Original Research Article

Risk factor profile for non-communicable diseases in public institutions of Shimla, Himachal Pradesh, India

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ABSTRACT

Background: Non communicable diseases (NCDs) are the leading causes of death globally, killing more people each year than all other causes combined. NCDs are caused, to a large extent, by four behavioural risk factors that are pervasive aspects of economic transition, rapid urbanization, and 21st century lifestyles: Tobacco use, unhealthy diet, insufficient physical activity, and the harmful use of alcohol.

Methods: This was a cross sectional study conducted in public institutions of urban field practice area of department of Community Medicine. World Health Organization (WHO) STEPS approach was used to find the prevalence of risk factors. The study was conducted in public institutions among working population aged 18 years and above.

Results: A total of 350 participants were included in the study. The overall prevalence of tobacco use was 23.4%. The prevalence of alcohol consumption was 36%. None of the participant was consuming more than five servings of fruits and vegetables per day. Physical inactivity was seen in 51%. Total of 32.6% were found to be hypertensive.

Conclusions: This study shows the high burden of risk factors for NCDs in the working population. Action should be oriented toward curbing the NCD risk factors and promoting healthier lifestyles to reduce NCD incidence rates and push back the age of NCD onset.

Keywords: Non communicable diseases, WHO STEPS, Risk factors

INTRODUCTION

The global burden and threat of non-communicable diseases (NCD) constitutes a major public health challenge that undermines social and economic development throughout the world. A total of 56 million deaths occurred worldwide during 2012. Of these, 38 million were due to NCDs, principally cardiovascular diseases, cancer and chronic respiratory diseases. Nearly three quarters of these NCD deaths (28 million) occurred in low- and middle-income countries. The leading causes of NCD deaths in 2012 were: cardiovascular diseases (17.5 million deaths or 46.2% of NCD deaths), cancers

(8.2 million, or 21.7% of NCD deaths), respiratory diseases, including asthma and chronic obstructive pulmonary disease (4.0 million, or 10.7% of NCD deaths) and diabetes (1.5 million, or 4% of NCD deaths).¹

Thus, these four major NCDs were responsible for 82% of NCD deaths. Although morbidity and mortality from non-communicable diseases mainly occur in adulthood, exposure to risk factors begins in early childhood. According to World Health Organization (WHO) projection, the total annual number of deaths from non communicable diseases will increase to 55 million by 2030.²

Premature death is a major consideration when evaluating the impact of NCDs on a given population, with approximately 42% of all NCD deaths occurring before the age of 70 years in 2012. This represents 16 million deaths – an increase from 2000 when there were 14.6 million NCD deaths before the age of 70 years. The majority of premature deaths (82%) are in low and middle-income countries. In low- and middle-income countries, a higher proportion (48%) of all NCD deaths are estimated to occur in people under the age of 70 years, compared with high-income countries (28%).¹

A “risk factor” refers to any attribute, characteristic, or exposure of an individual, which increases the likelihood of developing a non-communicable disease. The major (modifiable) behavioural risk factors identified in the World Health Report 2002 are tobacco use, harmful alcohol use, unhealthy diet (low fruit and vegetable consumption) and physical inactivity. On the other hand, the major biological risk factors identified are overweight and obesity, raised blood pressure, raised blood glucose and raised total cholesterol.³

Tobacco use is currently one of the leading causes of preventable deaths in the world. Risks to health result not only from direct consumption of tobacco but also from exposure to second-hand smoke. Tobacco use increases the risk of cardiovascular disease, cancer, chronic respiratory disease, diabetes and premature death. Six million people are currently estimated to die annually from tobacco use, with over 600 000 deaths due to exposure to second-hand smoke (with 170 000 of these deaths among children).⁴ Tobacco use accounts for 7% of all female and 12% of all male deaths globally.^{5,6}

In 2012 it was estimated that 3.3 million deaths, or 5.9% of all deaths worldwide, were attributable to alcohol consumption.⁷ Insufficient physical activity is one of the 10 leading risk factors for global mortality, causing some 3.2 million deaths each year.⁸ Raised blood pressure is one of the leading risk factors for global mortality and is estimated to have caused 9.4 million deaths and 7% of disease burden – as measured in DALYs – in 2010. The global prevalence of raised blood pressure in adults aged 18 years and over was around 22% in 2014.⁹

METHODS

Study area

The study was conducted in ten Public sector institutions of Boileauganj, urban field practice area of department of Community Medicine, Indira Gandhi Medical College, Shimla.

Study population

The working population in public sector institutions

Sample size

Due to unavailability of baseline data on risk factors for NCDs, the sample size of 350 was taken due to resource constraints. Subjects were randomly selected for the study by using random number generator of scientific calculator.

Methodology

To conduct this study prior permission was taken from the head of each institution. A written consent of selected employees was also taken before the start of actual study and were interviewed using a WHO STEPS questionnaire and screened at their work places. The interview was taken in three steps.

In step 1, the participants were interviewed to determine the socio-economic and behavioral risk profile by using WHO STEPS questionnaire. It consists of Core items includes Age, Sex, Literacy, Education in years, Tobacco use, Alcohol consumption, Fruits and vegetables intake, Physical activity.

In step 2, Anthropometric measurements including weight, height, waist circumference, and hip circumference and blood pressure were taken at their work places. Height and weight measurements were taken to calculate the Body mass index (BMI).

BMI was calculated as weight in kg/ height in m². Then the subjects having more than 3 behavioral and/ or anthropometric risk factors from STEP 1 and 2 were identified as being “at risk” and biochemical estimation was done.

Statistical analysis

Analysis was done using SPSS version 17. Qualitative data was expressed in mean and standard deviation. Chi square test was applied to find the association between these risk factors and socio demographic factors. Multivariate Logistic regression was applied to find out the risk factors. A ‘p’-value less than 0.05 was considered as statistically significant.

RESULTS

This was a cross sectional study conducted in public offices to find out the profile of risk factors for non communicable diseases. Maximum number of participants was in 45-54 years of age. The mean age of the study participants was 45.3±10 years among males and among female participants (46.2±9.8 years). Table 1 shows the age and sex wise distribution of the study population.

Majority of the population were educated up to graduation (34.3%). Table 2 shows the distribution of study population according to the occupation. The

maximum number of participants were from clerical group (46.3%) followed by professional/executive/manager (23.43%) and unskilled group (16.6%).

Table 1: Age and sex wise distribution of the study population.

Age groups (years)	Males N (%)	Females N (%)	Total N (%)
15-24	2 (100)	0 (0)	2 (0.5)
25-34	43 (76.8)	13 (23.2)	56 (16.0)
35-44	81 (81)	19 (19)	100 (28.6)
45-54	79 (69.3)	35 (30.7)	114 (32.6)
>55	59 (75.6)	19 (24.4)	78 (22.3)
Total	264 (75.4)	86 (24.6)	350 (100.0)

Table 2: Distribution of the study population according to the occupation.

Occupation	Male N (%)	Female N (%)	Total N (%)
Professional/ executive/ manager	66 (25)	16 (18.6)	82 (23.4)
Clerical	127 (48.1)	35 (40.7)	162 (46.3)
Skilled	38 (14.4)	7 (8.1)	45 (12.9)
Unskilled	31 (11.7)	27 (31.4)	58 (16.6)
Others	2 (0.8)	1 (1.2)	3 (1.0)
Total	264 (75.4)	86 (24.6)	350 (100.0)

Risk factor profile

The prevalence of Tobacco use was 23.4%. Tobacco was mainly used as smoking. The prevalence of tobacco use among participants was (21.4%) and among them daily

users was (86.7%). The mean age of initiation of smoking in males was 27.6 ± 9.78 years.

The overall prevalence of Alcohol consumption in study population was 36% and among them 46.6% were males and 2.3% were females and the difference was significant ($p < 0.05$). The daily fruits and vegetable consumption was 1.4% and 16.6% respectively. None of the participant had reported having more than five serving of fruits and vegetables per day. Table 3 shows the mean consumption of fruits and vegetables per day.

Table 3: Average fruits and vegetables consumption per week among the study subjects.

Fruits and vegetables	Total (Mean $\pm$ SD)
Mean number of days fruits consumed	2.7 ± 1.5
Mean number of servings of fruits per day	0.9 ± 0.32
Mean number of days vegetables consumed	4.9 ± 1.5
Mean number of serving of vegetables per day	1.2 ± 0.4

Table 4: Type of physical activity in the study population.

Physical activity	Males N (%)	Females N (%)	Total N (%)
Work related activity	16 (6.1)	0	16 (4.6)
Travel related activity	128 (48.5)	50 (58.1)	178 (50.9)
Recreational activity	57 (21.6)	13 (15.1)	70 (20)

Table 5: Results of multivariate logistic regression for the independent variables.

Variables	Hypertension N (%)	'p' Value	OR (95% CI)
Age			
15-39 years	6.3% (22)	0.000	0.320 (0.183-0.561)
40-70 years	26.3% (92)		Reference
Gender			
Male	28% (114)	0.063	1.873 (0.966-3.632)
Female	4.6% (16)		Reference
Occupation			
Sedentary	25.4% (89)	0.016	1.968 (1.133-3.419)
Non sedentary	7.1% (25)		Reference
Tobacco			
Users	9.7% (34)	0.161	1.549 (0.840-2.854)
Non users	22.9% (80)		Reference
Alcohol			
Users	14.6% (51)	0.099	1.598 (0.916-2.790)
Non users	18% (63)		Reference

According to WHO Global Physical Activity Questionnaire Analysis Guidelines¹⁰, 51% of the participants were having low level of physical activity followed by 47% in moderate physical activity. 15.7% participants were doing regular yoga and vigorous activity was reported by only 1.43%. Distribution of type of physical activity is shown in Table 4.

According to the WHO classification for BMI, majority (56.6%) of the participants were in normal category.¹¹ The mean BMI of the participants was $24.09 \pm 3.6 \text{ kg/m}^2$. 33.1% of the participants were overweight and 6% were obese.

As per JNC 7 classification majority of the participants were pre-hypertensive.¹² 28.9% of the participants were in stage - 1 hypertension and only 3.7% were in stage - 2 Hypertension. It was significantly ($P=0.001$) high among males (37.8%) than females (18.6%) which could be due to less number of female participants in the study as well as less behavioral risk factors among females. A study in Kerala showed that 34.9% were hypertensive and among them 36.2% were males and 33.6% were females.¹⁵

In bivariate analysis, age, gender, occupation, tobacco consumption and alcohol intake were found to be significant ($p<0.05$) for hypertension. So these factors were included in multivariate logistic regression model. In age group, reference age group was >40 years and it showed low risk for hypertension among 15 - 40 years. In occupation, the sedentary workers were on higher risk with odds ratio (OR) 1.96 as compared to non-sedentary workers.

DISCUSSION

This study showed the risk factors for NCDs among the working population in offices using WHO STEPs questionnaire. Tobacco use of 23.4% reported in this study includes 2.4% use of smokeless tobacco. This could be due to peer pressure or easy and cheap availability of the products. A study conducted in north Indian community found the current smoking prevalence was 17.6%.¹³

The overall prevalence of Alcohol consumption in study population was 36%. This is lower than the alcohol consumption in a study conducted in Delhi (50.5%) with the age of initiation being 19 years.

The daily fruits and vegetable consumption was 1.4% and 16.6% respectively. Such poor consumption could be related to limited affordability and behavior of the people. Similar finding was seen in a study in which daily fruit consumption was 1% and vegetable consumption was 16.8%.¹³

Physical inactivity is a major risk factor in promoting obesity, which itself is a risk factor for the other chronic diseases. 51% of subjects were found with low physical

activity due to their sedentary work as nearly half of the study population was having sitting jobs in the offices. Most of the physical activity was limited to travel related to reach the offices. This could be also due to the lack of parks and open space for walking. A study conducted in 9 Asian sites including India, found 51.7% males and 54.2% females with low level of physical activity.¹⁴

33.1% of the participants were overweight and 6% were obese. Commutation related activities could be promoted by encouraging bicycles and keeping footpaths free for walk. Promotion of physical activity during leisure time will require engagement of non-health sectors creating recreational facilities including provision of play grounds, parks, sports, etc.

This present study showed the high prevalence of hypertension among males (37.8%) than females (18.6%) which could be due to less number of female participants in the study as well as less behavioral risk factors among females. Similar finding was found in a study in Kerala which showed that 34.9% were hypertensive and among them 36.2% were males and 33.6% were females.¹⁵

CONCLUSION

This study shows the burden of risk factors for non-communicable diseases in the office workers. The risk factors were high among the workers with sedentary lifestyle and more sitting jobs. There is a need for straightening of the primary health care & availability of resources at primary level to ensure the implementation of NCD prevention and control. This study showed the strong association of sedentary lifestyle with hypertension. Further fruits and vegetable consumption was low. There is a need for promoting healthy life style at workplace including physical activity and more consumption of fruits and vegetables.

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