

PROFILE OF PHYSICAL INACTIVITY AS A RISK FACTOR FOR NON-COMMUNICABLE DISEASES IN A RURAL POPULATIONSanjay Choudhary¹, Ram C. Choudhary², Abhay Mude³, Vasant Wagh⁴**HOW TO CITE THIS ARTICLE:**

Sanjay Choudhary, Ram C. Choudhary, Abhay Mude, Vasant Wagh. "Profile of Physical Inactivity as a Risk Factor for Non-Communicable Diseases in a Rural Population". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 24, June 16; Page: 6794-6801, DOI: 10.14260/jemds/2014/2821

ABSTRACT: BACKGROUND: Eighty-five percent of the global burden of Non Communicable Diseases (NCD) is borne by the low and middle income countries, like India development. Emergence of NCDs in India is identified by WHO, ICMR and Government of India. NCDs share common risk factors like physical inactivity are causing 3.2 million deaths annually in the world (WHO, 2014). **AIMS:** Aim was to study profile of physical inactivity for non-communicable diseases. **METHODS AND MATERIALS: SETTING:** Community through home visit. **STUDY DESIGN:** Community based Cross sectional survey. **STUDY DURATION:** The study was conducted from July 2008 to September 2010. **STUDY POPULATION:** Through multistage sampling 3500 persons were studied in 12 villages of Wardha district (MH). **STUDY INSTRUMENTS:** Step-1(core) of WHO's STEP-wise approach (2002.) was used to study physical activity by home visit using a pretested structured schedule in English/Marathi. Step 1 contains Core or "minimum set", self-report measures for all countries. **PHYSICAL ACTIVITY:** The total physical activity is the sum of physical activity at work, transport and leisure time. Individuals were divided into physically inactive, moderately active and highly active according to MET minutes of exertion. **CONSENT:** Informed consent from participants and ethical clearance from Institutional Ethical Committee was obtained. **RESULTS:** 3500 individuals (Male 54.86% and Female 45.14%) were studied. Prevalence of physical inactivity was 26.88% in all, 18.75% in male and 35.44% in female; more in 15-24 years and 55-64 years, more in female than male in each age group. **CONCLUSIONS:** Physical inactivity is widely prevalent even in rural population but a preventable and modifiable NCD RF through organized multispectral efforts.

KEYWORDS: Physical inactivity, Non-communicable diseases, Risk factor, Rural.

INTRODUCTION: According to the World health report 2002, chronic non-communicable diseases (NCDs) are the leading causes of death both in developed and developing countries affecting all sections of communities. Globally, non-communicable diseases account for almost 58.5% of deaths and for 45.9% of the global burden of disease. Eighty-five percent of the global burden of Non Communicable Diseases is borne by the low and middle income countries. The situation in developing and newly industrialized countries is expected to worsen rapidly.^{1,2,3}

India and the member countries of WHO's South-East Asia Region are in an epidemiological transition. Non communicable diseases are, accounting for 49.7% of deaths and 42.2% of the disease burden in 2001. This is due to the demographic and socioeconomic transformation in recent decades and profound lifestyle changes. WHO estimates that 50.5% of the deaths in India in 2000 were due to NCDs. These are likely to increase to 66% by 2020.^{4,5}

Four major groups of NCDs –cardiovascular diseases (CVDs), cancers, diabetes mellitus and chronic lung diseases, are linked by a cluster of common risk factors that are lifestyle-related. These

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are unhealthy diet, tobacco use, excessive alcohol consumption and physical inactivity. Action to prevent NCDs should, therefore, focus on controlling these risk factors in an integrated manner.⁶

Reduction of morbidity and premature mortality due to NCDs is attainable, which requires vigorous action at all levels - primary prevention to treatment and rehabilitation as well as involvement of multiple sectors. Interventions applied during the advanced stages of the diseases usually have a limited impact and are less cost-effective. Therefore primary prevention is a more feasible option for low resource countries.⁷ Physical inactivity is a modifiable through individual and group efforts.

WHO(2014) update on NCDs have highlighted that 3.2 million deaths are attributable to inadequate physical activity.⁶ NCD risk-factor surveys using the STEPS approach in rural population of India observed that 10.0% were physically inactive.⁷ From very low prevalence of physical inactivity of 3.9% by Mohan et al (2008) in industrial workers of Chennai to a very high rate of 38.5% by Gandhari et al(2012)in a village of Hoogly (WB) have been reported by different researchers in various places in India.^{8,9}

However, few studies from India are community- based, using standardized data collection methods and definitions. This paper will focus on prevalence of physical inactivity as a common behavioural risk factor for NCDs in a rural population of Wardha district using STEP-1, (based on recall) of standardized WHO STEPS approach.¹⁰

AIMS AND OBJECTIVE: With the goal of reducing the burden of NCDs through reducing risk using primary prevention, objective was to study physical inactivity as a behavioral risk factors for NCDs in 15-64 years age group in a rural population.

METHODS AND MATERIAL:

Study Duration: The study was conducted from July 2008 to September 2010.

Study Design: Observational community based cross sectional study.

Study Population: Participants in the age range of 15 years to 64 years were covered in the study. In about 850 households it was possible to arrive at required sample population of 3500 individuals with 700 persons in each 10 year age brackets from the selected villages.

Study Instruments: Step-1(core) of WHO's STEP-wise approach was used to study NCD Risk Factors (2002.) by history through home visit using a pretested structured schedule in English/ Marathi. Step-1 contains the core or "minimum set" self-report measures for all countries.

Physical Activity: Categorical indicator of WHO STEP-wise technique was used in the study. One MET (Metabolic Equivalent)-minute is the energy cost of sitting quietly and is equivalent to consumption of 1 kcal/kg/hour. MET-minutes values of physical activities in three main domains of life were considered:^{10, 11}

Work - moderate MET value = 4, Vigorous MET value = 8;

Transport - cycling and walking MET value = 4,

Recreation/leisure - moderate MET value = 4, Vigorous MET value = 8,

Total physical activity in adults was labeled and reported in three categories:

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Low Level or insufficiently active (<600 MET-minutes per week),
 Moderate Level or minimally active (600- < 3000 MET minutes per week),
 High Level or sufficiently active (3000+ MET-minutes per week).

Consent: Consent from all participants of the study and ethical clearance from Institutional Ethical Committee of DMIMSU, Sawangi Meghe (Wardha) was obtained.

RESULTS: A total of 3500 persons in the age group of 15 to 64 years in villages of Wardha district of Maharashtra were studied by home visit. All were classified at 10years age interval and each age bracket had a total of 700 persons. The response rate could be reached 100% through communication and repeat visit when needed.

Table 1: is showing age and sex wise distribution of the survey respondents.

Respondents proportions						
Age Group (years)	Men		Women		Total	
	Number	%	Number	%	Number	%
15-24	380	19.79	320	20.25	700	20
25-34	380	19.79	320	20.25	700	20
35-44	400	20.83	300	18.99	700	20
45-54	380	19.79	320	20.25	700	20
55-64	380	19.79	320	20.25	700	20
Total	1920	100.00	1580	100.00	3500	100

Table 1: Age and sex wise distribution of steps survey respondents

A total of individuals were studied. Of the 3500 study subjects 1920 (54.86%) were male and 1580 (45.14%) were female. Among male proportion of persons was 19.79% in each age group except at 35-44 years where it was higher (20.83%). Out of all the 1580 female each age group had 20.25% of them except at 35-44 years which had a slightly lower proportion (18.995). For male and female together the proportion of persons was 20% in each 10 years age group.

Physical Activity: Table 2 shows that physical inactivity in all domains of life namely work, transport and leisure in male was 18.75% being significantly high(34.21%) in 15-24 years age group followed by that in 55-64 years age (31.58%) and least(7.89%) in 45-54 years($X^2=192$, $df=8$, $p<0.001$).

Age group (years)	Inactive <600 MET minutes per week		Moderately active 600-1500 MET minutes per week		Highly active > 1500 MET minutes per week	
	Men					
	number	%	number	%	number	%
15-24	130	34.21	150	39.47	100	26.32
25-34	40	10.53	150	39.47	190	50.00
35-44	40	10.00	190	47.50	170	42.50

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45-54	30	7.89	200	52.62	150	39.47
55-64	120	31.58	160	42.11	100	26.32
Total	360	18.75	850	44.25	710	37.00

Table 2: Categories of overall physical activity by age group in men across all domains

$X^2 = 192$, $df = 8$, $p < 0.001$

Moderate activity in male was seen 44.25%. It was lowest in 15-34 years age group (39.47%) but increased with age till 54 years and then came down in elderly.

More than one third (37.00%) of males were highly active physically. Their proportion was least (20%) in elderly and high in 25-44 years age group. 40-50% of the highly active males were in 25-54 years age it being 26.32% in 15-24 years and the elderly.

Table 3 shows that more than one third (35.44%) of female subjects were spending less than 600 MET minutes per week and labeled as physically inactive but the proportion was significantly high (68.75%) in those aged 55-64 years but least (20.00%) in the age group of 45-54 years ($X^2 = 241$, $df = 8$, $p < 0.001$).

Age group (years)	Inactive <600 MET minutes per week		Moderate active 600-1500 MET minutes per week		Highly active > 1500 MET minutes per week	
	Women					
	number	%	Number	%	number	%
15-24	110	34.37	150	46.87	60	18.75
25-34	80	25.00	130	40.62	110	34.38
35-44	90	30.00	100	33.33	110	36.66
45-54	60	20.00	150	50.00	110	36.66
55-64	220	68.75	60	18.75	40	12.50
Total	560	35.44	590	37.34	430	27.22

Table 3: Categories of overall physical activity by age group in women across all domains

$X^2 = 241$, $df = 8$, $p < 0.001$

Proportion of moderately active in women was 37.34%, it was least (18.75%) in 55-64 years followed by those in 35-44 years and 15-34 years. Half of the women in 45-54 years age were moderately active.

Those highly active physically activity was found in 27.22% of female and the least (18.75%) were in young age (15-24 years).

Table 4 shows that more than one fourth (26.88%) of study subjects spent less than 600 MET minutes per week and were thus physically inactive. Physical inactivity was significantly high (48.57%) in those aged 55-64 years and 34.21% in 15-24 years ($X^2 = 359$, $DF = 8$, $p < 0.001$).

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Age group (years)	Inactive <600 MET minutes per week		Moderate active 600-1500 MET minutes per week		Highly active > 1500 MET Minutes per week	
	Total					
	number	%	number	%	number	%
15-24	240	34.28	300	42.86	160	22.86
25-34	120	17.14	280	40.00	300	42.86
35-44	130	18.57	290	41.42	280	40.30
45-54	90	12.86	350	50.00	260	37.14
55-64	340	48.57	220	31.43	140	20.00
Total	920	26.88	1440	41.15	1140	32.57

Table 4: Categories of overall physical activity by age for men and women across all domains

$$X^2 = 359, df = 8, p < 0.001$$

Proportion of moderately active persons was 41.15%. Their proportion was more than 40% in all age groups except 55-64 years (31.43%).

Those physically highly active formed about one third of all (32.57%). Their proportion was least (20%) in elderly and the young (22.86%); it being high in 25-44 years age group (37.14% to 42.86%).

DISCUSSION:

Age & Sex: As per WHO steps guidelines comparable number of males and females were included in each age group of 15-24, 25-34, 35-44, 45-54 and 55-64 years for better yield of risk factors. Thus 700 persons were covered in each age group.¹⁰

Physical activity: Sedentary lifestyle of men and women leads to high prevalence of overweight and obesity, leading to risk for NCDs and deaths from NCDs. In the present study overall physical inactivity[PI] (physical activity of less than 600 minutes per week) was surprisingly high(26.88%) in rural setup and 34.28% in young adults in 15-24 years age group whether in school/college going persons or at home. These are potentially at risk persons for NCDs. As expected more (48.57%) persons aged 55-64 years were physically inactive.

Overall PI rate in study subjects of both genders was significantly high in young(15-24 years) and old age(55-64 years) as compared to that in remaining adults($X^2 = 359, DF=8, p<0.001$). Significant difference in PI in different age groups in males and in females was also observed ($X^2 = 192, df=8, p<0.001$; $X^2 = 241, df=8, p<0.001$).

This trend has been observed in most of the studies in India including the six centre NCD RF surveillance coordinated by WHO and ICMR. Among rural populations Shah et al(2005) reported job related physical inactivity(PI) in 39% and even more during transport and leisure, figures being higher for urban and slum dwellers.^{7,12} M. Deepa (2011) had reported it to be 35% in rural area and higher rates in urban and slum dwellers. Gandhari et al (2013) in a village of West Bengal, had

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observed similar rates (38.5%) in rural subjects and Gupta, R(2007) had similar experience (37.8%) in Urban Jaipur and R Sogarwal(2014) in school students(35.27%).^{13, 9,14,15}

On the other hand Nath et al(2009) in urban Delhi reported it to be very high(80.6%).Mehan et al (2006) in urban Baroda had also found PI in 74.4%.^{16,17}

In our study physical inactivity was noticed in 18.75% of males and 35.44% of females. In most of the studies women were more likely to be physically inactive compared with men: Anand K et.al. (2007) in urban population of Haryana (14.8% vs 55%); Bhagyalaxmi et al (2013) had similar findings in Gujarat. Sugathan (2008) in Kerala observed similar rates of physical inactivity in male (23%) and female (22%).^[18,19,20] Mathur P and Shah B (2011) had also found comparable proportion of physical inactivity during work in male and female.¹² On the other hand Veluswami et al (2014) observed overall PI in 13.9% being in 16.9% in male and less in female(11.4%).²¹

However Thankappan et al (2010) reported that only 6.8% were physically inactive.²² Bhardwaj et al (2012) also reported PI rate of less than10% in Nagpur.²³ Industries being production related lower rates of PI have also been observed in industrial populations by Mohan et al (2006) in 3.9% and Kaur et al (2007) in 10.7% in Chennai.^{8,24}

CONCLUSION: Our study in the rural population has shown high rates of physical inactivity an important modifiable risk factor which has a potential to show its effect in future for development of non-communicable diseases (NCD) like cardiovascular diseases, cerebral stroke, diabetes mellitus, The present rates of risk factors can be reduced by more physical activities in all domains of life like walking to reach place of education, work or leisure, active games, sports and gym.

RECOMMENDATIONS: Awareness to individuals, families, occupational groups through Information, Education and Communication (IEC) regarding reduction of risk factors for NCD is urgently required. This can start at primordial and primary level of prevention and continue for seeking medical help once the condition develops rather than landing in for tertiary level of prevention which is more expensive, least cost effective and beyond their affordability. Preparedness to tackle them by future health care services needs to be planned. Community participation in the form of organizing physical activity sessions on regular basis to have demonstrable beneficial effect on health and the future prevention of NCDs.

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Date of Submission: 02/06/2014.
Date of Peer Review: 03/06/2014.
Date of Acceptance: 09/06/2014.
Date of Publishing: 16/06/2014.