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PHYSICAL ACTIVITY PATTERNS AND ITS ENVIRONMENTAL ASSOCIATIONS AMONG SCHOOLTEACHERS IN SELECTED SCHOOL DIVISION IN EASTERN PROVINCE

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ABSTRACT

It is a well-established fact that prevalence of physical inactivity is rising in global level in all stages of life with significant association for increased non-communicable disease burden. This study was conducted to describe the physical activity (PA) patterns and its environmental associations among schoolteachers in a selected school. A descriptive cross-sectional study was conducted among 392 government schoolteachers selected by multistage cluster sampling method in 2018. Sociodemographic factors, environmental factors and physical activity pattern were assessed by using a validated questionnaire including The International Physical Activity Questionnaire long version and Physical and Social Environment Scale and the level of physical activity was categorized as sufficient an insufficient group. chi-square and Mann- whitney U test were performed at a 5% level of significance. It was found that each participant on average spends 3005.7 (SD±2706.7) MET-minutes total energy per week. The main contributor to the energy expenditure was engaging in home cleaning and gardening [1516.9 (SD±1618.9) MET-minutes per week]. People engaging in job, transport, leisure related activity was less. Majority (85%) of the participants had sufficient level of PA. Overall physical and social environment was less favorable to engaging PA. Insufficient PA level was significantly associated among young and not having chronic disease teachers. There were not significant association found between PA level and environment. Despite the non- conducive environment, majority of schoolteachers in KED had sufficient level of PA. Young teachers and those who not having chronic disease did not meet the sufficient level of PA. Young teachers should be motivated to engage in PA. The facilities have to be arranged to motivate the teachers to participate job, transport and leisure related activity.

Key words: Physical activity, teachers, physical and social environment.

INTRODUCTION

It is a well-established fact that prevalence of physical inactivity is rising in global level in all stages of life with significant association for increased non-communicable disease (NCD) burden. Sri Lanka is one of countries in South East Asia with nearly 21 million population (1). Sri Lanka experienced epidemiological transition where disease burden of communicable disease shifted to NCD. This caused a huge socio-economic

impact in individual, community and national level. Sri Lanka has formulated its "National Multispectral Action Plan for the Prevention and Control of NCD" with a vision of a country "Free of the avoidable burden of non-communicable diseases". The target was set to relatively reduce the premature mortality from cardiovascular disease, cancer, diabetes, or chronic respiratory diseases by 25% by 2025(2)

Physical inactivity, consumption of unhealthy diet, tobacco use, and harmful use of alcohol are the four behavioral or modifiable risk factors for most of NCD related disease. Worldwide, 23% of people (men 20% and women 27%) aged more than 18 years were physically inactive in 2010(3). STEPS survey 2015 has shown 22.5% of the males and 38.4% of the females do not engage minimum level of WHO suggested physical activity (PA) and overweight and obese prevalence is almost 29% (95% CI: 27.5-31.1) in adult population with 24.6% men and 34.3% females (4). Sri Lanka aims to achieve 10% relative reduction in prevalence of lack of physical activity targets by 2025. One of the strategic plans to reduce NDC burden is strengthen or establish the PA programmers in workplaces (5). There are many determinants of physical inactivity, namely individual factors are such as age, gender, education level, income, social motivation, environmental factors and personal barriers. Social and physical environments have a close association with PA (6).

Teachers are a large occupational group. According to the report of Ministry of Education, Sri Lanka, there are 241,591 teachers in 10,194 government schools. They are teaching to around 4.1 million students(7). The previous study results highlighted the importance of perceived teacher support to motivation in PA of students in schools (8). Teacher as a positive role model in encouraging PA has been shown in previous literatures (9). Also, teachers involve in "School Health Promotion Program (SHPP)" which is introduced by Sri Lankan Government with a collaboration of WHO as a part of NCD Prevention. Teachers are also a health resources to local public, especially in rural area in the aspect of sharing health related knowledge and practices. Improvement in health status of schoolteachers contribute not only the present generation but also future generation. Are teachers' daily activities sufficient? Do the teaching profession and their workplace allow them to be physically active? Therefore, assessing physical activeness of schoolteachers will help for policy makers and health planer to formulate the strategies on school health promotion program as well as it is very important need on improving occupational health promotion program of schoolteachers in workplace and community level. By keeping all these in mind, this study was planned to describe the PA patterns, its environmental associations among schoolteachers in Kattankudy Educational Division.

METHODS

A descriptive cross-sectional study was carried out among government schoolteachers, who has been teaching for more than 6 months in 31 schools in Kattankudy Educational Division (KED). There are 617 schoolteachers in all four types of schools. Teachers who are currently pregnant, unable to do PA due to physical disability and teachers from type 3 schools were excluded. The sample size was calculated with estimated prevalence of physical inactivity was 30.4%(4), 1.96 Z value with 5% precision and 1.2 design effect(10). After adjustment of 5% non-response rate, the calculated sample size was 410 (11). A multistage cluster sampling method with probability proportionate to size (PPS) of the schoolteachers in each school in KED was

used to select the representative study sample. All selected schools were stratified according to the types of schools. A cluster was considered as a group consist of thirty teachers and 14 clusters were calculated. Number of clusters were selected according to probability proportionate to size of each school. Teachers were selected through simple random sampling, if the total number of teachers would more than 30.

Pre-tested, validated, self-administered questionnaire with three sections was used for data collection. Assessment of the PA pattern of participant by International Physical Activity Questionnaire - Long Version, Assessment of the perceived physical and social environment in relation to physical activity by Physical and Social Environment Scale (PASES) for physical activity. Sections 2 and 3 were validated for Sri Lanka in previous studies(12)(13). Data were collected by the principal investigator and trained medical students. PA level was assessed according to the IPAQ scoring guidelines. PA was assessed as metabolic equivalents (METs) and expressed as MET-minutes/week. Total PA was calculated by adding different field specific activity such as job-related, transportation, housework and leisure-time. PA level was categorized into sufficient activity and insufficient activity.

There are 34 factors included in PASES. All these factors were grouped in to 8 separate main factors. This was measured in terms of six physical and two social factors. Physical factors were assessed by residential density, infrastructure for walking, aesthetics facilities for cycling, vehicular traffic safety, access and connectivity, recreational facilities, safety, land use diversity. Social factors were assessed by social cohesion and social acceptance of PA. Participants were asked to rate each item on a five-point Likert scale according to their agreement. Scoring was given based on ranging from 1-5 using the scoring protocol for PASES. Mean score for each main factor were calculated. If the median score was more than 4, considered as favorable environment to PA. All questions were coded by principle investigator before entering date. Data cleaning were done by manually checking all questionnaires. Data were analyzed by using Statistical Package for Social Sciences (SPSS version 22 package). Extra precaution was taken while entering data and double entry of 5% of the data was done to identify any input errors.

Descriptive statistics were used to describe the PA pattern, its different components. Continuous variables were described using frequency distributions. Cross tabulation was done between two selected variables. Chi-squared test was used to determine associations between categorical variables. When data set showed a non-normal distribution, a non-parametric test (Mann- whitney U) test was used to assess the association between a continues and categorical variable. A probability of < 0.05 evidence significant. Approval for the study was obtained from the Board of Study, Community Medicine of the Postgraduate Institute of Medicine (PGIM), and Colombo. Ethical clearance was obtained from Ethical Review Committee of PGIM. Informed written consent was obtained from the participants. Data collection was done after obtaining permission from relevant authorities.

RESULT

Description of the study sample based on Socio demographic & economical characteristics.

The sample included a total of 392 (76 men and 316 women) participants with the response rate of 95.8%, whose Socio demographic & economical characteristics are reported in Table 1. Majority of the study participant (62%)

belonged to age less than 40 years. Most of the study population were female (80.6%, n=316). Majority (74%, n=290) of them were receiving average monthly income between 20,001 to 40,000 Sri Lankan rupees. Approximately half of the teachers (49.7%, n=195) were trained teachers followed by graduate teachers (40.8%, n=160)). Half of the teachers had experience of more than 10 years (n=196). Majority of the teachers (75.5%, n= 296) were residing in urban area. Among the participant 20% had at least one chronic disease.

Table 1 Distribution of Socio demographic & economical characteristics (n=392)

Socio demographic & economical characteristics	**Number**	**%**
Age (in years)		
< 40	243	62.0
≥ 40	149	38.0
Sex		
Male	76	19.4
Female	316	80.6
Number of children		
No child	54	13.8
≤ 2	201	51.3
≥ 3	137	34.9
Ethnicity		
Tamil	72	18.4
Moor	320	81.6
Religion (n=391)		
Hinduism	65	16.6
Christianity	12	3.1
Islam	314	80.1
Civil status		
Never married	50	12.8
Currently married	335	85.5
Separate / divorced	7	1.8
Average monthly income (in rupees)		
10,000 – 20,000	37	9.4
20,001 – 40,000	290	74.0
> 40,000	65	16.6
Current Employment status (n=391)		
Permanent	361	92.1
Temporary	30	7.7

Qualification of the teachers		
Graduate teacher	160	40.8
Trained teachers	195	49.7
others	37	9.4
Experience (in years)		
< 10	196	50.0
≥ 10	196	50.0
Area of residence		
Urban	296	75.5
Rural	96	24.5
Having at least one Chronic disease		
Yes	75	19.1
No	317	80.9

Assessments of physical activity pattern of study sample.

It was found in this study that each participant on average spend 3005.7 (SD±2706.7) MET-minutes total energy per week. The main contributor to the energy expenditure was engaging in home cleaning or gardening 1516.9 (SD±1618.9) MET-minutes per week (Table 2). It carries the half of the total energy MET-minutes. Study participant spends approximately equal energy MET-minute in job related, leisure time related and transportation related activates. When considering intensity specific MET-minutes per week for the study participants (Table 2), It showed that according to the intensity of the PA, on average a participant had spent most of the energy in moderate activity [2069.0 (SD±2173.7) MET-minutes per week]

Table 2 Physical activity level according to the domain and the intensity (n=392)

Domain and Intensity specific PA	**PA level (MET minutes/week)**				
	Mean	%	SD	Median	IQR
Job-related	454.5	15.12	592.6	247.5	0.0 - 742.5
Transportation	498.2	16.58	808.9	231.0	0.0 - 693.0
Housework	1516.9	50.47	1618.9	810.0	270.0 – 2482.5
Leisure-time	536.1	17.84	1077.2	172.0	0.0 – 584.0
Vigorous intensity activity	110.4	3.67	326.3	0.0	0.0 – 0.0
Moderate intensity activity	2069.0	68.84	2173.7	1335.0	400.0 - 3120.0
Walking	826.3	27.49	980.1	495.0	132.0 – 1179.7
Total	3005.7		2706.7	2278.2	1027.1 – 4220.2

Level of Physical activity

Only 15.5% (n=61) were categorized as low level of PA. Most of them were moderate (48%, n=188) and 36.5% (n=143) were in high category (Figure 1).

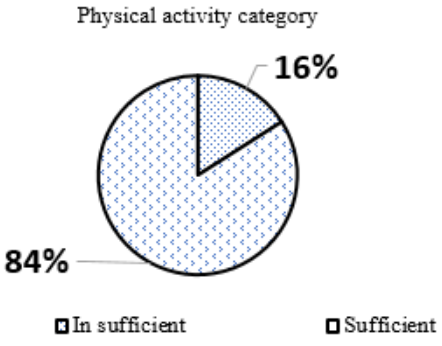

Figure 1 Distribution of study participants according to Physical activity level (n=392)

Association between Physical activity level and environmental factors

Infrastructure for walking (F1), Aesthetics and facilities for cycling(F2), and vehicular traffic safety (F3) were shown the lowest median value indicating least conducive environment for PA in this study population. Overall neighbourhood physical and social environment of study population was less favorable to engaging PA. Overall neighbourhood environment was not significant with sufficient level of PA.

Table 4 Association between Physical activity level and environmental factors

Factors in the PASES			**PA level**	**Mean rank**	**Sum of rank**	**Mann-whitny U**	**z**	**P value**
F1 infrastructure for walking	Mean	2.7	Sufficient	197.83	65481.00	9656.00	-0.545	0.585
	Median	2.7	Insufficient	189.30	11547.00			
	SD	0.68						
F2 aesthetics and facilities for cycling	Mean	2.7	Sufficient	197.25	65289.50	9847.50	-0.306	0.760
	Median	2.7	Insufficient	192.43	11738.50			
	SD	0.88						
F3 vehicular traffic safety	Mean	2.4	Sufficient	196.55	65056.50	10080.50	-0.19	0.985
	Median	2.2	Insufficient	196.25	11971.50			
	SD	0.83						
F4 access and connectivity	Mean	3.6	Sufficient	196.97	65197.00	9940.00	-0.192	0.848
	Median	3.6	Insufficient	193.95	11831.00			
	SD	0.65						
F5 recreational facilities	Mean	3.6	Sufficient	200.03	66209.50	8927.50	-1.448	0.147
	Median	3.6	Insufficient	177.35	10818.50			
	SD	0.65						
F6 safety	Mean	3.0	Sufficient	197.87	65496.00	9641.00	-0.562	0.574
	Median	3.0	Insufficient	189.05	11532.00			
	SD	1.00						
F7 social cohesion	Mean	3.5	Sufficient	199.5	66033.50	9103.50	-1.224	0.221
	Median	3.5	Insufficient	180.24	10994.50			
	SD	0.69						
F8 social acceptance of PA	Mean	3.3	Sufficient	196.98	65202.00	9935.00	-0.199	0.842
	Median	3.3	Insufficient	193.87	11826.00			
	SD	0.75						
land use diversity	Mean	3.1	Sufficient	195.54	64723.50	9777.50	-0.391	0.696
	Median	3.2	Insufficient	201.71	12304.50			
	SD	1.19						

DISCUSSION

In this study, it was found that each participant on average spends 3005.7 (SD±2706.7) MET-minutes total energy per week (Table 2). Ozdol et al (14) conducted a study to investigate PA level of 160 teachers working in provincial primary schools of the, Antalya. The authors reported that energy consumption of teachers, on average, was 1608.50 (SD±2026.11) MET-min per week. Previous studies done on general populations showed spectrum of energy expenditure in adult population in Sri Lanka. De Silva Weliange et al(15) conducted a cross sectional study by using the same instrument in 1320 Sri Lankan adult showed total mean energy expenditure was 2039 (SD ±2062) MET – minute. Another community level cross sectional study done among adult showed weekly average energy expenditure was 4473 (SD ±5866) MET-min per week(16). Population-based descriptive cross-sectional survey conducted among 4485 Sri Lankan adults reveled that average energy expenditure of an adult was 4703 (SD ±4369) MET-min per week(17). Comparing with current study, the different may be due to the sample size, socioeconomical background of study population and its behavioral differences.

The main contributor to the energy expenditure in the current study was engaging in home cleaning and gardening (Table 2). Similar finding was observed in the study done by De Silva Weliange et a l (15) where study participant was mainly achieved their PA with work inside the home and in the garden. In contrast to current study, STEPS survey 2015 found that work related PA was the major contribution in total PA in Sri Lankan population(4). Study participant spent energy on work, leisure time and transportation related activates was very low. Similar finding was found in previous studies in adult population in Sri Lanka (4) (18). A study done to determine the PA level in randomly recruited 957 of Italian adult population aged 19-65 years showed that study participant was physically more active in the domestic and garden domain (19). A study done in Bangladesh showed that, People (<3.0%) engaged in leisure-time PA was very low than working and transport related (20). Present study showed based to the intensity of the PA (Table 2), on average a participant had spent most of the energy in moderate intensity activity [mean -2069.0 (SD±2173.7), MET- minutes per week]. This finding was parallel with the study done to describe the pattern of PA among Sri Lankan adults aged 20 to 59 in the district of Colombo(18). There are some similar findings despite of many sociodemographic and methodological differences between current study and above studies may be due to similar nature of study population.

The current study showed that there are 84.4% of the participants categorized to sufficient activity. A previous cross-sectional Study showed that the prevalence of sufficient physical activity in adult population was 82.0% for males and 79.7% for females in Sri Lanka ((18)). A descriptive cross-sectional study among randomly selected 141 secondary school teachers investigated in a in Ibadan, Nigeria in 2012 showed 66.7% of the participants engaged sufficient level physical activity (21). In another study conducted in Turkey, showed that 46% had adequate physical activity level (22). A study done to evaluate the level of PA of teachers aged between 25 and 68 in the public-school system reveled 70% of teachers reached adequate levels of PA(23). A survey conducted among 293 school and university teaching staff in Dohuk city, Iraq reported that 39.5% had sufficient level of PA (24). A study on Italian adults showed that among the participants, 86% were, adhered to the international recommendations that

spending at least 30 minutes of moderate PA on 5 days of the week(19). When comparing the findings of both community setting and teachers' population the current study showed higher proportion of participants were in sufficient category. This could be due to the education level of the study

Current study showed overall physical and social environment was less favorable to engaging PA. Even though, our study results did not show a significant association between PA level and social and physical environment, previous national and international studies showed the significant association. Individual and environmental correlates with PA pattern was assessed in a cross-sectional study among 1320 Sri Lankan adults showed both physical and social environment seen to have influence in leisure related and transportation related PA. It showed the statistically significant between aesthetics and facilities for cycling factors and vehicular traffic safety factors. However, qualitative assessment showed the importance of social environment(25). A cross-sectional study conducted to investigate the performance of PA related to environmental variables among urban population in China was found that there was a positive associated observed between area of residence and transport, leisure related PA(26). Despite of having unfavorable environment to the study participants, majority of them had a sufficient level of PA. Because they involved more in household work and less involvement in transport and leisure related PA. Also, majority of the participants were female who were usually involved in much housework.

CONCLUSION AND RECOMMENDATIONS

Despite the non- conducive physical and social environment, majority of schoolteachers in KED had sufficient level of PA and they had spent most of the energy in moderate activities. Study participant spent energy on work, leisure time and transportation related activates was very low. The facilities have to be arranged to motivate the teachers to participate job, transport and leisure related activity.

Public health implication

Understanding the physical activity patterns of schoolteachers helps to take decisions on promoting healthy lifestyle modification in school environment and community. Also, it helps to strengthen the school health promotion program.

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