

Are We Physically Active? Assessment Using Global Physical Activity Questionnaire (GPAQ)

Bharti Veer, Dr. Jaishree Ghanekar, Dr. Prabha Dasila

MGM Institute of Health Sciences, Navi Mumbai.

Corresponding Author: Bharti Veer

ABSTRACT

Physical activity is the cornerstone of prevention of non-communicable disease. Aim of this paper was to assess the type of activities performed by the individuals living in Mumbai and to find its correlation with BMI, WHR, BP and random blood sugar. Inclusion criteria were participants aged ≥ 25 years and ≤ 60 years and not undergone cardiac rehabilitation program. Participants were given questionnaire, anthropometric measurements: height, weight, waist circumference measured. BP and random blood sugar were checked.

Result showed that 81(40.5%) of participants were overweight and 31 (15.5%) obese and 153 (76.5%) had WHR above normal. Thirty-one (15.5%) of participants had previous history of hypertension and 15 (7.5%) had diabetes mellitus. More than 90 % of participants did not spent time doing vigorous activities. The mean total time in minutes per week spent in moderate and vigorous activities is far less than recommended time by WHO. The mean time spent in sitting per week is 20 times more than the total of time spent in moderate and vigorous activities. Findings showed that there is minimal negative correlation between vigorous activities and BMI, WHR and random blood sugar. This study highlights the importance of vigorous activities in reducing risk factors of CAD.

Key Words: Coronary artery disease, vigorous activities, moderate activities, Global physical activity questionnaire, Metabolic equivalent (METs).

INTRODUCTION

A non-communicable disease (NCD) is a medical condition or disease that is not caused by infectious agents and is non-transmissible. NCDs can refer to chronic diseases which last for long periods of time and progress slowly. NCDs such as cardiovascular disease, diabetes, chronic respiratory disease and cancer are the leading global cause of death and are responsible for 70% of deaths worldwide. [1] According to the Global Burden of Disease 2016 study, Over six million people died of non-communicable diseases (NCDs) in India in 2016, with Ischemic heart disease as the leading cause of death. [2]

Behavioural risk factors such as tobacco use, smoking, alcohol consumption, lack of fruits and vegetable in diet, lack of physical activity leads to obesity, raised blood pressure, raised blood sugar are major risk factors for non-communicable diseases.

Decreased physical activities coupled with increased mental tension are important contributors of CAD, commonly seen amongst individuals where working is mostly sedentary. Hence these individuals are at high risk of developing CAD. Lack of Physical activity or inactivity or sedentary lifestyle in one of the major risk factor and it has become global challenge to reduce this risk factor. This risk factor is more common in urban population especially

working population. This behaviour may have lot of attributing factors like lack of time, too fatigued to do recreational activities, lack of motivation, lot of time invested in sitting imposed by job or travel, etc.

World Health organization, Centre for Disease control and prevention have provided with exercise guidelines. It is recommended to do moderate-intensity aerobic exercise for two hours and 30 minutes every week, plus muscle strengthening activities on two or more days a week. [3]

Monitoring physical activity levels of the population using a standardized protocol is a core part of identification of this global epidemic. The Global Physical Activity Questionnaire (GPAQ) developed by WHO for physical activity surveillance helps to gather information on physical activity participation in three domains as well as sedentary behaviour. The three domains are: activity at work, travel to and from places and recreational activities. [4]

Objectives of this paper are to assess the type of activities performed by the individuals living in Mumbai and to find its correlation with BMI and Waist hip ratio. Knowledge of current practices about moderate and vigorous physical activities will help to plan the awareness programs to reduce the risk factors of CAD.

MATERIALS AND METHODS

Quantitative research approach was used to assess the physical activity level of adults in Mumbai. Data was collected from various banks, offices, IT companies and housing colonies of Navi Mumbai. Inclusion criteria included willingness to participate, and age between 25years-60 years. Those involved in cardiac rehabilitation program and females who were pregnant at the time of data collection were excluded from the study. Individuals meeting inclusive criteria were chosen using convenient sampling till sample size of 200 were reached. Data was collected regarding demographic variables, physical activities, and physical

measurements (Body Mass Index, Waist Hip ratio, and blood pressure).

Data on physical activities was collected using Global Physical Activity Questionnaire (GPAQ) developed by World health organization to assess the physical activity performed by the person in one week. It collects information regarding physical activities performed in three domains, i.e., (i) activities at work, (ii) activities performed while travelling, (iii) Recreational activities. Apart from activities, it also includes questions for years' sedentary behaviour. GPAQ consists of total sixteen questions. It covers several components of physical activity, such as intensity, duration, and frequency. Data is taken for moderate and vigorous intensity activities. [4]

Intensity of physical activities is expressed in the term of Metabolic Equivalent (MET). MET is defined as the amount of energy consumed while sitting at rest and is equivalent to a caloric consumption of 1 kcal/kg/hour. [5] For the calculation of a person's overall energy expenditure using GPAQ, the following MET values were assigned as per the WHO guidelines. Moderate activities in work, travel and recreation consume 4 METs whereas Vigorous activities consume 8 METs. Total time spent and energy expenditure in MET is calculated in all three domains of activity. Total time spent in physical activities per week is the sum of the time spent in all five settings in one week, whereas total energy expenditure or MET per week is the sums of the energy spend in all five settings of activities in one week. A person is said to be having sedentary lifestyle if the total activities performed by a person in a week are less than any of the following;

1. 150 minutes of moderate-intensity physical activity OR
2. 75 minutes of vigorous-intensity physical activity OR
3. An equivalent combination of moderate- and vigorous-intensity

physical activity achieving at least 600 MET-minutes.

Both vigorous and moderate intensity activities were recorded if it is done for at least 10 minutes continuously. Vigorous-intensity activities are activities that require hard physical effort and cause large increases in breathing or heart rate. Example of vigorous activities at workplace include carrying or lifting heavy loads, digging or construction work and example of recreational vigorous activities include sports (football, cricket), running, jogging, tennis singles, aerobic dancing, bicycling 10 miles per hour or faster, jumping rope, heavy gardening (continuous digging or hoeing), and hiking uphill or with a heavy backpack etc. Moderate-intensity activities are activities that require moderate physical effort and cause small increases in breathing or heart rate like brisk walking or carrying light loads. Example of recreational moderate intensity activities includes brisk walking, cycling, swimming etc. Moderate activities during travel include walking or using bicycle. [4]

After ethical clearance from the University, written permission was taken from the Institute head. The purpose of study and their role in study was explained to participants before obtaining written consent.

The present study analysed the data based on the objectives. Data was analysed using the statistics software package SPSS 21 for windows and Microsoft Excel 2007. Categorical data were expressed as frequency and percentage. Continuous data was analysed using mean and standard deviation. Correlation of coefficient was calculated to assess correlation between variables.

RESULT

Study was conducted on 200 individuals living in Mumbai. It included 109 females (54.5%) and 91 (45.5%) males. Mean age of females and males were 43.03±10.17 years and 44.23±10.06 years

respectively. Majority were married (94.5%) and working (96.5%).

Table 1 shows that 81(40.5%) of study participants were overweight with BMI between 25 kg/m² - 29.9 kg/m² and 31 (15.5%) were obese. One hundred and fifty-three (76.5%) study participants had more than normal waist hip ratio. As per WHO guidelines 0.85 and 0.9 waist hip ratio is considered normal. Thirty-one (15.5%) of participants had previous history of hypertension and 15 (7.5%) had diabetes mellitus. None of them had history of coronary artery disease. Out of 31(15.5%) participants with history hypertension, 19 (61.29%) had BP under control whereas 12 (38.71) had their BP above 140 mmHg. Similarly, out of 15, 12 (80%) had their blood sugar under control and 3 (20%) had their blood sugar above 200 mg/dl.

Table 1: Distribution of participants based on risk factors of CAD. n=200

Risk factors	F	%
BMI Normal : 18.5-24.9 kg/m ²	96	48
Overweight ≥ 25kg/m ²	81	40.5
Obese ≥ 30kg/m ²	31	15.5
WHR Normal	55	27.5
Above 0.9 (Males) and 0.85 (Female)	153	76.5
BP Normal	128	64
HT (SBP>140mmHg)	41	20.5
History of HT	31	15.5
History of HT - Normal BP	19	61.29
History of HT-above normal BP	12	38.71
RBS Normal	162	81
Above 200 mg/dl	18	9
History of DM	15	7.5
History of DM -Normal RBS	12	80
History of DM -Above normal RBS	3	20

Table 2: Distribution of sample based on time spent in moderate and vigorous activities per week.

Time spent per week	Females n=109	Male n=91
Moderate Activities		
No time spent	15 (13.76 %)	33 (36.26 %)
1-149 min	79 (72.48 %)	42 (46.15 %)
150 and more min	15 (13.76 %)	16 (17.58%)
Vigorous Activities		
No time spent	102 (93.58%)	85 (93.41%)
1-74 min	6 (5.50%)	0 (0 %)
75 and more min	1 (0.92%)	6 (6.59%)

Table 2 depicts the amount of time spent by males and females in moderate and vigorous activities per week. It showed that more than 90 % of both females and males have spent no time doing vigorous activities. Only 15 (13.76 %) of females have spent recommended 150 min per week

doing moderate activities whereas only 1(0.92%) have spent recommended 75 min per week of time doing vigorous activities. It also showed that 16 (17.58%) and 6 (6.59%) of males were engaged in doing recommended amount of moderate and vigorous activities per week. Percentage of females doing moderate activities is more than males.

Line graph 1 showed that females and males showed identical pattern of time spent per week doing vigorous activities whereas percentage of females engaged in moderate activities were more (26.33%) than of males. Vigorous activities done by males included weight lifting, push ups done in gym.

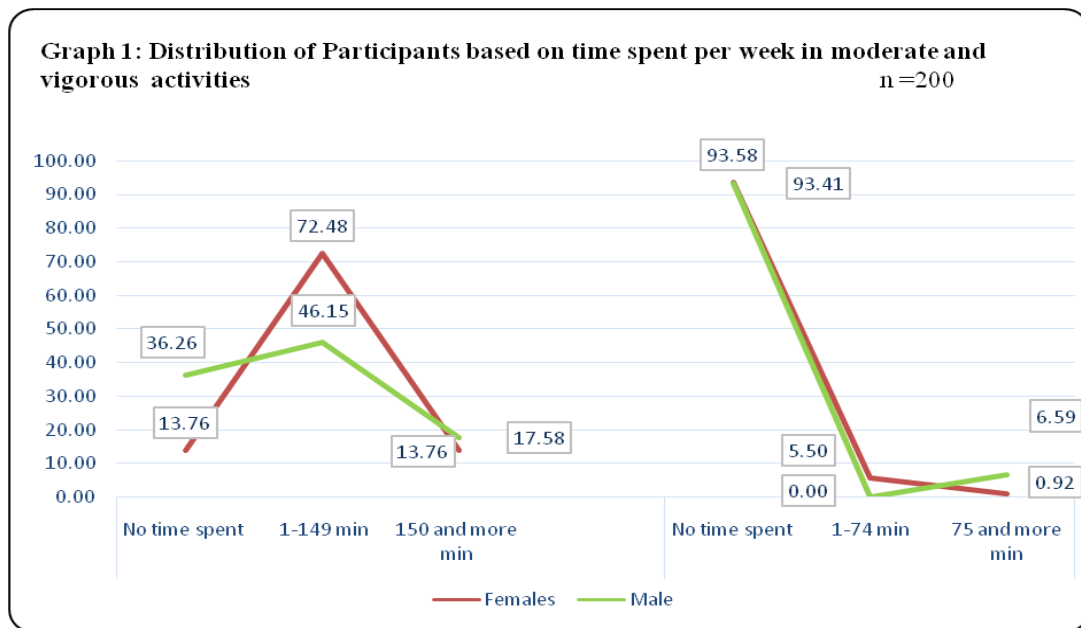


Table 3: Mean time (min) spent in moderate, vigorous activities and sitting per week. n = 200

Activity		Female	Male
Vigorous activity	1. Work	0	0
	2. Recreational	0.83	20.55
	3. Total	0.83	20.55
Moderate Activity	1. Work	7.66	11.59
	2. Recreational	34.45	27.36
	3. Travel (walking)	54.17	57.69
	4. Total	96.28	96.65
Sitting		2893.83	2798.69

Table 3 shows that both females and males did not spend time in vigorous activities at work. The mean total time in minutes per week spent by both gender in moderate and vigorous activities is far less than recommended time by World Health Organization. The recommended time for moderate and vigorous activities per week is 150 min and 75 min respectively. The above table also showed that moderate activities like walking were done during travel that is from home to station or station to workplace

and back. The mean time spent in sitting per week by both gender is more than 20 times the total of time spent in moderate and vigorous activities. Mean time spent in sitting per day is 423.15 minutes whereas mean time spent in moderate and vigorous intensity activities per day is 21.47 min.

Table 4: Distribution of sample based on total energy spent in moderate and vigorous intensity activities per week.

MET per week	Female	Male	Total
Less than 600	87 (86.13%)	85 (85.85%)	172 (86%)
600 or more	22 (21.78%)	14 (14.15%)	36 (18%)

Table 4 shows that only 18 % of adults consume 600 and more METs in moderate and vigorous intensity activities per week as recommended by WHO whereas majority (86%) is not practising this recommendations regarding physical activities.

Table 5: Correlation between the risk factors of Coronary artery disease and activity level.

Activity determinants per week	BMI	WHR	SBP	RBS
Time spent in moderate intensity activities	0.06	0.02	-0.1	-0.02
Time spent in vigorous intensity activities	-0.02	-0.01	0	-0.03
Energy consumed in moderate and vigorous intensity activities	0.01	-0.005	-0.05	-0.03

Table 5 shows that time spent in vigorous activities per week had slight negative correlation with BMI, WHR and Random blood sugar whereas it did not have any correlation with systolic BP of adults.

DISCUSSION

Findings of the study showed that (i) the majority of the study participants did not spend any time doing moderate and vigorous activities, (ii) Number of males spending time in vigorous activities were more than females (iii) number of females spending time in moderate activities were more than males (iv) The vigorous activities involved workout in gym and moderate activities involved brisk walking (v) majority of both females and males spent very less time in vigorous activities compared to moderate activities (vi) walking was done during travel and this time was fragmented (vii) More than 80 % of study participants did not meet the energy consumption criteria regarding physical activity as recommended by WHO, (viii) minimal negative correlation between vigorous activities and BMI, WHR and random blood sugar. This finding is similar to the studies done to find relationship between vigorous activities and BMI.

Above findings of the study are supported by the study done to assess physical activity and inactivity patterns in India - results from the ICMR-INDIAB study (Phase-1). [6] Current study also showed that males are more active than females in physical activity. This study had contrast findings that participants were more active in work than recreation and travel, whereas current study showed that most of the physical activity was done as recreational and while commuting than in work.

Many studies have been done to find the relationship between anthropometric parameters and physical activity. [7,8] Studies have not consistently found the expected negative associations between BMI and activity measures, and some studies have shown no or positive associations between activity measures and BMI. [9] The current paper has differentiated physical activities into moderate and vigorous intensity to find the correlation with BMI and WHR. It showed negative correlation between vigorous intensity activities and BMI, WHR. The result of the study suggest that vigorous activities help reduce BMI.

CONCLUSION

Study finding showed that more time is spent in sitting imposed by sedentary jobs. Time spent in doing moderate and vigorous activities need to be unfragmented to reduce the risk of CAD. Vigorous activities have shown more beneficial effect than moderate activities may be because it was fragmented, but increasing level of moderate activities is more attainable than doing vigorous activities. As the jobs are becoming more sedentary, recreational physical activities need to be given more attention and time.

REFERENCES

1. WHO. Global status report on non-communicable diseases. Description of the global burden of NCDs, their risk factors and determinants. World Health Organization; 2011 [cited 2018Mar20]. Available from: <http://www.who.int/nmh/publications/ncdreport2010/en/>
2. Dandona Lalit et.al. Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of

- Disease Study. *Lancet* 2017; 390: 2437–60.
3. Singh A., Purohit B. Evaluation of Global Physical Activity Questionnaire (GPAQ) among Healthy and Obese Health Professionals in Central India. *Baltic Journal of Health and Physical Activity*. 2011; 3:1, 34-43.
 4. World Health Organization. Global Physical Activity Questionnaire (GPAQ) Analysis Guide. Surveillance and Population-Based Prevention of Non-communicable Diseases Department World Health Organization.
 5. Hills, A. P., Mokhtar, N., & Byrne, N. M. (2014). Assessment of physical activity and energy expenditure: an overview of objective measures. *Frontiers in Nutrition*, 1(5), 1-16. Hopkins, W. G. (2015)
 6. Anjana et al. Physical activity and inactivity patterns in India – results from the ICMR-INDIAB study. *International Journal of Behavioral Nutrition and Physical Activity* 2014, 11:26 .
 7. Wanner M. et.al. Association between domains of physical activity, sitting time and different measures of overweight and obesity. *Preventive Medicine Reports* 3 (2016) 177–184.
 8. Kim Y. et.al. Longitudinal associations between body mass index, physical activity, and healthy dietary behaviors in adults: A parallel latent growth curve modeling approach. *PLOS one*. March 15, 2017 1 / 15.
 9. Fan M, Su M, Tan Y, Liu Q, Ren Y, Li L, et al. (2015) Gender, Age, and Education Level Modify the Association between Body Mass Index and Physical Activity: A Cross-Sectional Study in Hangzhou, China. *PLoS ONE* 10(5).

How to cite this article: Veer B, Ghanekar J, Dasila P. Are we physically active? Assessment using global physical activity questionnaire (GPAQ). *Int J Health Sci Res*. 2018; 8(4):137-142.
