

The Profile of Risk Factors for Non-Communicable Diseases among the Urban Population in Garhwal Region of Uttarakhand, India

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Abstract:

Introduction: Non communicable diseases (NCDs) are the leading causes of adult mortality and morbidity world-wide. NCDs currently cause more deaths than all other causes combined and NCD deaths projected to increase from 38 million in 2012 to 52 million by 2030. **Objectives :** 1.To know the socio-demographic profile of the study participants. 2. To study the behavioural and physiological risk factor's profile for non-communicable disease of the participants. **Method :** A community based cross-sectional study was conducted among the urban population in Garhwal region of Uttarakhand. Data collected was coded and entered into Microsoft excel sheet and was analysed using SPSS version 16. Chi square test was used to test the association and p value <0.05 was considered as significant. **Results :** Tobacco (current) and Alcohol (current) consumption was seen in 14.5% and 14.6% respectively. < 5 servings of fruits and vegetables was observed in 98% while 94.8% were taking ≥ 5 gm/day salt. 50.3% were physically inactive. 41.2% and 15.6% of the study participants respectively were having raised blood pressure and raised blood glucose level. In 76% of the study subjects, central obesity was present while 49% were having body mass index of ≥ 25 kg/m². There was statistically significant difference between male & female gender in regards to different behavioural and physiological risk factors. **Conclusion :** The prevalence of risk factors for non communicable is high. Since behavioural and physiological are modifiable risk factors, health education and awareness regarding life style modification is required.

Key words: Non-communicable diseases, Risk factors, Urban Population, WHO STEPS Approach

Introduction:

Noncommunicable diseases (NCDs) are one of the major health and development challenges of the 21st century, in terms of both the human suffering they cause and the harm they inflict on the socioeconomic fabric of countries, particularly low- and middle-income countries. NCDs currently cause more deaths than all other causes combined and NCD deaths projected to increase from 38 million in 2012 to 52 million by 2030.^[1]

In India, NCDs contribute to around 5.87 million deaths that account for 60% of all deaths.^[2] The main preventable risk factors for NCDs are tobacco consumption, harmful use of alcohol, unhealthy diet including high salt intake and physical inactivity. Other risk factors include stress, lack of dietary fibre, trans-fatty acids etc. If these behavioural risk factors

are not modified they may lead to following biological risk factors: overweight/obesity, raised blood pressure, raised blood glucose and raised total cholesterol levels.^[3]

Method:

Study settings and participants : A community based cross-sectional study was conducted in the urban field practice areas of a Government Medical college in Uttarakhand, from April 2018 to September 2018. The study area is a small town consisting of nine wards and having a population of 20,115 as per census 2011. People who were permanent residents of age 30 years and above, gave their voluntary consent to participate were included in the study. The critically ill, bed ridden, pregnant females were excluded from the study.

Sample size estimation : Sample size was calculated from the formula $4pq/l^2$, where p is the prevalence of raised blood pressure ($\geq 140/90$ mmHg) ($p= 23\%$)^[1] and $q =100-p$, l is the allowable error = 15% of p. Further considering non response rate of 15%, final sample size estimated was=684.

Sampling Technique : Out of the nine wards, 5 wards were randomly selected and all the households in these wards were considered in the sampling frame. Further only one eligible person from these household was selected by lottery method.

Study tool : A study tool based on the World Health Organization STEP wise approach to surveillance of non-communicable diseases and their risk factors (STEPS) was used.^[4] The questionnaire was modified after conducting a pilot study on 30 individuals. Only STEP 1 & 2 were used because of limited resources. However, random blood sugar was estimated by glucometer. Modified Kuppuswamy classification for the year 2018 was used to assess the socio-economic status (SES) of an individual.

Operational definition

Current Tobacco users : Individuals, who at the time of survey were using tobacco products in any, form either smoking or smokeless, daily or occasionally.

Past Tobacco users : Individuals, who were using tobacco products in any, form either smoking or smokeless in the past, but now they are not using since one year preceding the survey.

Current Alcohol users : Individuals, who at the time of survey was consuming alcohol either daily or occasionally.

Past Alcohol users : Individuals, who were consuming alcohol either daily or occasionally in the past, but now they are not using since one year preceding the survey.

Fruits & vegetables consumption : Information on fruit and vegetable consumption was based on the number of daily servings eaten. Five or more servings were considered sufficient, and fewer than five

Junk food: Foods containing little or no proteins, vitamins or minerals but are rich in salt, sugar, fats and high in energy (calories).^[6]

Salt intake : Increased salt intake was considered if salt consumption was more than 5 gram/person/day.^[7] Amount of the salt (number of packets of 1 kg salt) consumed by the family per month and divided it by 30 (considering 30 days in a month) and number of persons living in the family. Hence, salt consumption per gram per day of an individual was calculated.

Physically active : For assessment of physical activity, the respondents were asked whether they undertook any kind of specific physical activity for at least 30 minutes during the day. Using the CDC guidelines, those who undertook moderate physical activity such as walking/sports for 30 minutes a day for at least 5 days a week were considered to be physically active.^[8]

Hypertension : Individuals with systolic blood pressure (SBP) ≥ 140 mmHg, and/or diastolic blood pressure (DBP) ≥ 90 mmHg^[9] and/or patient who were previously diagnosed case of hypertension by physician and/or were on treatment with anti-hypertensive drugs.

Diabetes : In a patient with classic symptoms of hyperglycaemia or hyperglycaemic crisis, a random plasma glucose ≥ 200 mg/dl^[10] and/or patient who were previously diagnosed case of diabetes by physician and/or were on treatment with anti-diabetic drugs.

Waist Circumference (WC) : The cut off point for central obesity was defined as ≥ 90 cm for males & ≥ 80 cm for females as suggested for Asian ethnicity.^[11]

Waist to Hip Ratio (WHR) : The cut off point for truncal obesity was defined as ≥ 0.9 for males & ≥ 0.8 for females as suggested for Asian ethnicity.^[11]

Body Mass Index (BMI) : Individuals were classified into four groups: Underweight (BMI = <18.5 kg/m²), Normal (BMI = 18.5- 22.99kg/m²), Overweight (BMI = 23-24.99kg/m²) and Obese (BMI = ≥ 25 kg/m²).^[12]

Physical Measurements

Height : measured to the nearest centimetre using a wall mounted measuring tape with the subject standing erect and barefoot.

Weight : measured to the nearest 0.1 kg using a Bathroom weighing scale.

Body Mass Index (BMI) : calculated as body weight in kilograms (kg) divided by square of the height in meter (m²).

Waist circumference (WC) - measured to the nearest 0.1 cm using a non-stretchable measuring tape. Subjects were asked to stand erect with both feet together. WC was measured at the smallest horizontal girth between the lower end of the rib cage and the iliac crest.

Hip circumference (HC) - measured to the nearest 0.1 cm at the greatest horizontal circumference below the iliac crest, at the level of greater trochanter with the subject in standing position & both feet together.

Waist to Hip Ratio (WHR) - calculated with the corresponding values of waist and hip circumference.

Blood Pressure (BP) - BP was measured using mercury sphygmomanometer in the sitting posture with an appropriate- sized cuff encircling the arm. Two readings were taken in a resting patient at a 5-minutes interval, and the average of the two readings was reported. Blood sugar – capillary blood glucose was measured by glucometer.

Statistical analysis : Data collected was coded, entered into Microsoft excel and were analyzed using the Statistical Package for the Social Sciences version 16 software (SPSS Inc., Chicago, IL, United States). Chi-square test was used to analyze the difference between proportions. value of less than 0.05 was considered statistically significant.

Ethical considerations : The study subjects were explained the purpose of the study, and written informed consent was taken. Complete privacy and confidentiality of participation was assured. Approval by Institutional Ethics Committee was taken before the commencement of study.

Results :

Socio demographic characteristic of the study subjects shows that majority 209 (30.6%) of the people were in 30-39 years of age group, females 458 (67%), married 589 (86.1%), having post graduate degree 122 (17.8%), housewife 396 (57.8%) and belongs to upper lower class 264 (38.6%). [Table 1]

Behavioural risk factors profile of the study participants revealed that 543 (79.4%) of the subjects had never use tobacco in any form i.e., either smoking or smokeless while 539 (78.8%) had never consume alcohol in their life. 455 (66.6%) were taking 1-2 servings of fruit and vegetables per day while salt consumption among 648 (94.8%) of the study subjects were >5 grams per day. Junk food consumption was present among 290 (42.4%) of the patients. 340 (49.7%) were physically active with undertaking various activity for \geq 5 days a week. Physiological risk factors profile of the study subjects revealed that 195 (28.5%) were known case of raised blood pressure while 87 (12.7%) were newly diagnosed. 102 (14.9%) were aware of their diabetic status prior to the survey while 5 (0.7%) were newly diagnosed case of diabetes. 520 (75.9%) were having increased waist circumference while 626 (91.4%) were found to be having increased waist hip ratio. 151 (22.1%) and 335 (48.9%) of the study participants were overweight and obese respectively. [Table 2]

Amongst various risk factors, tobacco consumption, alcohol consumption, raised blood pressure, raised blood glucose level was found to be more prevalent in males as compared to females and this difference was statistically significant. While females were less physically active, eating more of junk food, having increased waist circumference, increased waist hip ratio and body mass index. This difference between the two genders was also statistically significant. No statistically significant difference was found for less than 5 servings per day of fruits and vegetables and >5gm/day salt intake. [Table 3]

Table 1: Socio demographic characteristics of the study participants (N=684)

Variables	Frequency	Percentage
Age group (years)		
30-39	209	30.6
40-49	162	23.7
50-59	131	19.1
≥ 60	182	26.6
Sex		
Male	226	33.0
Female	458	67.0
Marital Status		
Never Married	10	1.5
Married	589	86.1
Widowed	85	12.4
Educational Status		
Illiterate	107	15.7
Primary	81	11.8
Middle	67	9.8
High School	86	12.6
Intermediate	104	15.2
Graduate/diploma	117	17.1
PG/Professional degree	122	17.8
Occupation		
Housewife/Unemployed	399	58.3
Unskilled	50	7.3
Semiskilled	41	6.0
Skilled	66	9.6
Clerical/shop/farmer	51	7.5
Semi-professional	67	9.8
Professional	10	1.5
Social class[#]		
Upper	55	8.0
Upper Middle	101	14.8
Lower Middle	162	23.7
Upper Lower	264	38.6
Lower	102	14.9

as per modified prasad classification

Table 2: Prevalence of behavioral and physical risk factors among the study participants

Variables	Frequency (N=684)	Percentage %
Tobacco consumption		
Current	99	14.5
Past	42	6.1
Never consumed tobacco	543	79.4
Alcohol consumption		
Current	100	14.6
Past	45	6.6
Never consumed alcohol	539	78.8
Fruit & vegetables servings/day		
≥5	14	2.0
3-4	215	31.4
1-2	455	66.6
Salt intake (gm)/person/day		
≤5	36	5.2
>5-10	320	46.8
>10-15	214	31.3
>15	114	16.7
Junk food Consumption		
Present	290	42.4
Absent	394	57.6
Physically active		
Yes	340	49.7
No	344	50.3
Blood Pressure (mmHg)		
H/o Raised Blood Pressure	195	28.5
New cases of HTN	87	12.7
Normal	402	58.8
Blood Sugar (mg/dl)		
H/o Raised Blood Sugar	102	14.9
New cases of DM	05	0.7
Normal	577	84.4
Waist Circumference (cm)		
Normal	164	24.0
Increased	520	76.0
Waist/Hip Ratio		
Normal	58	8.5
Increased	626	91.5

Body Mass Index (kg/m²)		
<18.5	28	4.1
18.5-22.99	170	24.8
23.0-24.99	151	22.1
25.00-29.99	247	36.1
≥30	88	12.9

Table 3: Behavioral and physical risk factors of the study participants according to sex

Variables	Males n = 226 (%)	Females n = 458 (%)	p value
Tobacco consumption			p = 0.000*
Current	87 (38.5)	12 (2.6)	
Past	39 (17.2)	03 (0.7)	
Never consumed tobacco	100 (44.3)	443 (96.7)	
Alcohol consumption			p = 0.000*#
Current	100 (44.3)	00 (0.0)	
Past	45 (19.9)	00 (0.0)	
Never consumed alcohol	81 (35.8)	458 (100.0)	
Fruit & vegetables servings/day			p = 0.585
≥5	03 (1.3)	11 (2.4)	
3-4	69 (30.5)	146 (31.9)	
1-2	154 (68.2)	301 (65.7)	
Salt intake (gm)/person/day			p = 0.156
≤5	08 (3.5)	28 (6.1)	
>5-10	105 (46.5)	215 (46.9)	
>10-15	75 (33.2)	139 (30.3)	
>15	38 (16.8)	76 (16.6)	
Junk food			p = 0.023
Present	82 (36.3)	208 (45.4)	
Absent	144 (63.7)	250 (54.6)	
Physically active			p = 0.000*
Yes	158 (70.0)	182 (39.7)	
No	68 (30.0)	276 (60.3)	
Blood Pressure (mmHg)			p = 0.001*
H/o Raised BP	75 (33.2)	120 (26.2)	
New cases of HTN	40 (17.7)	47 (10.3)	
Normal	111 (49.1)	291 (63.5)	

Blood Sugar (mg/dl)			
H/o Raised BS	53 (23.5)	49 (10.7)	p = 0.000*
New cases of DM	00 (0.0)	05 (1.1)	
Normal	173 (76.5)	404 (88.2)	
Waist Circumference (cm)			
Normal	81 (35.8)	83 (18.1)	p = 0.000*
Increased	145 (64.2)	375 (81.9)	
Waist/Hip Ratio			
Normal	33 (14.6)	25 (5.5)	p = 0.000*
Increased	193 (85.4)	433 (94.5)	
Body Mass Index (kg/m²)			
<18.5	13 (5.7)	15 (3.3)	p = 0.000*
18.5-22.99	74 (32.7)	96 (20.9)	
23.0-24.99	44 (19.5)	107 (23.4)	
≥25.00-29.99	82 (36.4)	165 (36.0)	
≥30	13 (5.7)	75 (16.4)	

*p<0.05 is significant, # - chi square with yates correction

Discussion:

In the present study, 38.5 % and 17.2% of the males respectively were consuming tobacco currently and in the past in comparison to 2.6% and 0.7 % of the females. The prevalence of tobacco consumption among males and females was comparable to several other studies^[13-19] done in urban areas of India and the gender difference were also found as statistically significant in their research.

Alcohol consumption was reported by male's participants only; the prevalence being 44.3%. It is comparable to that reported by Oommen AM et al,^[19] while it is more than Chauhan RC et al,^[15] Krishnan K et al^[16] and less than Garg A et al.^[13] In Chauhan RC et al^[15] and Krishnan K et al,^[16] none of the females were taking alcohol while 2.7% and 0.1% of the females were consuming alcohol in study done by Garg A et al^[13] and Oommen AM^[19] respectively, the gender difference were significant in these studies also.

Consumption of < 5 servings of fruits & vegetables per day were reported by 670 (97.9%) of the

participants, (male – 98.7% and female – 97.6%). There is no significant difference between the two sexes. Similar findings were reported by other researchers in their studies. The prevalence was comparable to other studies^[13, 14, 17, 19] while more than that observed by Chauhan RC et al^[15] and Kadarkar KS et al^[16] in their research.

In the present study, salt intake >5 gm/day was consumed by 94.8%. Thakur JS et al^[20] reported 88.3% of the study subjects consuming higher salt in urban areas of Punjab.

Physical inactivity was reported among 50.3% of the study subjects, more among females (60.3%) than that of males (30%) may be because majority of them are housewives and hence busy in their household chores. This difference between male and female sex was statistically significant. Similar findings were observed by other researchers.^[13,17,19] While Aror B et al,^[14] Chauhan RC et al^[15] and Kadarkar KS et al^[16] observed males were more physical inactive in comparison to that of females.

High blood pressure was observed in 282 (41.2%) [Male (50.9%) & female (36.5%)] and this difference was statistically significant in present study. The prevalence of blood pressure was more than that observed by all other researchers.^[13-19,21] While it is comparable to observation made by Thakur JS et al^[20] and Htet AS et al.^[22] The difference in prevalence of raised blood pressure between the two sex was found to be statistically significant difference by Aroor B et al,^[14] Krishnan K et al^[17] and Oommen AM et al^[19] while no statistically significant difference was observed in others.^[13,15,16,18]

In present study, raised blood sugar was observed in 107 (15.6%), male (23.5%) & female (11.8%) and difference was statistically significant. In study done by Garg A et al^[13] and Oommen AM et al^[19] the prevalence of diabetes was more than ours, i.e., 18% and 23.6% respectively and the gender difference was not found to be statistically significant.

In this study, increased waist circumference was observed more in females (81.9%) participants than males (64.2%) and this difference was found to be statistically significant. The other researchers^[13-15, 18,19] have also reported similar findings of increased waist circumference more in females than in males and this difference being statistically significant.

In the present study, increased waist hip ratio was observed more in females (94.5%) in comparison to that of males (85.4%) and this difference were statistically significant. While in studies conducted by Oli N et al^[21] and Htet AS et al^[22] though the waist hip ratio was reported to be more in females' subjects but no statistically significant gender difference was found.

In this study, 42% of the male and 52% of female participants were having BMI \geq 25 kg/m² and this difference was found to be statistically significant. Similar findings were reported by Garg A et al^[13] and Oommen AM et al^[19] while Aroor B et al^[14] and Chauhan RC et al^[15] reported male having slightly higher prevalence of overweight /obese among males, also the difference between two genders was not significant.

Conclusion:

The prevalence of behavioural and physiological risk factors present among the study participants, like consumption of tobacco & alcohol among males and more number of females being physically less active, hence having increased central & generalised obesity points towards the fact that burden of non-communicable diseases will continue to rise in near future. There is a need for self-motivation for adapting better lifestyle if we want to curb the prevalence of lifestyle related diseases.

Limitations of the study:

It is cross-sectional study. Behavioural risk factors are self-reported, so there can be under or overestimation in the findings. The resource constraints have prevented us from collecting data related to biochemical risk factors for non-communicable diseases.

Declaration:

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Conflict of Interest: Nil

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