

Original Research Article

A study of physical activity levels and its correlates among adults: a cross-sectional study

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Received: 30 January 2017

Accepted: 02 March 2017

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ABSTRACT

Background: Three fourth of the world's death burden is shared by low to middle income countries due to non-communicable diseases. Physical inactivity is one of the important preventable risk factor in non-communicable diseases. It amounts to 4th leading risk factor for global mortality. Hence, this study was conducted to study the physical activity level and its correlates among adult patients attending health training centres in Nagpur.

Methods: A cross sectional study was conducted among adult patients attending the health centres of Indira Gandhi Government Medical College. Pregnant women, lactating women, debilitated patients and patients not giving consent were excluded from the study. A preformed and pretested questionnaire was used to conduct the interviews which included socio-demographic variables like age, sex, and educational status. Anthropometric measurements and blood pressure were measured according to the standard guidelines. The physical activity level was calculated using the principles of 1985 FAO/WHO/UNU expert consultation (WHO, 1985).

Results: Of 200 study subjects, 59% were having a sedentary lifestyle, 27% were having a moderately active lifestyle and 14% were having a vigorously active lifestyle. A statistically significant increasing trend for sedentary study subjects ($p = 0.002$ with age was found. Those who reported sedentary physical activity levels had 3.42 odds of being hypertensive, 7.44 times odds of being diabetic, 3 times odds of being overweight and 2.41 odds of being obese. The adults in urban areas were having significantly less physical activity levels when compared rural areas.

Conclusions: Higher levels of sedentary lifestyle were found in urban areas compared to rural areas. As the age increased the sedentary lifestyle was having a significantly increasing trend. Physical activity was associated with the diabetic status, hypertensive status, and obesity status.

Keywords: Physical activity levels, Adults, Lifestyle

INTRODUCTION

Every year 38 million people succumb to death all over the world due to non-communicable diseases (NCD). Three-fourths of these deaths occur in low and middle-income countries like India. The probability of dying between 30 to 70 years in India is about 26 %, the cause being NCD's.¹ A set of risk factors is attributed in the causation of these new generation epidemic diseases affecting the population across the World. These risk

factors are tobacco, insufficient physical activity, harmful use of alcohol, unhealthy diet, raised blood pressure, overweight and obesity and raised cholesterol. Insufficient physical activity increases the risk of diabetes, breast and colon cancers, high blood pressure and depression.²

According to World Health Organisation, 23 % of the population are physically inactive globally. It amounts to be the 4th leading risk factor for global mortality.³ Globalization and urbanisation affected the interests in

physical activity in two ways. One, the use of motorized vehicles (passive modes of transport) has increased since the last three decades. The second reason is that high-velocity traffic, pollution, lack of parks, sports facilities and recreational facilities have an additional effect.⁴ Since this risk factor is one the preventable factors, it has been targeted by the policy makers of different countries to handle the burden. Various studies have been conducted across the world to assess the physical activity levels among all age groups.⁵⁻²¹ This study is an attempt to focus on the physical activity levels and its correlates among adults of central India.

METHODS

This cross-sectional study was conducted in rural and urban health administrative area of Indira Gandhi Government Medical College, Nagpur from March 2015 to May 2015. The sample size was determined based on the study conducted by Indian Centre for Medical Research in India, which inferred that 54.4% of the people in Maharashtra were inactive⁵. With 95 % confidence interval, 7 % margin of error the sample size came to be as 194. A total of 100 study subjects were selected by simple random sampling in both rural and urban area each. The study subjects who were permanent residents and who gave consent were included in the study. Pregnant women, lactating women, debilitated patients and patients not giving consent were excluded from the study. Ethical committee consideration was sought before the start of the study.

Data was collected conducting face to face interviews by the investigator in the preferred language of the study subjects. A preformed and pretested questionnaire was used to conduct the interviews which included socio-demographic variables like age, sex, and educational status. Anthropometric measurements were measured according to the standard guidelines.²² Blood pressure was measured using standard procedures and diagnosed hypertension based on JNC 8 Guidelines.^{23,24} Body mass index was calculated and classified according to the South East Asian cut-offs.²⁵ Random blood sugar was done for all patients by glucometer. If sugar levels were more than 200mg/dl, then the patients were referred to the higher center for confirmation of diagnosis by doing fasting blood sugar of the individual.²⁶ The cases newly diagnosed and old cases of diabetes and hypertension were included in the analysis. The physical activity level was calculated using the principles of 1985 FAO/WHO/UNU expert consultation (WHO, 1985) which allocates the number of hours which a person spends on his daily activities, which was multiplied by the energy cost which is specific for a specific activity. This product was divided by 24 to get total mean physical activity level, which was further classified as a sedentary, active and vigorous lifestyle.²⁷

Statistical analysis

Epi info 7.1® (CDC Atlanta) was used to collect the information, compilation, and analysis. Categorical variables were documented in terms of percentages. Categorical variables were compared using fisher's test or chi-square test. Chi-square for trend was used for analysis of the trend of physical activity among its correlates. All analysis was two tailed and $p < 0.05$ was considered to be significant.

RESULTS

Of 200 study subjects, 59% were having a sedentary lifestyle, 27% were having a moderately active lifestyle and 14% were having a vigorously active lifestyle in Figure 1.

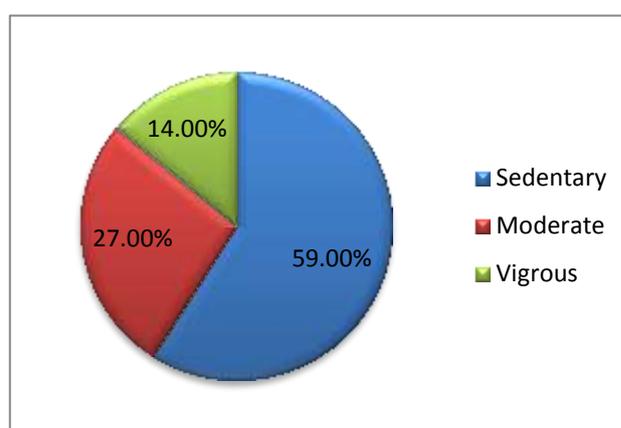


Figure 1: Distribution of study subjects based on the physical activity levels (N=200).

Among sedentary study subjects, the majority of them belonged to age group of 60 to 70 years, followed by 50 to 60 years and 40 to 50 years and >70 years. Among moderately active study subjects, the majority of them belonged to age group of 40 to 50 years and 60 to 70 years, followed by 50 to 60 years and >70 years. Similarly, in vigorously active study subjects, the majority of them belonged to age group of 40 to 50 years, followed by 50 to 60 years, 60 to 70 years and >70 years. A statistically significant increasing trend for sedentary study subjects ($p = 0.002$) and decreasing trend in case of vigorously active study subjects ($p = 0.002$) with age was found. No significant trend was found in moderately active study subjects as shown in Table 1.

In our study females (51.69%) were more sedentary than males (48.30%) but no statistical significance was derived. Based on the educational status, literate people (69.49%) were more sedentary than illiterate people (30.50%) but no statistical significance was established. In urban areas, 82% of them were sedentary, 13% of them were moderately active and 5% were vigorously

active. In rural areas, 41% were moderately active, 36% were sedentary and 23% were vigorously active. This

difference was statistically significant ($p < 0.01$) with an odds ratio of 8.09(4.21-15.56) as shown in Table 1.

Table 1: General characteristics of study subjects.

Age group (in years)	Sedentary(N=118)	Moderate(N=54)	Vigorous(N=28)	P value
40-50	27 (22.88)	17 (31.48)	13 (46.42)	0.01
50-60	30 (25.42)	15 (27.78)	11 (39.28)	
60-70	34 (28.81)	17 (31.48)	2 (7.14)	
>70	27 (22.88)	5 (9.25)	2 (7.14)	
Gender				
Male	57(48.30)	22 (40.70)	11 (39.28)	0.25
Female	61(51.70)	32 (59.25)	17 (60.71)	
Educational status				
Illiterate	36 (30.50)	11 (20.37)	5 (17.85)	0.12
Primary	22 (18.64)	6 (11.12)	6 (21.42)	
Middle	29 (24.57)	16 (29.62)	9 (32.14)	
Matriculation	13 (11.01)	11 (20.37)	2 (7.14)	
Intermediate	8 (6.78)	6 (11.12)	6 (21.42)	
Graduate and above	10 (8.47)	4 (7.40)	0 (0)	
Residence				
Urban	82 (69.49)	13 (24.07)	5 (18.87)	0.01
Rural	36 (30.50)	41 (75.92)	23 (82.14)	

Table 2: Distribution of study subjects based on the risk factors and level of physical activity.

Risk factor	Physical activity levels			Odds ratio*	P value
	Sedentary (n=118)	Moderate (n=54)	Vigorous (n=28)		
Hypertension					
Present	35 (29.66)	7 (12.96)	2 (7.14)	3.42(1.54-7.59)	<0.01
Absent	83 (70.34)	47 (87.03)	26 (92.85)		
Diabetes					
Present	26 (22.03)	3 (5.56)	0 (0)	7.44(2.17-25.52)	<0.01
Absent	92 (77.96)	51 (94.44)	28 (100)		
Body mass index					
Underweight(<18.5kg/m ²)	3 (2.54)	6 (11.12)	4 (14.28)	0.41(0.10-1.62)	0.1954
Normal(18.5-22.99kg/m ²)	34 (28.81)	30 (55.56)	17 (60.71)	1.00	
Overweight(23.00-26.99kg/m ²)	50 (42.37)	13 (24.07)	10 (35.71)	3.00(1.54-5.82)	<0.01
Obese(>27kg/m ²)	21 (17.79)	9 (16.67)	3 (10.71)	2.41(1.04-5.57)	0.03

*Odds ratio was calculated by classifying Sedentary and moderate to vigorous physical activity levels as two groups.

The presence of hypertension, diabetes, overweight and obesity was significantly associated with low physical activity levels. Those who reported sedentary physical activity levels had 3.42 odds of being hypertensive, 7.44 times odds of being diabetic, 3 times odds of being overweight and 2.41 odds of being obese as shown in Table 2.

DISCUSSION

In our study, about 59% of the study subjects were found to be sedentary. This inactive lifestyle had a significant association with the presence of hypertension, diabetes mellitus, overweight, and obesity. Studies by Anjana et

al, Agrawal et al, Vaidya and Krettek et al and Azevedo et al demonstrated the prevalence of inactivity as 54.4%, 86.42%, 41.7% and 57.1% respectively.^{5,7,9,12} This high burden of sedentary activity has to be tackled by educating the population about the increase in physical activity in the daily routine so that it helps them for a longer life. A survey by integrated disease surveillance project-NCD in Maharashtra in the year 2007, reported that the physical inactivity levels are as high as 81.65%.¹⁴ Varied range in the prevalence of physical activity is because a different type of questionnaire used in different studies.

Helena et al conducted a cross-sectional study to assess the physical activity levels among the workers in Brazil

using the same scoring system for assessment of physical activity.¹¹ They found that females were more sedentary (Physical Activity Score <1.4) when compared with males with an odds ratio of 5.34. This was in concordance with studies done by Anjana et al, Bergman et al, Azevedo et al, Vaidya and Krettek et al and Jayapreasad et al.^{5,6,9,10} Our study did not find any significant association between the physical activity levels and gender. A study conducted by Prabhakaran et al also demonstrated that there was no significant association of physical activity and gender.¹³

In the majority of studies, there was a significant association between the age and physical activity levels.^{5,6,12,18,20} In our study, along with a significant association, we also found that the trend for sedentary activity was decreasing as the age increases and was significant. This is a physiological process that as the age increases, the physical capacity of individual decreases and thus the physical activity level. But, this inactivity adds up to the risk factor burden of the individual along with the increasing age.

Our study demonstrates that there is a significant difference between the physical activity levels of urban and rural areas. Similar results were given by studies done by Anjana et al, Bergman et al, Jayaprasad et al and Sullivan et al.^{5,6,10,13} Some studies conducted in China specifically to compare the physical activity levels among adults showed the similar significant difference in urban and rural areas.²⁸⁻³⁰

Studies by Helena et al, Vaidya and Krettek et al, Bergman et al, Creber et al and Hall et al found a significant association between the physical activity levels and obesity status.^{6,7,9,11,31} This was in concordance with our study. Sullivan et al and Sibai et al did not find any association between obesity and physical activity levels.^{13,15} A study by Anjana et al postulated that the individuals having low physical activity levels had significantly higher blood pressure levels.⁵ Similarly, studies by Vaidya and Krettek et al and our study had an association between hypertension and physical activity levels.⁷ But, Creber et al did not find any association between hypertension and physical activity levels.³¹ We also found a significant association between the presence of diabetes and physical activity levels.

The main limitation of the study is that the sample size is less. Another drawback what hasn't been taken care of in the study is that the physical activity levels differ in different geographic distribution and different ethnicity. Studies with larger sample size and multicentric studies would yield more precise results.

CONCLUSION

Higher levels of sedentary lifestyle were found in urban areas compared to rural areas. As the age increased the sedentary lifestyle was having a significantly increasing

trend. Physical activity was associated with the diabetic status, hypertensive status, and obesity status. Such higher trends in sedentary physical activity among adults should be tackled by health education about physical activity and its consequences among the general population. Health promotion has to be targeted from start of adulthood since those are the days were people in developing countries like India are less educated about their habits.

ACKNOWLEDGEMENTS

We would like to thank the staff and post graduate students of Department of Community Medicine Indira Gandhi Government Medical College, Nagpur for their support during the study. We would also like to thank the patients who gave consent to take part in the study..

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Patil C, Dhoble M, Kaware A. A study of physical activity levels and its correlates among adults: A cross-sectional study. *Int J Community Med Public Health* 2017;4:1154-8.