ORIGINAL ARTICLE

A community based study of NCD risk factors among adult population in Dehradun, India

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Abstract

Background: A Non-Communicable disease (NCD) is one which is non-infectious and non-transmissible among people. NCDs account for leading causes of death and disease burden worldwide. To decrease the burden of NCDs experts stress on the importance of prevention and control with respect to modifiable risk factors. The World Health Organization's World Health Report 2002 identified tobacco use, alcohol consumption, overweight, physical inactivity, high blood pressure and high cholesterol as the most important risk factors for NCDs.(1) **Aims & Objectives:** 1. To know the prevalence of risk factors leading to NCDs in the study population. 2. To know the socio-demographic correlates associated with risk factors of NCDs. 3. To suggest appropriate recommendations regarding modifiable risk factors of NCDs in study population. **Material & Methods:** A Cross-sectional study, Community-based study among 18+ population in field practice areas of Community Medicine Department, SGRRIM&HS, Dehradun. Sample Size: 300 each in urban and rural, total 60. **Results**: The prevalence of Smoking was 11.3%, Smokeless tobacco use 10.5%, Alcohol use 13.2%, Unhealthy diet 99.5%, Low physical activity 0.8%, High BMI (≥ 25 kg/m2) 51.2%, above normal waist-hip ratio 57.0%, Raised blood pressure 58.5% and raised blood sugar 25.2%. **Conclusion:** Smoking is significantly associated with age, sex and occupation. Raised blood pressure is significantly associated with age, sex and social class.

Keywords

Prevalence; NCDs; Modifiable risk factors

Introduction

NCDs are emerging as one of the major causes of morbidity and mortality following an epidemiological transition from communicable diseases to Non-Communicable diseases.

Communicable diseases have been controlled to a considerable extent in developed countries. On the other hand, there is a trend towards increase in prevalence of Non-Communicable diseases due to ecological imbalance and changing lifestyle of man.(2)

The emergence of NCDs as important causes of morbidity and mortality is not only due to reductions in infectious disease mortality and population ageing; it is also due to real increases in the age-specific incidence and mortality of several Non-Communicable conditions.(3)

World Health Report 2002 points out that world faces some common large and certain risks to

Health. India falls in the group of high mortality countries and risk factors like tobacco use, high cholesterol and high blood pressure are fast emerging. The world is living dangerously, either because it has little choice or because it is making wrong choices.(4)

Rapid changes in diets and lifestyles that have occurred with industrialization, urbanization, economic development and market globalization, have accelerated over the past decade. This is having a significant impact on the health and nutritional status of populations, particularly in developing countries and in countries in transition.(5)

Non-Communicable diseases (NCDs) are considered a major public health concern worldwide. As the leading cause of death globally, NCDs were responsible for 38 million (68%) of the world's 56 million deaths in 2012. More than 40% of them (16 million) were premature deaths under age 70 years. Almost three quarters of all NCD deaths (28 million), and the majority of premature deaths (82%), occur in low and middle-income countries.(6) It is projected that if no action is done in the present, these rates would increase to as high as 73 percent of total deaths and 60 percent of disease burden respectively by 2020 (WHO, 2005). The rapidly increasing burden of these diseases is affecting poor and disadvantaged populations disproportionately, contributing to widening health gaps between and within countries.

Developing countries confront double jeopardy of prevalent infectious diseases and increasing Non-Communicable Diseases (NCDs) with imminent projected epidemic proportions. The impact of these diseases on the lives of people is enormous when measured in terms of outcomes.(7)

NCDs account for 52% deaths, 43% disability adjusted life years (DALYs) and 62% of total disease burden in India. (8) This burden is likely to increase in the years to come. Cardiovascular diseases (CVDs) figure at the top among the ten leading causes of adult (25 – 69 years) deaths in India.

WHO has projected that by the year 2030, CVDs will emerge as the main cause of death (36%) in India and majority of these deaths are premature. The expenditure associated with the long-term effects of NCDs is high and about 10 to 25 percent of families with CVDs or cancer are respectively driven to poverty. The economic burden would be in the range of 5-10% of GDP, which is significant and this slowing down of GDP hampers the development of the country. Associated with this, the demographic transition (i.e., raise in aged population), the epidemiological transition (i.e., increase in the incidence of NCDs compared to communicable diseases) and social transition (like eating habits, smoking and alcoholism) pose serious challenge to the health system for providing treatment, care and support. Besides industrialization, urbanization and globalization are also contributing to the epidemic of NCDs by increasing the risk factor levels. As a result of this multidimensional effect at individual household, health system and macroeconomic level, NCDs are being labelled as 'Chronic Emergency'. Since health sector alone cannot deal with the chronic emergency of NCDs, a multi-sectoral action is required with a high political commitment.(4)

Costs borne by the affected individuals and families may be catastrophic as treatment is long-term and expensive. The efforts made by the Government of India and the States have not been able to check the rising burden of NCDs. Investments during the 11thfive year plan and earlier plans have been more on the provisions of medical services, which have not been adequate in the public sector. Private sector has grown particularly in urban settings but is beyond the reach of the poor and middle sections of the society.(8) There is urgent need for a comprehensive scheme that should focus on health promotion and prevention of NCDs and their risk factors and comprehensive management of NCDs. Lessons learnt during the 11thyear plan should be addressed and the programs for various NCDs and their risk factors should be integrated.(9)

To stop the increasing burden of Non-Communicable Diseases, the Ministry of Health & Family Welfare, Government of India, launched National Program for prevention and control of Diabetes, Cardiovascular diseases and Stroke (NPCDCS).(10)

The pattern of diseases encountered in a community is quite different from that in a hospital. In a community/society, a far larger proportion of disease (e.g., diabetes, hypertension) is hidden from view of the general public or physician. In this context, the analogy of an iceberg is widely used to describe the disease pattern in the community.(11)

Aims & Objectives

1. To know the prevalence of risk factors leading to NCDs in the study population.
2. To know the socio-demographic correlates associated with risk factors of NCDs.

3. To suggest appropriate recommendations regarding modifiable risk factors of NCDs in study population.

Material & Methods

This community-based, cross-sectional study was carried in Rural and Urban field practice areas (RHTC, UHTC) of Department of Community Medicine, SGRRIM&HS, Dehradun during April, 2014 – March, 2015.

Sample size: was calculated by the formula(12): $4pq/L^2$. where p is the prevalence of positive character, q is 100-p (L is allowable error).

According to a WHO study on 'Global ageing and Adult health' in SAGE countries in 2004(13), the burden of morbidity in India due to Non-communicable diseases is 41.4 % among adult population.(13) At 95% confidence level with 10 % allowable error and taking prevalence (p) as 41.4%, it was calculated as:

4 x 41.4 (100 – 41.4) / (10 % of 41.4)2=566.18 ~ 600.

Sampling technique: Systematic random sampling was used. 300 individuals each were taken from UHTC and RHTC, respectively, for the study. These individuals were interviewed from different localities and villages of UHTC and RHTC, respectively, by applying 'Probability Proportional to Size (PPS)' with determination of sampling interval.

In a household, if more than 1 individual above 18 years of age were consenting, then one of them was selected by lottery method. All the study participants were interviewed and examined for Non-Communicable Diseases and screening methods were applied only for hypertension and diabetes. For other Non-Communicable Diseases only diagnosed cases were taken. Sampling unit Households of rural and urban field practice areas of Department of Community Medicine, SGRRIM&HS, Dehradun.

Study unit: Individuals aged above 18 years.

Inclusion criteria: Individuals above 18 years, Residents of study area, Ready to give consent.

Exclusion criteria: Pregnant women.

Study tool: A pre-structured and pre-tested questionnaire was adopted based on STEPS instrument for NCD risk factor surveillance.(14) Modifications to suit the local requirements were done to generate data.

Data Analysis: Data was tabulated and analyzed by using SPSS version 23 (letter no: SGRR/MC/PO/Lib/2015/-11164; license code: e27995dcb17243a98de5. Multivariate analysis and chi-square tests were applied to find out the significance of the results.

Ethical Approval: Approval was obtained from 'Ethics Committee' of SGRRIM&HS, Dehradun

Results

The multivariate analysis shows that the difference among various risk factors is statistically significant ($p < 0.05$) (Table 1)

It can be observed from Table 2that the maximum prevalence of smokers is seen in age group51 – 60 years (25.8%). Smoking is much more prevalent among males (32.6%) than females (1.9%). Smoking is more prevalent in rural area (14.0%) than urban area (8.7%). Maximum prevalence of smoking is seen among labourers and daily-wage workers.

Table 3 shows that maximum prevalence of raised blood pressure is seen in age > 60 years (81.2%). Moreover, prevalence of raised blood pressure is more among males (70.1%) as compared to females (53.4%). Maximum prevalence of raised blood pressure is seen among upper class (68.8%) followed by upper middle class (57.2%) and least prevalence is seen among upper lower and lower class (49.5%).

Discussion

The prevalence of smoking in present study is8.7% in urban area and 14.0% in rural area. Similarly in a study by Chockalingam K *et al*(15), the prevalence of smoking is 12.4% in urban area and 14.3% in rural area. The present study reports 32.6% prevalence of smoking in males and 1.9% in females. A similar finding where 36.5% smokers are males and 7.0% are females, is reported by Anand K *et al*(16).

In the present study, the prevalence of smokeless tobacco use is 9% in urban area and 12% in rural area. In a similar study by Chockalingam K *et al*(15), the prevalence of smokeless tobacco use is 7% in urban area and 9.5% in rural area. The present study reports 23.4% prevalence of smokeless tobacco use in males and 4.8% in females. A similar finding where 10.2% smokeless tobacco users are males and 2.7% are females, is reported by Anand K *et al*(16). In the present study, the prevalence of alcohol use in urban males is 24.7% and 0.4% in urban females. Analogous finding is seen in study by Anand K *et al* (25.9% in males and 0.0% in females).(16) The present study reports 53.1% prevalence of alcohol use in rural males and 0.5% in rural females. However, in a study by Kumar SG *et al*, the prevalence of alcohol use is 16.8% in rural males and 1.3% in rural females.(17) In the present study, the prevalence of unhealthy

diet intake (< 5 servings of fruits &/or vegetables) is 99.0% in urban area and 100.0% in rural area. As per WHO report on Global Health risk 2009, approximately 80% of the population does not eat sufficient quantities of fruits and vegetables. WHO reported in Situation and Response in SEAR in 2011 that the prevalence of eating unhealthy diet ranges from 60% to 97% in males and 64% to 94% in females.(18) 99% prevalence of unhealthy diet is reported in a report by WHO/Government of Nepal (2014-2020)(19). This could be due to high cost of fruits and vegetables and lack of awareness in the large segment of population. In the present study, the prevalence of low physical activity (MET minutes per week < 600) is 0.8% in urban area and 1.0% in rural area. In a WHO report on NCD in SEAR in 2011, the prevalence of insufficient physical activity varies from 3% to 41% among males and from 6.6% to 64% among females.(20) In the present study, increasing prevalence of raised blood pressure is seen with increasing age. Similar finding is reported by Bhagyalaxmi A *et al* (2013).(21)

Conclusion

Smoking is significantly associated with age, sex and occupation and raised blood pressure is significantly associated with age, sex and social class.

Recommendation

There is need of health promotion activities at individual level with specific focus on healthy diet, physical activity, behavioural risk factors (use of tobacco and alcohol).

At community level, we need to create an environment that promotes the adoption of healthy behaviour.

There is immense economic burden on public health expenditure due to Non-Communicable Diseases as majority of the individuals affected are in the productive years of their life. Hence there is need for framing appropriate policies for tobacco and alcohol control, promotion of good diet and adequate physical activity with regular health checkup.

Relevance of the study

Current study emphasizes on various modifiable risk factors of Non-Communicable Diseases.

Authors Contribution

HA: Acquisition of data, SKG: Concept and supervision, KSN: Data analysis, KJ: Supervision, SS: supervision, ML: supervision.

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Tables

TABLE 1 PREVALENCE OF MODIFIABLE RISK FACTORS OF NCDS

Risk Factor	Rural		N (%)	Urban		N (%)	Combined		N (%)
	Male (%) (111)	Female (%) (189)		Male (%) (73)	Female (%) (227)		Male (%) (184)	Female (%) (416)	
Smoking	36(32.4)	6(3.2)	42(14.0)	24(32.9)	2(0.9)	26(8.7)	60(32.6)	8(1.9)	68(11.3)
Use of smokeless tobacco	26(23.4)	10(5.3)	36(12.0)	17(23.3)	10(4.4)	27(9.0)	43(23.4)	20(4.8)	63(10.5)
Alcohol use	59(53.1)	1(0.5)	60(20.0)	18(24.7)	1(0.4)	19(6.3)	77(41.8)	2(0.5)	79(13.2)
Unhealthy diet	111(100.0)	189(100.0)	100.0	71(97.3)	226(99.6)	99.0	182(98.9)	415(99.8)	597(99.5)
Low physical activity	1(0.9)	2(1.1)	3(1.0)	0(0.0)	2(0.9)	2(0.7)	1(0.5)	4(1.0)	5(0.8)
High BMI (≥ 25 Kg/m2)	40(36.0)	89(47.1)	129(43.0)	32(43.8)	146(64.3)	178(59.3)	72(39.1)	240(57.7)	312(52.0)
Above normal Waist-Hip Ratio (> 1 in males; > 0.85 in females)	14(12.6)	115(60.8)	129(43.0)	17(23.3)	196(86.3)	213(71.0)	31(16.8)	311(74.8)	342(57.0)
Raised blood pressure (> 120/80 mmHg)	80(72.1)	94(49.7)	174(58.0)	49(67.1)	128(56.4)	177(59.0)	129(70.1)	222(53.4)	351(58.5)
Raised blood sugar (> 140 mg/dl)	25(22.5)	42(22.2)	67(22.3)	15(20.5)	69(30.4)	84(38.0)	40(21.7)	111(26.7)	151(25.2)

TABLE 2DISTRIBUTION OF SMOKERS ACCORDING TO EPIDEMIOLOGIC CORRELATES

Correlate	Smokers (n = 68)	Non-smokers (n = 532)	Total (n = 600)	p-value
	N(%)	N(%)		
Age (in years)				0.0000
≤ 30	8(7.5)	99(92.5)	107	
31 – 40	10(6.4)	146(93.6)	156	
41 – 50	12(8.6)	127(91.4)	139	
51 – 60	25(25.8)	72(74.2)	97	
> 60	13(12.9)	88(87.1)	101	

Sex				0.0000
Male	60(32.6)	124(67.4)	184	
Female	8(1.9)	408(98.1)	416	
Area				0.0393
Rural	42(14.0)	258(86.0)	300	
Urban	26(8.7)	274(91.3)	300	
Family type				0.0204
Nuclear	35(9.1)	350(90.9)	385	
Joint	33(15.3)	182(84.7)	215	
Occupation				0.0000
Government employee+ Non-Government employee	9(22.0)	32(22.0)	41	
Student+ Homemaker	8(2.1)	382(97.9)	390	
Retired	7(24.1)	22(75.9)	29	
Unemployed	6(31.6)	13(68.4)	19	
Labourer+ Daily-wage worker	20(36.4)	35(63.6)	55	
Businessman	18(27.3)	48(72.7)	66	

TABLE 3 DISTRIBUTION OF SUBJECTS WITH RAISED BLOOD PRESSURE ACCORDING TO EPIDEMIOLOGIC CORRELATES

Correlate	Raised blood pressure (n = 351)	Normal blood pressure (n = 249)	Total (n = 600)	p-value
	N(%)	N(%)		
Age (in years)				
≤ 30	41(38.3)	65(60.7)	107	0.0000
31 – 40	70(44.9)	86(55.1)	156	
41 – 50	85(61.2)	54(38.8)	139	
51 – 60	72(74.2)	25(25.8)	97	
> 60	82(81.2)	19(18.8)	101	
Sex				
Male	129(70.1)	55(29.9)	184	0.0001
Female	222(53.4)	194(46.6)	416	
Social class				
Upper	86(68.8)	39(31.2)	125	0.0265
Upper Middle	127(57.2)	95(42.8)	222	
Lower Middle	84(58.3)	60(41.7)	144	
Upper lower+ Lower	54(49.5)	55(50.5)	109	