in the COVID pandemic reported that even though female students were more sedentary before the lockdown, the reduction in physical activity level was higher among male students during the lockdown.^[15]

This might be due to the difficulties in engaging outdoor activities such as going

for gymnasiums and participating in sport activities at universities due to lockdown and social distancing measures.

In agreement with many studies the present study also revealed a significantly increased sedentary behaviour including a mean screen time of 7.09 ± 3.43 hours per day, a mean sitting time of 7.50 ± 5.21 hours per day and a mean sleeping time of 7.27 ± 2.97 hours per day. According to the results from lifestyle related behaviours questionnaire, 68.5% of participants reported that screen and sitting time were significantly increased during the COVID-19 lockdown compared to the pre-lockdown period. This increased screen time might be due to the fact that most teaching and learning activities during lockdown were delivered online and also home confinement could lead to increased use of social media. A slight increase in sleeping hours were reported by 41.5% of the participants. A study done in Italy reported that the usage of digital media near bed time was increased during COVID-19 lockdown. In addition to that, marked changes of sleep wake rhythms were observed with people going to bed and waking up later thus spending more time in bed [16] leading to increased sedentary behaviours.

The information collected in the survey highlight the need of interventions to promote physical activity and active lifestyles at the examined population. However, there are several limitations of the current study. Physical activity level was only assessed subjectively using the IPAQ (short form) and no objective measures were included. Also, this method is subject to recall bias which could lead to overestimation of the physical activity levels which is one of the main limitations. Therefore, future research should target larger sample size, students from other academic disciplines and different outcome measures to assess physical activity level.

CONCLUSION

The main findings highlight the immediate need of strategies and policies to

promote indoor physical activities and active lifestyle behaviours among medical and physiotherapy undergraduates, especially during a pandemic like COVID-19. The findings would be beneficial in managing secondary complications associated with physical inactivity and sedentary lifestyle.

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REFERENCES

1. Kumar, A. et al. (2021) 'Impact of Coronavirus disease-19 (COVID-19) lockdown on physical activity and energy expenditure among physiotherapy professionals and students using web-based open E-survey sent through WhatsApp, Facebook and Instagram messengers', *Clinical Epidemiology and Global Health*. Elsevier, 9(May 2020), pp. 78–84. doi: 10.1016/j.cegh.2020.07.003.
2. Lee, P. H. et al. (2011) 'Validity of the international physical activity questionnaire short form', *International Journal of Behavioral Nutrition and Physical Activity*, 8(115), pp. 1–11.
3. López-Sánchez GF, López-Bueno R, Gil-Salmerón A, Zauder R, Skalska M, Jastrzębska J, Jastrzębski Z, Schuch FB, Grabovac I, Tully MA, Smith L. Comparison of physical activity levels in Spanish adults with chronic conditions before and during COVID-19 quarantine. *Eur J Public Health*. 2021 Feb 1;31(1):161-166. doi: 10.1093/eurpub/ckaa159. Erratum in: *Eur J Public Health*. 2021 Mar 13;:null. PMID: 32761181; PMCID: PMC7454536.
4. Yang S, Guo B, Ao L, et al. Obesity and activity patterns before and during COVID-19 lockdown among youths in China. *Clin Obes*. 2020;10(6):e12416. doi:10.1111/cob.12416.
5. Castro, O. et al. (2020) 'How Sedentary Are University Students? A Systematic Review and Meta-Analysis'. *Prevention Science*, (Ea 4556).

6. Gallè F, Sabella EA, Ferracuti S, et al. Sedentary Behaviors and Physical Activity of Italian Undergraduate Students during Lockdown at the Time of CoViD-19 Pandemic. *Int J Environ Res Public Health*. 2020;17(17):6171. Published 2020 Aug 25. doi:10.3390/ijerph17176171.
7. Cheval, B. et al. (2020) 'Relationships between changes in self-reported physical activity, sedentary behaviour and health during the coronavirus (COVID-19) pandemic in France and Switzerland', *Journal of Sports Sciences*. Routledge, 00(00), pp. 1–6. doi: 10.1080/02640414.2020.1841396.
8. Craig, C. L. et al. (2003) 'International physical activity questionnaire: 12-Country reliability and validity', *Medicine and Science in Sports and Exercise*, 35(8), pp. 1381–1395. doi: 10.1249/01.MSS.0000078924.61453.FB.
9. Lee, P. H. et al. (2011) 'Validity of the international physical activity questionnaire short form', *International Journal of Behavioral Nutrition and Physical Activity*, 8(115), pp. 1–11.
10. Fan, M., Lyu, J. and He, P. (2014) 'Chinese guidelines for data processing and analysis concerning the International Physical Activity Questionnaire', *Zhonghua liu xing bing xue za zhi = Zhonghua liuxingbingxue zazhi*, 35(8), pp. 961–964.
11. Kumari, A. et al. (2020) 'A short questionnaire to assess changes in lifestyle-related behaviour during COVID-19 pandemic', *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*. Elsevier Ltd, 14(6), pp. 1697–1701. doi: 10.1016/j.dsx.2020.08.020.
12. Stockwell, S. et al. (2021) 'Changes in physical activity and sedentary behaviours from before to during the COVID-19 pandemic lockdown: a systematic review', pp. 1–8. doi: 10.1136/bmjsem-2020-000960.
13. Ranasinghe, C. et al. (2016) 'Physical inactivity among physiotherapy undergraduates: exploring the knowledge-practice gap', *BMC Sports Science, Medicine and Rehabilitation*. BMC Sports Science, Medicine and Rehabilitation, pp. 1–9. doi: 10.1186/s13102-016-0063-8.
14. Kilpatrick M, Hebert E, Bartholomew J. College students' motivation for physical activity: differentiating men's and women's motives for sport participation and exercise. *J Am Coll Health*. 2005 Sep-Oct;54(2):87-94. doi: 10.3200/JACH.54.2.87-94. PMID: 16255320.
15. López-Valenciano A, Suárez-Iglesias D, Sanchez-Lastra MA, Ayán C. Impact of COVID-19 pandemic on university students' physical activity levels: an early systematic review. *Frontiers in psychology*. 2021:3787.
16. Cellini N, Canale N, Mioni G, Costa S. Changes in sleep pattern, sense of time and digital media use during COVID-19 lockdown in Italy. *J Sleep Res*. 2020 Aug;29(4):e13074. doi: 10.1111/jsr.13074. Epub 2020 May 15. PMID: 32410272; PMCID: PMC7235482.

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