Original Article

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Status of Physical Activity and Associated Factors among Secondary School Teachers in Pokhara Metropolitan, Nepal

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ABSTRACT

Background: Cardiovascular diseases are a leading cause of death globally, with physical inactivity as a significant risk factor. In Nepal, lifestyle-related health issues are rising, necessitating an understanding of physical activity patterns in specific groups like secondary school teachers. This study aims to assess the status of physical activity and associated factors among secondary school teachers in Pokhara, Nepal.

Methods: A cross-sectional study was conducted from December 2022 to April 2023 among 406 secondary school teachers in Pokhara. Physical activity was measured using the IPAQ-long form, and other variables were collected through self-administered questionnaires. Univariate and bivariate analyses were followed by logistic regression to calculate adjusted odds ratios (aOR) for factors associated with moderate and high physical activity.

Results: Most participants were male (53%) and Brahmins/Chhetris (69.2%), with a mean age of 38.65 years. The majority (86.3%) met WHO physical activity guidelines, with 65.3% reporting moderate and 21.5% high activity levels. Higher physical activity was associated with being male (aOR: 2.19, 95% CI: 1.11–4.35), higher education (aOR: 2.88, 95% CI: 1.45–5.73), walking while teaching (aOR: 9.13, 95% CI: 4.20–19.87), and access to walking areas (aOR: 2.28, 95% CI: 1.12–4.62).

Conclusion: Male teachers, those with higher education, and those who walked while teaching were more likely to engage in higher physical activity. Access to walking-friendly environments also positively influenced activity levels. Promoting walking friendly spaces and addressing educational and occupational factors could enhance physical activity among teachers.

Keyword: Cardiovascular disease; international physical activity questionnaire; metabolic equivalents.

INTRODUCTION

Cardiovascular diseases (CVDs) are disorders of the heart and blood vessels, including coronary heart disease, strokes, and conditions like rheumatic and congenital heart disease.[1] Cardiovascular disease is the leading global cause of death, accounting for an estimated 17.9 million deaths in 2019, or 32% of all deaths worldwide.[2,3] Nearly half of the burden can be prevented with lifestyle modification such as physical activity, eating behavior, altering drinking and smoking habits.[2,3]

Global physical activity levels are below WHO recommendations, and in Nepal, inactivity among adults aged 18-69 rose from 2.4% to 7.4% between 2013 and 2019.[4,5] The study conducted among 40-80 years respondents in Lamjung district in 2014 shows the prevalence of low physical activity of 10%.[6] Regular physical activity is the proven cost-effective intervention of cardiovascular diseases.[7,8] The study aims to assess the status of physical activity and its associated factors among school teachers of Pokhara, Nepal.

METHODS

This study was a school-based cross-sectional study. The study was conducted in secondary schools within Pokhara Metropolitan City from 2nd December 2022 to 26th April 2023. Ethical approval was obtained from the Institutional Review Committee (IRC) of the Institute

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of Medicine, Maharajgunj [Ref:259(6-11) E2 2079/080]. Similarly, formal permission was obtained from the Pokhara metropolitan city and respective schools. Written informed consent was signed by participants who were willing to participate in the study.

School teachers of both public and private schools of Pokhara Metropolitan city was taken into consideration for the study. Female teachers who report being pregnant at the time of data collection and those participants who had contraindication for physical activity because of different of their health condition were systematically excluded from data collection.

The reference prevalence value (p=80%) physical activity was taken from the cross sectional study conducted among civil servants of Nepal.[9]

The study was conducted in Pokhara Metropolitan City, focusing on secondary level schools. Initially, a total of 111 schools were considered, with a list of 2,044 school teachers compiled for sampling purposes. Using the cluster sampling technique, 22 schools were selected for the study. Ultimately, the required sample of 406 participants were collected from 20 of these schools.

Self-administered structured questionnaire was used. International physical activity questionnaire (IPAQ)-long form which measure physical activity in four domains specific (work, transport, domestic/garden and leisure time) and three activity specific physical activity (walking, moderate and vigorous physical activity) of a week were calculated as per IPAQ scoring protocol. The status of physical activity was classified as high-level, moderate-level, and low-level physical activity.

High-Level Physical Activity: Participants who meet any of the following criteria were considered as having a high level of physical activity: vigorous-intensity activity on at least 3 days, achieving a minimum total physical activity of at least 1500 MET-minutes/week, or 7 or more days of any combination of walking, moderate-intensity, or vigorous-intensity activities, achieving a minimum total physical activity of at least 3000 MET-minutes/week.

Moderate-Level Physical Activity: Meeting any of the conditions below was considered as moderate-level physical activity: 3 or more days of vigorous-intensity activity of at least 20 minutes per day, or 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day, or 5 or more days of any combination of walking, moderate-intensity, or vigorous-intensity activities, achieving a minimum total physical activity of at least 600 MET-minutes/week.

Low-Level Physical Activity: Participants who fail to meet the criteria for moderate or high levels were considered to have low-level physical activity.

Data were entered and analysed using the Statistical Package for Social Sciences (SPSS v27.0). To ensure accuracy, data entry was performed meticulously. Univariate analysis was used to compute frequencies, percentages, means, and standard deviations for all variables, including socio-demographic characteristics, physical activity status, enabling environments, and sedentary behaviour. Bivariate analysis, primarily utilizing chi-square tests, was employed to investigate associations between independent variables (e.g., socio-demographic characteristics, enabling environments, and sedentary behaviour) and the dependent variable (physical activity levels). All variables with a p-value < 0.05 in the chi-square test were entered into the multiple logistic regression model to assess the determinants. Logistic regression analysis was then conducted to determine both unadjusted and adjusted odds ratios (aOR) for factors associated with moderate and high levels of physical activity, adjusting for potential confounders. Multi-collinearity was assessed, with results showing tolerance values above 0.1 and variance inflation factors below 10, indicating no significant interdependence among independent variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Of the study respondents, 64.8% were from private schools, while 35.2% were from public schools. In terms of gender, 53% were male. Ethnicity-wise, Brahmin and Chhetri constituted the majority (69.2%), followed by Janajati (21.3%) and a small proportion of Dalit participants (3.4%). Regarding age distribution, 21.5% of participants were aged 20–30 years, 42.3% were aged 31–40 years, 24.0% were aged 41–50 years, and 12.2% were over 50 years old. The mean age of the participants was 38.65 years (SD: 9.469), while the average number of years spent teaching was 15.58 years (SD: 12.025). In terms of educational qualifications, more than half of the participants (53.3%) had a master's degree, followed by a bachelor's degree (31.6%) and higher secondary education (11.2%). The majority (82.2%) were married, and more than half (53.8%) lived in joint or extended families, while the remaining 46.2% lived in nuclear families.

Among the study participants, 13.2% were classified as having a low level of physical activity (CI: 0.10-0.17). The majority, 65.3%, demonstrated a moderate level of physical activity (CI: 0.61-0.70), while 21.5% were highly active (CI: 0.18-0.26). Notably, 86.3% of respondents met the WHO's global recommendation for physical activity, reflecting a strong overall engagement in healthy activity levels among the participants.

Similarly, activity specific analysis showed moderate activity (52.37%) as the highest contributor of total MET-minutes/week followed by walking (26.25%) and vigorous activity (21.38%). Domain wise analysis showed that, maximum contributor of MET- minute/week was domestic and garden work (34.39%), followed by work (31.38%), leisure time activity (21.89%) and transport (12.35%).

Analysis of enabling environment for physical activity and sedentary behavior among the study participants showed, 59.2% study participants had availability of a playground around their home environment, and nearly 82% mentioned having open space for walking near their home. Similarly, 64.5% reported having physical activity facilities around their home, with football or volleyball grounds and badminton courts being the most common facilities available in their residential areas. In addition to job-related activities, most participants had access to farming land (67%) and kitchen gardens (69.2%) for engaging in physical activities. Other options reported for physical engagement included animal husbandry (24.7%), cycling (37.6%), and gardening (45.7%). Motorcycles were the most common means of transport, used by 61.4% of participants, followed by public buses (13.2%), while very few participants used bicycles or private cars for their daily commute to work.

Regarding sedentary behavior, the study assessed two variables: average sitting time per day and average screen time per day. The majority of participants reported sitting for less than 480 minutes per day, while 10.5% exceeded this duration. The mean sitting time was 273 minutes per day (SD = 178.41). Similarly, the average screen time per day was found to be 205.33 minutes (SD = 130.27). More than half of the participants (56.7%) reported having screen time of ≤180 minutes per day, while the remaining participants exceeded this duration. Most teachers (87.8%) indicated that they usually teach by walking around the classroom, while a smaller proportion (10.8%) preferred sitting, and a negligible number (1.5%) taught while standing. The study also found that only one-fourth of the participants had to travel more than 30 minutes to reach school, while over three-fourths (76%) traveled less than 30 minutes.

The variables which were found statistically significant in chi-square test were put into logistic regression model. Both unadjusted and adjusted logistic regression model for physical activity level were calculated using bivariate and multivariate logistic regression. Adjusted OR (95% CI) shows that males were nearly 2.193 times more likely to be physically active compared to their female counterparts. Similarly, participants with higher educational qualifications were also 2.88 times more engaged in moderate or high level of physical activity compared to participants with higher secondary and bachelor level of education. Compared to sitting and standing way of teaching, walking as a way of teaching was associated with nearly a 10-fold increase in engagement in moderate or high levels of physical activity. Similarly, respondents having walkable area around their home were more likely to engage in regular physical activity compared to respondents having no walking area available around their home. Ethnicity and mean screen time per day were found having significant association in bivariate logistic regression. However, in multiple logistic regression, they were not found significantly associated with physical activity.

Table 1. Distribution of the Participants by Socio-demographic Characteristics.

Characteristics		Number	%
School type	Public	144	35.2
	Private	265	64.8
Sex	Male	217	53
	Female	192	47
Ethnicity	Dalit	14	3.4
	Janajati	87	21.3
	Brahmin/Chhetri	283	69.2
	Others	25	6.2
Respondents age	20-30 Years	88	21.5
	31-40 Years	173	42.3
	41-50 Years	98	24.0
	≥51 Years	50	12.2
Mean age of the participants (SD)		38.65(9.469)	
Years of Teaching	Up to 5 Years	67	16.4
	6-10 Years	81	19.8
	11-15 Years	95	23.2
	16-20 Years	70	17.1
	21 and above	96	23.5
Mean Years of teaching (SD)		15.58 (12.025)	
Educational qualification	Higher secondary	46	11.2
	Bachelor	129	31.6
	Masters	218	53.3
	MPhil	9	2.2
	PhD	7	1.7
Marital Status	Married	336	82.2
	Unmarried	73	17.8
Family type	Nuclear	189	46.2
	Joint/Extended	220	53.8

Table 2. Status of Physical Activity.

Characteristics	**Number**	**Percent (%)**	**95% CI**
IPAQ classification			
Low Physical Activity	54	13.2	0.10-0.17
Moderate Physical Activity	267	65.3	0.61-0.70
High Physical Activity	88	21.5	0.18-0.26
WHO global recommendation on physical activity	355	86.3	0.84-0.90

Table 3. Activity and Domain-specific Physical Activity.

Total PA score	Total (%)	Median MET- minutes/week	IQR
		3561	1324~6733
Activity specific			
Walking	26.25	780	219~1647
Moderate	52.37	1665	462.50~3780
Vigorous	21.38	240	(-)
Domain Specific			
Work	31.38	840	230~2020
Transport	12.35	247	(-)
Domestic and Garden	34.38	870	180~2520
Leisure Time	21.89	438	63~1320

Table 4. Enabling Environment for Physical Activity and Sedentary Behavior.

Characteristics		Number	%
Availability of play ground around home	Yes	242	59.2
	No	167	40.8
Availability of open space for walking	Yes	334	81.7
	No	75	18.3
Physical activity facility around home	Yes	264	64.5
	No	145	35.5
Physical activity facility around home	Gym	146	55.3
	Football/Volleyball ground	172	65.2
	Cricket	43	16.3
	Swimming Pool	73	27.7
	Badminton	156	59.1
	Table Tanis	61	23.1
Physical activity facility outside job	Yes	279	68.2
	No	130	31.8
Engaging in physical activity beside job	Farming land (Khetbari)	187	67.0
	Animal husbandry	69	24.7
	Physical activity stools	87	31.2
	Cycle	105	37.6
	Kitchen garden	193	69.2
	Garden	128	45.7
Usual Means of Transport to school	Walking	90	22.0
	Cycle	10	2.4
	Motorcycle	251	61.4
	Public Bus	54	13.2
	Car	4	1.0

Table 4. Enabling Environment for Physical Activity and Sedentary Behavior.			
Characteristics		Number	%
Usual way of teaching	Sitting	44	10.8
	Standing	6	1.5
	Walking	359	87.7
Time taken to reach school from home	≤30 minutes	311	76.0
Average sitting time per day	≤480 minutes	365	89.2
	>480 minutes	44	10.8
Mean sitting time (SD)	-	**273**	**(178.41)**
Average screen time per day	≤180 minutes	232	56.7
	>180 minutes	177	43.3
Mean screen time (SD)		**205.33**	**(130.27)**

Table 5. Factors Associated with Physical Activity.				
Characteristics	Physical activity level			
	Unadjusted OR (CI)	P value	Adjusted OR (CI) (95% CI)	P value
Sex				
Male	1.937 (1.08-3.48)	0.027*	2.193(1.11-4.35)	0.025*
Female	(ref)		(ref)	
Ethnicity				
Janajati and other	0.551 (0.31-0.99)	0.046*	1.064(0.53-2.13)	0.861
Brahmin/Chhetri	(ref)		(ref)	
Education qualification				
Master/MPhil/PhD	2.892 (1.56-5.14)	0.001*	2.88(1.45-5.73)	0.003*
Higher sec and bachelor	(ref)		(ref)	
Usual teaching way				
Walking	10.12(5.19-19.76)	<0.001*	9.13(4.20-19.87)	<0.001*
Sitting and standing	(ref)		(ref)	
Screen time per day				
>180 minutes	0.525 (0.30-0.94)	0.029*	0.78(0.40-1.53)	0.469
≤181 minutes	(ref)		(ref)	
Walking environment available around home				
Available	3.44(1.88-6.29)	<0.001*	2.28(1.12-4.62)	0.023*
Not available	(ref)		(ref)	

Throughout the analysis, p-values less than 0.05 were considered statistically significant and significant results are marked with an asterisk (*).

DISCUSSION

This study identified the prevalence of low physical activity at 13.2 %, moderate physical activity at 65.3 %, and high physical activity at 21.5 %. About 86% of the study participants met the WHO's global recommendation for physical activity. The multivariate logistic regression showed gender, educational qualifications, having walkable

areas around home as enabling factor, ethnicity mean screen time per day were found statistically significant with the outcome variable physical activity.

The reported prevalence of low physical ,activity in this study (13.2%) was observed higher compared to the nationwide prevalence of low physical activity from the STEPS survey report (7.4%).[4] The higher prevalence of low physical activity in this study is supported by the argument that physical inactivity is more common in urban areas due to urban lifestyles, as this study was also conducted in an urban setting.[10] However, the global prevalence of physical inactivity (27.7%) is almost double that found in this study, [11] which may be due to differences in the age groups of the study population.

Other studies conducted in different locations and time periods have shown 2 to 3 times higher prevalence of low physical activity compared to the current study.[12-15] The time difference could be one reason, as back in 2009, there was lower awareness about the importance of physical activity compared to today, where individuals can easily acquire information from different sources. The fluctuating prevalence of low physical activity across different studies could also be due to the use of different measurement tools for physical activity.

In this study, low physical activity was more prevalent among female teachers compared to male counterparts, which is similar to studies conducted in Iran and among Brazilian teachers.[16,17] However, this contradicts the findings from a study in Chandigarh, which showed higher prevalence of low physical activity among male teachers compared to female counterparts.[18]

Similarly, the domestic and garden work domain contributed the most to total MET-minutes per week, which contrasts with the NCD STEPS survey 2019, which found that the work domain contributed the most to total physical activity.[4] Nepal is an agrarian country, and many teachers might be involved in domestic chores such as working in kitchen gardens, agricultural fields, or animal husbandry in the morning and evening, despite having teaching jobs during the day.

The significant association between physical activity and factors such as educational qualifications and the availability of walking areas around the home is consistent with the studies from Libya and Nigeria.[19,20]

A study using GPAQ found that 97% of men and 98% of women met the WHO global recommendation for physical activity, which is much higher than the 86.6% of participants meeting this recommendation in the current study. However, another study found an equivalent rate of meeting the WHO recommendation.[12,21]

The median MET-minutes/week in this study was 3561, which is almost half that of another study, which reported 8400 and 7140 MET-minutes/week for males and females, respectively. Additionally, the other study found that the work domain contributed most to energy expenditure, which contradicts the findings of the current study, where domestic and garden work contributed the most .[21] Contextually in Nepal, domestic and garden work contributing to more energy expenditure is justifiable as many teachers reported doing household chores outside office hours.

This study found a significant association between physical activity and sociodemographic characteristics such as sex, education level, availability of walkable areas near the home, and the way of teaching in the classroom. Another report from Australia also found that the availability of physical activity facilities had a significant association with performing regular physical activity.[22]

Few reliable studies have shown that sitting for more than 8 hours per day increases the likelihood of cardiovascular diseases by 32% compared to sitting for less than 8 hours per day.[23,24] In this study, 10.5% of participants were at higher risk for cardiovascular diseases due to sitting for more than 8 hours per day. The mean sitting time in this study was 273 minutes per day (SD 178.41), which is higher than the mean occupational sitting time reported in another study conducted among Australian adults (199.9). [25] This could be due to the difference in the nature of occupations, as school teachers spend time standing or walking in classrooms, but may engage in table work during office and leisure time, contributing to higher sitting times.

The cross-sectional design of this study limited the ability to establish causal relationships between variables. The reliance on self-reported data introduced potential biases related to recall and reporting. Additionally, the study's geographic limitation to a single region reduces the generalizability of the findings. The potential influence of unmeasured confounders may have also affected the validity of the results.

CONCLUSIONS

The prevalence of low physical activity was found to be 13.2%, and the majority of participants fell into

the moderate physical activity category. 86.3% of the study participants were compliant with the WHO global recommendation for physical activity. Domestic and garden work contributed the most to domain-specific physical activity among participants. Female participants were more physically inactive compared to their male counterparts. Factors such as sex, ethnicity, educational qualifications, mean screen time, and the availability of walking areas around the home were significantly associated with physical activity levels. These findings suggest that promoting accessible walking environments and considering educational and occupational factors could effectively enhance physical activity levels among individuals.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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