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Original Article

Prevalence of risk factors for non-communicable disease in a rural area of nagpur district, maharashtra – A WHO STEP wise approach.

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ABSTRACT

Background & Objectives: To estimate the prevalence of common risk factors for non-communicable disease (NCD) among people above 15 years in rural population of Nagpur, Maharashtra. **Methods:** The study involved a survey of 1964 male and 1807 female respondents, aged 15 years and above. Multistage sampling was used for recruitment (PHCs/ sub-centres/ villages). All households in the selected villages were covered and all subjects above 15 years in the household were interviewed. WHO STEP- wise tool was used as the study instrument which included behavioural risk factor questionnaire and physical measurements of height, weight, waist circumference and blood pressure. **Results:** The prevalence of daily smoked tobacco was 20.5 % (95% CI 18.6% - 22.3%) for men while all females were life time abstainer. Daily smokeless tobacco user were 62.6 % (95% CI 60.2% - 64.9%) and 32.8 % (95% CI 30.6% - 35.0%) in men and women respectively. The prevalence of current alcohol consumer was 37.7 % (95% CI 35.5% - 39.9%) among men and none of the women reported consuming alcohol. The mean number servings of fruits and vegetables per day was 2.2 (95%CI 1.48 - 2.9) for men and 1.97 (95% CI 1.21- 2.7) for women. The percentage of people undertaking at least 150 minutes of physical activity in a week was 92.3 % (95% CI 91.1% - 93.5%) for men and 90.4 % (95% CI 89.0% - 91.7%) for women. Among men 6.0 % (95% CI 4.9% - 7.0%) had BMI > 25.0Kg/m² while among women it was 7.9 % (95% CI 6.6% - 9.2%). The prevalence of measured hypertension, i.e. >140 SBP and/or >90 DBP or on antihypertensive drugs was 14.8 % (95% CI 13.2% - 16.4%) among men and 15.9 % (95% CI 14.1 % - 17.6%) among women. **Conclusion:** The study showed a high burden non-communicable disease risk factor in rural area of Nagpur. It showed tobacco and alcohol use was high among men while physical inactivity and overweight were higher in women. Low fruit and vegetable consumption was found among both the gender.

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1. Introduction

The increasing burden of Non- communicable diseases (NCDs) particularly in developing countries threatens to overwhelm already stretched health services [1]. It is estimated that globally in the year 2002, NCD contributed 60% of deaths and 43% of global burden of disease and by 2020, it is projected to account for 73% of deaths and 60% of disease burden [2]. Almost half of the disease burden in low and middle-income countries is already due to NCDs [3]. India is in the midst of an epidemiological transition with non-

communicable diseases increasing in importance. Targeting the risk factors for non-communicable diseases is recognized as an essential preventive strategy. But currently there is lack of good quality data on prevalence of NCD risk factors [4].

Affluence, progressive ageing of population, improving socio-economic conditions and changed life styles have caused an increase in non-communicable diseases and these are spreading to rural areas as well and these need to be documented to dispel myths that NCDs are a problem only in urban areas[5].

An integrated approach to risk factor surveillance is vital for NCD control. Surveillance of NCD risk factors, as currently practiced in India have largely used different working definition and surveyed different age groups, thus there is a felt need to have a comprehensive look at the NCD risk factors using standard

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methodology to ensure comparability. Thus utilizing data in formulation of population based strategies by making cost-effective interventions both for people with established disease and for those at high risk of developing the disease, which would help in prevention of significant proportion morbidity & mortality due to NCD. Tools to measure the NCD risk factor burden have been developed by WHO and are being used by health planners to generate evidence for advocacy. The present study examines the prevalence of various risk factors of NCDs in central part of India using the WHO STEP approach.

2. Material and Methods

We conducted a cross-sectional study in the rural area of Saoner, Nagpur district of Maharashtra from May 2008 to November 2008. To calculate the sample size, the prevalence of obesity was taken as one of the NCD risk factor, one of the previous study demonstrated the prevalence of obesity to be 9% in rural area of Faridabad, Haryana [5] and to provide a 95% confidence interval with 10% margin of error, we estimated a sample size of 3600 people above 15 years of age. Multistage sampling was used for the purpose of recruitment. Tehsil Saoner of Nagpur district has 5 Primary Health Centres (PHCs), out of which PHC Khapa was randomly selected; PHC Khapa has 5 sub-centres covering 30,030 populations of total 20 villages as per PHC record. Out of these sub-centre Wakodi and Kodegaon was randomly selected. One village was randomly selected from the list of villages in the sub-centre. If the village was small, an additional village was selected from the same sub-centre. All the households in the selected villages were covered and all subjects above 15 years in the household were interviewed. Seriously ill study subjects who were unable to stand erect and study subjects who were unavailable in spite of three informed home visits one week apart were excluded from the study. Ethical clearance from our Institutional Ethical Committee was obtained. The objective of the study and the method was explained to the Sarpanch of respective village and his cooperation was sought. House to house survey was carried out in morning as well as evening hours to get maximum number of study subjects at home. The WHO STEP-wise tool was used and the behavioural risk factor Questionnaire was suitably modified and translated in local language. It included questions on socio-demographic status, data on tobacco and alcohol use, measures of dietary habits and physical inactivity. Standard procedure was followed as per STEPs protocol for anthropometric and blood pressure measurements. The height was measured using adult portable SECA anthropometric rod to the nearest 0.1 cm. SECA digital weighing scales were used to measure weight of the individuals and was recorded in kilograms up to 0.1 kg. A SECA constant tension tape was used to measure Waist circumference to the nearest 0.1 cm. The blood pressure was measured using OMRON digital automatic blood pressure monitor. There were three members in the team which included one female who were trained and regularly supervised by the investigator.

Definitions [6]

Current daily smokers were defined as those who were currently smoking cigarettes, bidis or hookah daily.

Current daily smokeless tobacco users were defined as those who were currently using chewable tobacco products, gutka, naswar, khaini or zarda paan daily.

Current alcohol drinkers were defined as those who reported to consuming alcohol within the past one year. One standard drink was equivalent to consuming one standard bottle of regular beer (285 ml), one single measure of spirits (30 ml) or one medium size glass of wine (120 ml).

One serving of vegetable was considered to be 1 cup of raw green leafy vegetables, ½ cup of other vegetables (cooked or chopped raw) or ½ cup of vegetable juice.

One serving of fruit was considered to be 1 medium size piece of apple, banana or orange, ½ cup of chopped, cooked, canned fruit or ½ cup of fruit juice, not artificially flavoured.

Physical inactivity was defined as less than 10 minutes of activity at a stretch, during leisure, work or transport.

Body mass index (BMI) was calculated by dividing the weight (in kilograms) by square of height (in meters). Overweight was defined as $BMI < 25 \text{ kg/m}^2$ and $< 30 \text{ kg/m}^2$.

Obesity was defined as $BMI \geq 30 \text{ kg/m}^2$.

Hypertension was defined as $BP \geq 140/\geq 90$ mm of Hg or currently on antihypertensive drugs.

The results of the measurement were provided to the respondents and all cases needing referral were referred to the Government Medical College, Nagpur to consult a physician.

Data were entered simultaneously. 10 percent data was re-entered and these were validated. For analysis, data was stratified into age groups of 10 years class interval, analysis was performed using statistical programme (SPSS Version 15.0, SPSS Inc, Chicago, USA).

3. Results

Total number of people surveyed was 3,980 out of which 3,771 (94.7%) persons were enrolled in the study. 209 people were excluded either due to not available at home or ill health. A total of 1964 men and 1807 women were included in the survey. Mean age of men and women were 37.04 ± 16.28 years and 38.07 ± 16.57 years respectively. Among the men, majority were unskilled or landless labourers (64.9%), of the women, 23% were housewives. Literacy among men and women was 82.6% and 70% respectively. Majority, 41.2% belonged to socioeconomic class IV according to Prasad classification adjusted for the all India Consumer Price Index for that period.

3.1. Tobacco & alcohol use (Table 1)

The prevalence of daily smoked and smokeless tobacco user in men was 20.5 % (95% CI 18.6% - 22.3%) and 62.6 % (95% CI 60.2% - 64.9%) respectively. Among women none were smoking tobacco; all were life time abstainer, while the prevalence of smokeless tobacco use was 32.8% (95% CI 30.6% - 35.0%). For men, smoked tobacco use was highest in 45-54 years age group, whereas smokeless tobacco in the forms of kharra, gutka, snuff and chewed tobacco were more prevalent in 35-44 years age group. There was a steep rise in daily smokeless tobacco use after 24 years of age from 43.7% in 15- 24 years age group to 76.0% in 25- 34 years age group. There after a gradual rise to a peak of 77.7 % at 35-44 years age group. The prevalence then showed a decline in the later age group. For women smokeless tobacco use was more common in the older age group of 55-64 years. The median age for starting to smoke among men was 22.0 yrs, while the median duration of smoking was 22.57 yrs. Smoking tobacco in the form of bidis was the most common with the mean number of bidis smoked per day among men being 14.92. Kharra was the commonest form in which smokeless tobacco was consumed by men while it was snuff and tobacco toothpaste among women. None of the women reported consuming alcohol. The prevalence of ever alcohol consumption among men was 38.7 % while that of current alcohol consumption was 37.7% (95% CI 35.5% - 39.9%). The prevalence was highest in the 25-34 years age group. Total, 1.7 % men had consumed more than or equal to 5 drinks on any day, in the last week.

Table 1. Prevalence of tobacco use and alcohol use by age & sex

Age Group in years	Men				Women ^{a)}	
	Total	Current Smokeless tobacco user (%)	Current Smoker (%)	Current Alcohol consumers (%)	Total	Current Smokeless tobacco user (%)
15-24	586	43.7	4.9	15.9	526	9.1
25-34	450	76.0	14.2	61.1	471	30.6
35-44	377	77.7	24.9	56.5	318	43.4
45-54	233	58.8	45.1	40.6	179	44.1
55-64	185	68.1	33.5	23.2	181	60.8
≥65	133	57.1	37.5	18.0	132	55.3
Total	1964	62.6	20.5	37.7	1807	32.8

a) All the women were life time abstainer for smoking and alcohol consumption

3.2. Fruits and vegetable consumption

The physical inactivity was highest during leisure time and was least during transportation from one place to another for both men and women. Among all age groups, the percentage of people undertaking at least 150 minutes of physical activity in a week was less for women [90.4% (95% CI 89.0% - 91.7%)] as compared to men [92.3 % (95% CI 91.1% - 93.5%)]. Such level of physical activity was highest in the age group 35-44 years (96.9% and 94.9% for men and women respectively) and lowest in 55-64 years age group (79.2% and 73.9% for men and women respectively).

3.4. Anthropometry (Table 2)

Among men 6.0 % (95% CI 4.9% - 7.0%) had BMI > 25.0 Kg/m² compared to 7.9 % (95% CI 6.6% - 9.2%) among women. The prevalence of overweight (BMI 25 – 29.9 Kg/m²) among men and female was 5.7 % and 7.2 % respectively. While the same for obesity (BMI ≥ 30 Kg/m²) was 0.3% and 0.7%. Across all age groups overweight was more common among women than men. A total of 3.2 % of men had waist circumference ≥ 102 cm, which was most commonly seen in the 35-44 years age. This was against the cut-off for women of ≥ 88 cm which was seen in 7.2%. Again it was more common in the 35-44 years age group.

Table 2. Prevalence of thinness, overweight and obesity in the study subjects

Age Group in years	Men BMI (Kg/m ²)					Women BMI (Kg/m ²)			
	Total	<18.5 (%)	18.5-24.9 (%)	25-29.9 (%)	>30 (%)	<18.5 (%)	18.5-24.9 (%)	25-29.9 (%)	>30 (%)
15-24	586	55.1	42.2	2.7	0.0	526	59.3	3.2	0.2
25-34	450	35.3	60.7	3.8	0.2	471	51.8	4.5	0.4
35-44	377	36.3	56.2	6.9	0.5	318	43.7	8.5	0.9
45-54	233	30.5	60.5	8.2	0.9	179	36.9	11.2	2.2
55-64	185	42.7	46.5	10.3	0.5	181	39.2	13.3	0.6
≥65	133	42.9	45.9	11.3	0.0	132	49.2	15.9	1.5
Total	1964	42.1	51.9	5.7	0.3	1807	49.6	7.2	0.7

3.5. Blood pressure (Table 3)

The prevalence of self-reported hypertension was 2.3% in men and 2.8% in women, whereas the prevalence of hypertension (defined as BP ≥ 140/90 mm of Hg or currently on antihypertensive drugs) [7] was 14.8 % (95% CI 13.2% - 16.4%) in men and 15.9 % (95% CI 14.1 % - 17.6%) in women. There was a sharp increase in prevalence of hypertension among women after 35-44 years age group. In younger age group men were having higher prevalence than women but after 45-54 years age group women took over, probably due to menopause.

Table 3. Prevalence Of Hypertension According To Age And Sex

Age Group in years	Men		Women	
	Total	Hypertensive (%)	Total	Hypertensive (%)
15-24	586	1.0	526	0.8
25-34	450	9.8	471	7.9
35-44	377	18.0	318	17.6
45-54	233	26.2	179	30.7
55-64	185	34.1	181	46.4
≥65	133	36.8	132	39.4
Total	1964	14.8	1807	15.9

4. Discussion

Epidemiological field studies of NCDs are going increasing importance over the past two decades. They contribute not only to an estimate of the prevalence of a disease but help to gain an insight into the spectrum of the disease which is incompletely brought out by hospital based data. Our study presented the NCD risk factor burden using WHO-STEPs tool and it was found that there was high prevalence of smoking, smokeless tobacco use, alcohol consumption, obesity, hypertension and low prevalence of physical inactivity among the rural population of Nagpur.

Tobacco use in India is high and there are considerable differences in the form how tobacco is consumed among gender, present study showed the prevalence of current smokers to be 20.5 % among males and none among females which was in consistency with result reported by Anand K et al (2008) [4] in Faridabad, which was 22.2% and 1.4% in men and women respectively and Kuthy V R et al (1993) [8] in Thiruvananthapuram. However study conducted in rural area of Faridabad by Krishnan A et al (2008) [5] showed

high prevalence of current smokers, 41.0% in men and 13.0 % among women while the prevalence of smokeless tobacco was 7.1 % and 1.2% among men and women respectively, which was lower than the present study (62.6% in men and 32.8% in women), this can be due to higher social acceptability of smokeless tobacco than smoking in this part of rural area. Among men, bidi and kharra was the most common form of smoking and smokeless tobacco use respectively, while among women it was snuff and tobacco tooth paste as most common form of smokeless tobacco consumption. Similar results have been obtained by NCD- ICMR (2005) [1] conducted at six different centres, where they found bidi and gutkha among men and snuff among women as most common form of tobacco consumption. In our study prevalence of current alcohol consumers in men was 37.7% and all women did not report to consume alcohol which was similar to as reported by other studies [1,5,9,10]. There was sharp rise in prevalence among men in the age group 25-34 years this can be due more independence gained during this part of life. Mostly were consuming locally made

alcohol. Very few, only 1 % quite alcohol consumption and most common reason was health problem. Our study revealed that women and men were consuming less amount of fruit and vegetable than the recommended; this can be attributed to their low socio-economic status [11,12]. In the study population there were very few subjects who were obese ($\text{BMI} \geq 30\text{Kg/m}^2$), but most were in the overweight range ($\text{BMI } 25\text{-}29.9\text{Kg/m}^2$) and they are in the potential category to enter in to obesity. The Overweight increased with age in all the age groups, finding that can be attributed to their increase physical inactivity as age advances. These finding are in consistency with studies carried out in India, Nepal and Sri-Lanka [13,14]. Our study showed that there was less prevalence of physical inactivity among the subjects, as most of them were involved in farming and mainly walked to move from one place to another. Physical inactivity was mainly during leisure time. Our finding showed high burden of hypertension in the study population and this burden increased more in elderly. Hypertension was more prevalent among men than women in age groups below 45-54 years and then it increased among women, mainly post menopausal. Recently ICMR has published their Phase-I NCD Risk Factor Survey reports from seven states of India including Maharashtra state [15]. Our study showed similar findings with the report and most of the risk factors were in the 95% C.I. However in the present study, prevalence of risk factors like low fruits and vegetable consumption was found to be higher while of obesity to be lower, as reported in ICMR report. This probably may be explained as present study is being conducted in the vidharba part of Maharashtra and the demographic profile of people is different in different region of the Maharashtra state. Hence, study may not reflect the result for the entire state of Maharashtra. Similar findings has been reported by other studies [16,17].

Government of India in past few years has taken some positive steps in this regards, establishing surveillance system to provide risk factor data from different parts of the country, using WHO's STEPS methodology. Data obtained from simple and sustainable surveillance systems would help to guide future policy. The Integrated Disease Surveillance Programme, launched by the Government of India in 2004, incorporates key elements of chronic disease risk factor surveillance and has the potential to yield such nationally representative data [18]. Along with data generation, various intervention models (school-based projects) are also being studied which would help in strengthening the design and delivery system of a national programme for chronic disease prevention and control [19].

5. Conclusion

Our study reveals high burden of NCD risk factors in rural areas and reiterates the need to address these issues comprehensively as a part of NCD prevention and control strategy. These NCD risk factors were found to be distributed unequally among the population with respect to age groups and gender. Hence for formulation of any strategies for NCD prevention and control it is important to keep in mind the differential distribution of NCD risk factors in the population. STEP wise approach of WHO

offers an entry point for low and middle income countries to initiate NCD surveillance, as it allows for the development of a flexible, increasingly comprehensive and complex surveillance system depending on local needs and resources. Further surveys are recommended based on this approach to ensure data comparability over time and between different sites. It is also important to study trends of various NCD risk factors.

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