

Physical Activity among Nursing Students of Tribhuvan University during COVID-19 Pandemic

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Abstract

Background

Reduced physical activity is one of the major factors affecting health and has been a serious global problem during COVID-19. Prolonged homestays can lead to increased sedentary behavior and reduced physical activity for nursing students. The objective of this study was to assess the level of physical activity among nursing students.

Methodology

A cross-sectional study was carried out on nursing campuses of Tribhuvan University in 2020 among undergraduate nursing students using a self-administered structured International Physical Activity questionnaire. Samples of 255 students using proportionate systematic random sampling were included. Data were analyzed in SPSS version 17. The total score of physical activity over the recent last seven days period was calculated by adding the total of duration and the frequency of all the activities which was expressed in terms of MET (Multiples of Resting Metabolic Rate)-minutes /week. The level of physical activity was categorized as low, moderate, and high. Ordinal logistic regression was used to find the association between the level of physical activity and selected demographic variables.

Results

The study showed that 38.4% of respondents were from the age group 22-24 years and engagement in vigorous physical activity was lower but the median time spent on moderate MET-Minutes/Week was 630 (1620-180). Likewise, 29.4% have low and 49% have a moderate level of Physical Activity. Furthermore, there is an association between the level of physical activity with the place of residence.

Conclusions

The study concludes that more than one-third of respondents have a low level of physical activity and nearly half have a moderate level. Furthermore, there is an association between the level of physical activity and place of residence. This reflects the need to sensitize nursing students to adopt physical activity in everyday life to improve general health and well-being during the COVID-19 pandemic.

Introduction

Physical activity (PA) includes activities such as play, work, active transportation, housework, and leisure that result in energy expenditure. The WHO recommends 150-300 mins of moderate exercise or 75-150 mins of vigorous activity or an equivalent combination of moderate- and vigorous-intensity aerobic exercise, per week for adults [1]. One of the risk factors for death globally is insufficient PA. During the past 15 years, levels of insufficient activity remained constant as globally, 32% of women and 23% of men who were 18 or older did not adhere to the WHO Recommendations (28.5% in 2001; 27.5% in 2016) [2]. In addition to its many health advantages, PA helps to prevent NCDs. However, worldwide, 1 in 4 adults does not engage in enough PA. Over 80% of teenagers around the world are insufficiently physically active [3].

The outbreak of COVID-19 began in December 2019 in Wuhan, China. On January 30, 2020, the World Health Organization (WHO) declared that the new Coronavirus outbreak is a public health emergency of international concern [4]. As of June 29, 2020, there were 9843073 confirmed cases of COVID-19 globally and 495760 confirmed deaths [5]. The authorities have implemented several protective measures as the COVID-19 pandemic continues to spread throughout almost all territories and regions, including placing cities on lockdown, extending national holidays, closing schools and universities, delaying classes, and prohibiting travel, cultural and sporting events, as well as social gatherings [6]. Due to the COVID-19 pandemic's self-isolation and quarantine regulations, the limited possibilities for physical activity and the fear of getting infections have further reduced the level of habitual PA [7]. People's typical daily routines have been interrupted by the required travel limitations and prohibitions on outdoor activities, including regular physical activity and exercise [8]. People who are already at risk for cardiovascular disease may experience worsening cardiovascular health and premature deaths as a result of confinement-induced reductions in PA levels and increases in sedentary behavior [9]. A study reported before the COVID-19 breakout, there were more students involved in PA than there were during the national lockdown. Inactivity was associated with higher levels of anxiety and depression than PA [10] whereas another study showed an increase in physical activity and sitting time globally as well as within the group during lockdown [11].

PA has also an impact on mental health, a study showed individuals who were physically active enough or considerably so reported decreased psychological distress. Significant differences between the insufficiently active group and the more physically active group were observed in terms of depression, anxiety, interpersonal sensitivity, and somatization [12] similarly moderate level of stress perceived by the student nurse during the COVID-19 pandemic [13].

Because habits formed early in life are more likely to be sustained throughout one's lifetime, it is crucial to regularly assess the level of physical activity among nursing students, identify the most common causes of physical inactivity, and familiarize nursing students with healthy lifestyle choices [14]. Literature suggests that despite being aware of the importance of regular physical activity, nursing students do not meet WHO recommendations [15]. A study among Thai students reported that nearly one-third were not active for the recommended duration [16]. The research indicates that nursing students in Brazil engaged in a low level of physical activity [17]. A study from Hong Kong revealed that male nursing students were more physically active than female nursing students [18] whereas a study from the US revealed that full-time nursing students were more physically active than part-time nursing students [19]. Nursing students in the UK did not adhere to the WHO's recommendations for physical activity [20]. For nursing students, lack of free time, physical exertion, fatigue, a busy work schedule, a busy study schedule, and lack of energy are obstacles to doing PA [18], [19].

The age of Bachelor of Nursing Science student is emerging adults and likely to experience several stressors during the transition period including change of residence as most nursing students moved away from home, independent living, increased responsibility, peer pressure, coursework management, and demanding schedules all are factors to consider. PA would help in reducing work-related stress [15]. Nursing students are role models to their patients. Studies have indicated that physically inactive student nurses are less likely to recommend PA to their patients [21]. A student nurse's promotion to PA can increase their sense of self-esteem and satisfaction in life, as well as their physical and mental wellbeing. Few studies are available on PA among health professionals in Nepal. Furthermore, not much is known about nursing undergraduates regarding PA. It is important to study physical activity among nursing during the COVID-19 pandemic. This study aimed to assess the level of PA among nursing students during a covid-19 pandemic.

Methods

Study designs and setting: A cross-sectional descriptive study was carried out on nursing campuses of Tribhuvan University in 2020 among Bachelor in Nursing Science (BNS) and B.Sc. Nursing students.

Participants and sampling: The formula used to determine the sample size was $Z^2 pq / d^2 + (Z^2 pq / N)$ where $p = 52\%$ of nursing students meet recommended levels of PA needed to improve their health, which is regarded as $(p) = 52$ [22] and allowable error 5%. Samples of 255 students using proportionate systematic random sampling were included from Bachelor of Nursing Science and B.Sc. Nursing students of the five constituent Nursing Campuses of TU, IOM. The sampling frame was developed based on proportion. A list of the students was made available from the campuses.

Data collection: An online survey with a structured questionnaire was used to collect data. A list of the participants was obtained from the concerned authority of the campuses and questionnaires were e-mailed to the participants with clear instructions. The first sample was taken randomly then every 3rd student from the list was taken as a sample. In case of non-response, the next participant of the frame was enrolled as a sample accordingly until desired sample size was achieved. Checking for completeness was done on the same day of data collection.

The data collection tool was divided into two parts. Part I asked for information related to demographic factors (age, level of study, religion, ethnicity, type of family, marital status, place of residence, sitting time, sleeping time, and health problems (history of chronic diseases)). Part II consisted of questions from the International Physical Activity Questionnaire – Long-form (IPAQ-LF). The development of an international physical activity measure commenced in Geneva in 1998, and in 2000, thorough reliability and validity testing was carried out across 12 countries (14 sites). The IPAQ-LF consists of a collection of four questions for use by either telephone or self-administered techniques in each of the four activity categories (occupational PA, transportation-related PA, domestic PA, and leisure-time PA sitting) [23]. IPAQ-LF is a valid tool adopted in different studies [14], [24]. It has reasonable measurement capabilities for monitoring population levels of physical activity among persons aged 18 to 65 in a variety of settings. The study demonstrated that the IPAQ questionnaires produced repeated data (Spearman's rho clustered around 0.8) and that the median rho for criterion validity was approximately 0.30, which was comparable to the majority of prior self-report validation studies. For measuring physical activity in developing nations, IPAQ-LF is suitable [25].

Ethical consideration:

Ethical approval was obtained from the Institutional Review Board of Institute of Medicine, T.U, reference no 56(6-11) E2077/078. Written permission for the data collection was taken from the Research Management Committee of Biratnagar Nursing Campus and all constituent campuses of TU, IOM. Written informed consent was taken from each respondent. Respondents were informed of the aspects of informed consent, including the objective and procedures, anticipated length of involvement, remuneration or reimbursement, voluntary participation or withdrawal, and any potential risks and advantages. Privacy and confidentiality of information of all the respondents were maintained. The responses were classified and anonymity was preserved because this specific ID number was provided in the questionnaire when information was being collected

Data analysis: All the data were kept for editing and coding. The 20 incomplete questionnaire with missing values were not included in analysis. Total 255 respondents were included in final analysis. Data processing and analysis were done using Statistical Package for the Social Sciences (SPSS) version 17.0. For descriptive analyses, frequency, percentage mean, standard deviation, median, and Interquartile range were used. For each of the four domains, the long-form of the IPAQ-LF asks specific questions regarding walking, moderate-intensity, and vigorous-intensity physical activity. The term MET (multiples of the resting metabolic rate) - min/week was used to express continuous scores. Each activity level's energy requirement is represented by a METs score: walking - 3.3 METs, moderate-intensity activity - 4.0 METs, and vigorous-intensity requires 8.0 METs. To determine a participant's overall score, the duration and frequency of each activity level over seven days were added together to provide a total MET - min/week. A. Participants are assigned to one of three PA categories in categorical scoring: low, moderate, or high. Low (No activity is reported OR Some activity is reported but not enough to meet Categories 2 or 3), Moderate (three or more days of vigorous activity lasting at least 20 minutes per day OR five or more days of moderate activity and/or walking lasting at least 30 minutes per day OR five or more days of any combination of walking, moderate-intensity or vigorous activity achieving at least 600 MET-min/week) and High (Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week OR 7 or more days of any combination of walking, moderate- or vigorous- intensity activities accumulating at least 3000 MET-minutes/week)[26]. Ordinal logistic regression was used in inferential analysis to determine the relationship between dependent and independent variables. A p-value <0.05 was regarded as statistically significant (with a confidence interval of 95%). All variables with a p-value ≤ 0.20 in bivariate analysis were included in the multivariate ordinal regression.

Results

The mean age (SD) of the participant was 22.73 (2.36) years, 66.7% of respondents were studying BNS while 33.3% were studying BSc. Nursing. Based on ethnicity, the majority of the respondents were Brahmin/ Chhetri (48.6%) and 36.1% were relatively advantaged Janajati. The majority of the respondents were Hindus (80.4%), 88.6% were unmarried, 74.9% were from nuclear families and 35.3% respondents were from rural areas. Regarding sitting time 60.4% of

respondents spent <6 hours a day and 39.6% spent ≥ 6 hours a day. Similarly, 11% of respondents had some kind of health problem, of which 17.85% of respondents had gastrointestinal problems in the last 7 days [Table 1].

The findings showed Median MET Minutes/week for domestic PA is 420(135-990), transport domain 198(0-396) followed by Leisure time domain 132(40-412.50). Total scores for all activities, including walking and moderate and vigorous ones, with median moderate MET-Minutes/week, was 630(180-1620) followed by walking MET- Minutes/week 429 (148.50-957). The median Total physical activity MET-Minutes/week was 1510 (3379.50-609-33), one-third (29.4%) of respondents had a low level of PA, and nearly half (49%) have a moderate level [Table 2].

Table 3 showed a bivariate analysis of which that age, place of residence, and presence of health problems are associated with the level of physical activity. Table 4 multivariate analysis of the association of level of PA and demographic variables in which place of residence is associated with the level of physical activity (OR 0.366, CI .216-0.621). Whereas other variables such as age, ethnicity, religion, marital status, types of family, sitting time, and presence of health problems are not associated with the level of PA.

Table 1. Demographic characteristics

Variables	n=255	
	Frequency	Percentage
Age in completed years		
19-21	97	38.1
22-24	98	38.4
≥ 25	60	23.5
Mean ± SD= 22.73± 2.36		
Level of study		
BNS	170	66.7
BSc. Nursing	85	33.3
Ethnicity		
Brahmins/ Chhetri	124	48.6
Relatively advantaged Janajati	92	36.1
Others*	49	15.3
Religion		
Hindu	205	80.4
Kirat	28	11.0
Buddhist	14	5.5
Christian	6	2.4
Muslim	2	0.8
Marital status		
Married	29	11.4
Unmarried	226	88.6
Type of family		
Nuclear	191	74.9
joint	64	25.1
Place of residence		
Rural	90	35.3
Urban	165	64.7
Sitting time		
< 6 hr	154	60.4
≥6 hr	101	39.6

*others=Relatively disadvantaged janajati, other socially excluded, Dalit and Religious Minorities

Table 2: Total Scores for all walking, moderate and vigorous activities

Variables	Median MET-Minutes/week	Q ₁ -Q ₃
Walking MET-Minutes/week	429	148.50-957
Moderate MET-Minutes/week	630	180-1620
Vigorous MET-Minutes/week	0	0-240
Physical activity MET-Minutes/per week	1510	609-3379.50

n=255

Table 3: Association between the level of physical activity and demographic variables

n=255

Variables	Low PA	Moderate PA	High PA	Unadjusted OR	CI	p-Value
Age						
19-21	23(9.0)	50(19.6)	23(9.0)	0.472	0.253-0.881	0.018*
22-24	38(14.9)	49(19.2)	15(5.9)			
≥ 25	14(5.5)	26(10.2)	17(6.70)			
Level of study						
BNS	54(21.2)	77(30.2)	39(15.3)	1.095	0.675-1.778	0.713
BSC Nursing	21(8.2)	48(18.8)	16(6.3)			
Ethnicity						
Brahmin	34(13.30)	62(24.3)	28(11.0)			
Relatively advantage janajati	32(12.5)	42(16.5)	18(7.1)	0.662	0.331-1.326	0.245
others**	9(3.5)	22(8.6)	9(3.5)			
Religion						
Hindu	59(23.1)	98(38.4)	48(18.8)	0.729	0.410-1.295	0.281
Others ***	16(6.3)	27(10.6)	7(2.7)			
Type of family						
Nuclear	57(22.4)	99(38.8)	35(13.7)	1.475	0.854-2.548	0.169
Joint	18(7.1)	26(10.2)	20(7.8)			
Marital Status						
Married	9(3.5)	9(3.5)	11(4.3)	0.629	0.291-1.363	0.240
Unmarried	66(25.9)	116(45.5)	44(17.3)			
Place of Residence						
Rural	21(8.2)	38(14.9)	31(12.2)	0.452	0.274-0.746	0.002*
Urban	54(21.2)	87(34.1)	24(9.4)			
sitting time						
<6 hours	50(19.6)	73(28.6)	36(14.1)	1.081	0.673-1.737	0.747
≥6 hours	25(9.8)	52(20.4)	19(7.5)			
Health problems						
yes	5(2.0)	13(5.1)	11(4.3)	0.418	0.199-0.878	0.021*
No	70(27.5)	112(43.9)	44(17.3)			

*significant p_value <0.05,**others= Kirat,Buddhist,Christian,Muslim,***others=Relatively disadvantage janajati,other socially excluded, Dalit and Religious Minorities

Table 4: Association of the level of physical activity and demographic variables (Multivariate analysis)

n=255

Variables	unadjusted OR	adjusted OR	CI	p-value
age				
19-21	0.472	1.308	0.531-3.221	0.559
22-24		0.525		0.068
≥ 25		Ref		
Type of family				
Nuclear	1.475	1.410	0.796-2.494	0.239
Joint		Ref		
Place of Residence				
Rural				
Urban	0.452	0.366	0.621-0.216	0.000*
		Ref		
Health problems				
yes				
No	0.418	0.523	0.231-1.186	0.121
		Ref		

Discussion

This study showed that more than one-third (29.4%) of respondents have a low level of PA, and nearly half (49%) have a moderate level of PA which reiterates the previous findings from Nepal showed insufficient physical activity was the highest among the youngest age group and the women [27]. Similarly, a study conducted in India showed that the prevalence of insufficient PA in adults was 22.5% [28] whereas the findings contradict the findings of the study conducted at the University of California Los Angeles showed Baccalaureate students comprised 68.4% of low PA [15]. Likewise, a study conducted in the United States using IPQA showed students maintained high PA levels, walking was the predominant activity followed by vigorous and moderate activity [19]. Another study conducted in King Fahad Medical city showed that 60.2% are engaged in physical exercise [2]. A study in Malaysia with a sample size of 189 student nurses showed that nurses were active [21] which contradicts the present study. These discrepancies might be due to the setting and the time of study as the present study is conducted in Covid -19 pandemic and there is a lockdown and homestay order which might lead to increased sedentary behaviors and decreased PA

levels among Nursing students. It's crucial to maintain regular physical activity and to exercise routinely in a safe environment at home during the coronavirus outbreak. Although the social distancing measures are important and needed in a time such as now, we need physical activity. For these reasons, implementing an adaptive physical training program at home which may last weeks to months will reduce the detrimental physiological and psychological effects of sedentary behavior during the pandemic[29].

The findings reflected that 60.4% of respondents spent <6 hours a day and 39.6% spent ≥ 6 hours a day sitting which is congruent with the study conducted in Banke district, Nepal which showed per day mean sitting time was higher [24]. During a coronavirus crisis, infection control, and safety precautions must be followed but prolonged homestay can increase the probability of inactivity and lead to a sedentary lifestyle. Regarding health problems, 11% of respondents had some kind of health problem. This study showed that the Median MET minutes/ week for domestic and the garden domain is 420(990-1135), transport domain 198(396-0) followed by leisure time domain 132(412.50-0) which contradicts the findings of the study done in Nigeria [30]. Social distancing and homestay during Covid-19 time provide fewer opportunities for physical activity. Previous studies from Nepal report girls' outdoor PA is limited. COVID-19 restrictions might have further limited their outdoor PA participation. This time to increase activity level students may engage in doing domestic and garden activities.

Likewise, this study showed that the median moderate MET - minutes/week was 630(1620-180) followed by walking MET 429(957-148.50) and the median total physical activity was 1510(3379.50-609). Evidence from studies in Nepal showed that women participated for long hours in moderate-intensity activity while men participated in the more vigorous-intensity activity [27]. The findings are coherent with findings of the study conducted in Nigeria showed that students spent the least time in vigorous-intensity activity. Health professional students had a high prevalence of sedentary time and a very low prevalence of vigorous activity [30]. Another study conducted on Australian University students showed fewer students undertook any walking activity and less time was spent walking among students in 2019 compared to 2018 [31].

In multivariate analysis, there is an association between physical activity level and residence. (OR 0.366, CI 0.216-0.621). A study from Nepal reported that participation in physical activity was higher in rural municipalities [27] whereas a study in multivariate regression analysis showed that PA was associated with being older, having higher education, living in an urban area, never getting married, being underweight, and smoking in both sexes [32].

Limitations: The study was conducted only in BNS and Bs nursing students and confined to only constituent campuses under Tribhuvan University. Though tool is self-report; data was not collected in classroom setting due to Covid 19 pandemic. Desired sample size was not achieved due to non-response

Conclusion

The study concludes that more than one-third of respondents have a low level of PA and nearly half have a moderate level. Furthermore, the level of physical activity and place of residence are associated. This reflects the need to sensitize the nursing students to adopt physical activity in everyday life to improve general health and wellbeing during the COVID-19 pandemic.

Abbreviations

BMI Body Mass Index

IOM Institute of Medicine

IPAQ International Physical Activity Questionnaire

IPAQ-LF International Physical Activity Questionnaire – Long-form

MET Metabolic equivalent of tasks

MVPA Moderate to vigorous -intensity physical activity

NCDs Non-communicable diseases

PA Physical activity

SB Sedentary behaviour

SD Standard Deviation

TU Tribhuvan University

WHO World health organization

Declarations

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Availability of data and materials

The data collected and analyzed during the process are not publicly available. However, the data sets are available from the corresponding author on request.

References

1. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behavior. *Br J Sports Med*. 2020 Dec;54(24):1451–62.
2. Al-Tannir MA, Kobrosly SY, Elbakri NK, Abu-Shaheen AK. Prevalence and predictors of physical exercise among nurses. A cross-sectional study. *Saudi Med J*. 2017 Feb;38(2):209–12.
3. Wilkerson AH, Thomas HO, Nahar VKN. Correlates of physical activity behavior among nursing professionals: A systematic search and literature review. *JOURNAL OF HEALTH AND SOCIAL SCIENCES* [Internet]. 2019 [cited 2021 Oct 29]; Available from: <https://doi.org/10.19204/2019/crr15>
4. Hammami A, Harrabi B, Mohr M, Krstrup P. Physical activity and coronavirus disease 2019 (COVID-19): specific recommendations for home-based physical training. *Managing Sport and Leisure*. 2020 Apr 20;1–6.
5. Coronavirus disease (COVID-19) – World Health Organization [Internet]. [cited 2021 Oct 29]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
6. Parnell D, Widdop P, Bond A, Wilson R. COVID-19, networks and sport. *Managing Sport and Leisure*. 2020 Mar 31;0(0):1–7.
7. Pinto AJ, Dunstan DW, Owen N, Bonfá E, Gualano B. Combating physical inactivity during the COVID-19 pandemic. *Nat Rev Rheumatol*. 2020 Jul;16(7):347–8.
8. Chen P, Mao L, Nassis GP, Harmer P, Ainsworth BE, Li F. Coronavirus disease (COVID-19): The need to maintain regular physical activity while taking precautions. *J Sport Health Sci*. 2020 Mar;9(2):103–4.
9. Peçanha T, Goessler KF, Roschel H, Gualano B. Social isolation during the COVID-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease. *American Journal of Physiology-Heart and Circulatory Physiology*. 2020 Jun;318(6): H1441–6.
10. Rogowska AM, Pavlova I, Kuśnierz C, Ochnik D, Bodnar I, Petrytsa P. Does Physical Activity Matter for the Mental Health of University Students during the COVID-19 Pandemic? *Journal of Clinical Medicine*. 2020 Nov;9(11):3494.
11. Romero-Blanco C, Rodríguez-Almagro J, Onieva-Zafra MD, Parra-Fernández ML, Prado-Laguna M del C, Hernández-Martínez A. Physical Activity and Sedentary Lifestyle in University Students: Changes during Confinement Due to the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*. 2020 Jan;17(18):6567.
12. Factors Associated with Psychological Distress and Physical Activity During the COVID-19 Pandemic | Health Security [Internet]. [cited 2022 May 10]. Available from: <https://www.liebertpub.com/doi/abs/10.1089/hs.2020.0062>
13. Nursing students' views on the COVID-19 pandemic and their perceived stress levels - Aslan - 2021 - Perspectives in Psychiatric Care - Wiley Online Library [Internet]. [cited 2022 May 10]. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/ppc.12597>
14. Cilar Budler L, Preložnik N, Stiglic G, Dominika V, Pajnikihar M. Physical activity among nursing students. *Pielęgniarstwo XXI wieku / Nursing in the 21st Century*. 2017 Mar 1;16.
15. Fitzgerald L. Categorization and determinants of physical activity among nursing students. *Journal of Nursing Education and Practice*. 2015 Feb 10;5.
16. Kalinin-Yobas P, He HG, Lau Y. Physical fitness, health behavior and health among nursing students: A descriptive correlational study. *Nurse Educ Today*. 2015 Dec;35(12):1199–205.
17. Monteiro CR, Mancussi e Faro AC. Physical exercise according to nursing students' perceptions. *Rev Lat Am Enfermagem*. 2006 Dec;14(6):843–8.
18. Chan JCY. Psychological determinants of exercise behavior of nursing students. *Contemp Nurse*. 2014;49:60–7.
19. Bryer J, Cherkis F, Raman J. Health-promotion behaviors of undergraduate nursing students: a survey analysis. *Nurs Educ Perspect*. 2013 Dec;34(6):410–5.
20. Hawker CL. Physical activity and mental well-being in student nurses. *Nurse Educ Today*. 2012 Apr;32(3):325–31.
21. Geok SK, Yusof A, Lam SK, Japan S, Leong OS, Fauzee MSO. Physical Activity and Health-Promoting Lifestyle of Student Nurses in Malaysia. *Journal of Biosciences and Medicines*. 2015 Mar 18;3(3):78–87.
22. Blake H, Stanulewicz N, Mcgill F. Predictors of physical activity and barriers to exercise in nursing and medical students. *J Adv Nurs*. 2017 Apr;73(4):917–29.

23. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003 Aug;35(8):1381–95.
24. Paudel S, Subedi N, Bhandari R, Bastola R, Niroula R, Poudyal AK. Estimation of leisure-time physical activity and sedentary behavior among school adolescents in Nepal. *BMC Public Health.* 2014 Jun 22;14(1):637.
25. Macniven R, Bauman A, Abouzeid M. A review of population-based prevalence studies of physical activity in adults in the Asia-Pacific region. *BMC Public Health.* 2012 Jan 17;12(1):41.
26. Ara A. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ) – Short and Long Forms Contents. [cited 2021 Oct 29]; Available from: https://www.academia.edu/5346814/Guidelines_for_Data_Processing_and_Analysis_of_the_International_Physical_Activity_Questionnaire_IPAQ_Short_and_Long_Forms_Content
27. [ncd-steps-survey-2019-compressed.pdf](https://www.who.int/docs/default-source/nepal-documents/ncds/ncd-steps-survey-2019-compressed.pdf?sfvrsn=807bc4c6_2) [Internet]. [cited 2021 Aug 11]. Available from: https://www.who.int/docs/default-source/nepal-documents/ncds/ncd-steps-survey-2019-compressed.pdf?sfvrsn=807bc4c6_2
28. Newtonraj A, Vincent A, Gowtham P, Haritha S, Ilaveyini S. Level of insufficient physical activity among adults in a rural area of South India: A population-based cross-sectional study. *Journal of Current Research in Scientific Medicine.* 2019 Jan 1;5:105.
29. Hammami A, Harrabi B, Mohr M, Krustrup P. Physical activity and coronavirus disease 2019 (COVID-19): specific recommendations for home-based physical training. *Managing Sport and Leisure.* 2020 Apr 20;0(0):1–6.
30. Oyeyemi AL, Muhammed S, Oyeyemi AY, Adegoke BOA. Patterns of objectively assessed physical activity and sedentary time: Are Nigerian health professional students complying with public health guidelines? *PLoS One.* 2017 Dec 27;12(12):e0190124.
31. Gallo LA, Gallo TF, Young SL, Moritz KM, Akison LK. The Impact of Isolation Measures Due to COVID-19 on Energy Intake and Physical Activity Levels in Australian University Students. *Nutrients.* 2020 Jun 23;12(6):1865.
32. Pedisic Z, Shrestha N, Loprinzi PD, Mehata S, Mishra SR. Prevalence, patterns, and correlates of physical activity in Nepal: findings from a nationally representative study using the Global Physical Activity Questionnaire (GPAQ). *BMC Public Health.* 2019 Jul 3;19(1):864.