Research Article

Prevalence of Risk factors of Non Communicable Diseases amongst Medical Students, Kanpur, Uttar Pradesh, India

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Abstract

Background: Non-Communicable Diseases (NCDs) in India have increased from 37.9% in 1990 to 61.8% in 2016. They are slowly progressive are of long duration and are responsible for more than 50% of the global burden of disease Very few studies have been conducted that studied the prevalence of risk factors in non-communicable diseases among medical students. The authors observed that most of the students are at risk of developing NCDs, and the cumulative effect of risk factors bundles up and eventually leads to disease as students advance through their lives.

Aim and objectives: (i) To estimate the prevalence of risk factors of NCD amongst medical students, (ii) To study the association between various risk factors and NCDs in study subjects.

Settings and design: A cross-sectional analytical study involving 362 undergraduate students of Rama Medical College using simple random sampling.

Material and methods: The study used a pretested structured questionnaire which was conducted by using the WHO NCD steps approach.

Statistical analysis used: Data analysis was done by using M S Excel and software SPSS version 26.

Results: Our study results showed that physical activity is Prevalent in female students at 51% and in male students at 48.9%, almost equal. Junk food consumption had an overall prevalence of 69.34% of females outnumbering males in junk food consumption. The association of BMI with NCD as a risk factor was statistically significant in the current 75 smokers only.

Conclusion: There is a huge opportunity to reduce modifiable risk factors and NCD among our future doctors by encouraging them to change their behavior-related lifestyles such as smoking habits, alcohol use, junk food, etc.

Introduction

Non-communicable diseases (NCDs), also known as chronic diseases, including heart disease, stroke, cancer, diabetes, and chronic lung disease, are collectively responsible for almost 70% of all deaths worldwide [1]. The rise of NCDs has been driven by primarily four major risk factors: tobacco use, physical inactivity, the harmful use of alcohol, and unhealthy diets. Few studies to date have examined the prevalence of tobacco and alcohol use among UGs and PGs [2]. Out of the available studies, tobacco and alcohol use prevalence was 9.0% in UGs and 7.1 in PGs [2-4]. Very few studies have been conducted that studied the prevalence of risk factors in non-communicable diseases among medical students. It is observed that most of the students are at risk of developing NCDs, and the cumulative effect of risk factors bundles up and eventually leads to disease as students advance through their lives. High prevalence of modifiable NCD risk factors among medical students, there is an urgent need to bring change in students' lifestyles through health education and interventions [3-5].

Aim and objectives

1. To identify the risk factors associated with the development of NCD.

2. To estimate the prevalence of risk factors of NCD.

3. To study the association between various risk factors and NCD.

Material and methods

Study type: A cross-sectional analytical study.

Study population: Undergraduate Medical Students of

Rama Medical College, Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

Study area: Rama Medical College and Research Institute.

Study duration: January 2021 to September 2022.

Sample size estimation

Prevalence of daily smoking men between ages 15-25 in a study conducted in the year 2012 by Dhanawat, et al. [5] was taken to be 31.2%.An allowable error of 5% was taken at a 95% confidence interval. By putting formula $N=z^2Pq/d^2$,

where

P=31.2

Q=68.8

D=5

sample size came out to be 329 after adding 10% nonresponders it came up to 362.

Inclusion criteria: Medical students from first year to final year MBBS were included in the study.

Exclusion criteria: Those unwilling the study& Non cooperative students.

Sampling technique

The sampling method used in this study was simple random sampling, prepared by using the total MBBS student's list of four batches namely 2018,2019,2020,2021 from their attendance register.

There were a total of 450 students on the list, 362 students were randomly selected, in EXCEL, by random number table.

Data collection

The study used a pretested structured questionnaire which was conducted by using the WHO NCD STEPS approach. The data was collected in 3 steps (step 1, step 2, step 3). Demographic information, behavioral risk factor profile, and family history of hypertension, obesity, cardiovascular disease, dyslipidemia, COPD, Cancer, Mental health disorder, and diabetes were obtained using interview technique STEP 1 questionnaire.

Physical measurements of height, weight, waist circumference, hip circumference, blood pressure, and pulse rate were measured as per the guidelines given by the WHO STEPS instrument (130) for chronic disease risk factor surveillance, in STEP 2. As recommended by the STEPS Manual, measurements of Step 2 were taken immediately after Step 1, as the participants were already seated for at least 15 minutes while collecting Step 1.

Blood pressure was measured by a semi-automated BP

measuring electronic device that has been recommended by WHO for community-based studies. It was measured on the right arm and in a sitting position. Two readings with five minutes rest in between were recorded. The average of two readings was taken. But if there was > 5 mm Hg variation in diastolic BP and/or > 10 mm Hg in systolic BP, then a third reading was also taken and then the average of three readings was taken into consideration (Table 1). Weight was recorded by using the weighing machine without footwear, light clothing, standing still, facing forward, and both arms on the side. It was recorded in kilograms with an accuracy of 100 gm. Height was measured using a stadiometer with an accuracy of 1 mm. Participants were asked to: remove footwear, stand straight with feet together, knees straight and looking straight, and not tilt their head up or down. Waist circumference was measured by using non-stretchable measuring tape with light clothing at the end of normal expiration with the arms relaxed at the sides and the midpoint between the lower margin of the last palpable rib and the top of the iliac crest (hip bone). Hip circumference was measured by non-stretchable measuring tape, at the maximum circumference over the buttocks.

Ethical approval

Ethical approval of the study was obtained from the Ethical Committee of Rama Medical College and Research Centre, Mandhana, Kanpur(RMCH&RC/12052-11)(dated22/ 02/2021).

Data analysis

Data collected was entered into Microsoft Excel. Data analysis was done by using the software SPSS version 26. The prevalence of NCD risk factors was presented in the form of frequencies and percentages. Most of the variables in this study were categorical so statistical significance was tested using the Chi-square test and p - value (p - value ≤ 0.05 is statistically significant, and > 0.05 is not significant), and also the strength of association was tested between risk factors using an independent t - test.

Results

Among study subjects (n = 362) female students were more than male students. The majority of the students i.e. 58.83% were from the 21-23 year age group, with a minimum of 18 years and maximum age of 26 years. Out of a total 90.33% were Hindu and 7.73 % were Muslims.

The family history was positive for diabetes in 46.13% followed by hypertension in 41.71%. Obesity was next in line at 32.32%. It is quite evident that male students needed more attention. The majority of the students (78.5%) were

Table 1: Blood pressure and pulse rate measurements in study subjects: (N = 362).

Blood pressure	Maximum	Minimum	Median	Mean ± SD
Systolic Blood Pressure	152	96	120	120.30 ± 8.539
Diastolic Blood Pressure	100	57	80	77.82 ± 9.087
Pulse rate	106	58	74	75.67 ± 9.816

physically active out of which 35.94% were doing it for > 150 mins/week. Prevalence of physical activity in female students was 51.05% and in male students, it was 48.94%. This association was statistically significant (*p* - value = 0.004) (Table 2).

A large segment of students was non-smokers (91.16%). Among students who were smoking i.e., 15.15% were smoking more than 3 packets per week (Table 3).

Significant association of NCD risk factors like smoking, alcohol intake, and physical activity with gender. The prevalence of smoking was highest among male students (93.75%), with the most common age group being 21-26 years. This was a statistically significant association (*p* - value = 0.000). The prevalence in male students consuming alcohol was 87.5.% and the prevalence was highest among 21-26 year-olds which was 64.24% and this was a statistically significant association.

Discussion

In the present study the demographic profile of study subjects showed that out of a total of 362 study subjects,163 (45.02%) were male and 199 (54.97%) were female (Table 4), however study done by Sarkar J, et al. (2018) had 55.2% male students which is near to 54.97% of this present study.

Among the total study subjects those having a positive family history of various NCDs, 167 (46.13%) were Diabetics, 151 (41.71%) had a history of Hypertension, 117 (32.3%) were Obese, 12 (3.31%) had a history of Coronary artery disease, 04 (6.3%) were having a history of Rheumatic heart disease, 14 (3.87%) were having a history of Stroke, 13 (3.59%) were having a history of Dyslipidemia, 17 (4.70%) were having a history of COPD, 34 (9.39%) were having a history of Mental health disorder and 23 (1.10%) were having a history of Cancer (Tables 1,5). A study by Aday (2000) and Reddy and Prabhu [6] reported a positive association between family history and hypertension.

Lifestyle has long been associated with the development of many chronic diseases. Major NCDs share common lifestyle-related risk factors like physical inactivity, unhealthy diet,

Table 4: Demographic profile of the study subjects (*n* = 362).

Gender	Frequency (No.)	Percentage (%)
Male	163	45.02%
Female	199	54.97%
Total	362	100%
Age (in years)		
18 – 20 years	126	34.80%
21 – 23 years	213	58.83%
24 – 26 years	23	6.35%
Total	362	100%
Religion		
Hindu	327	90.33%
Muslim	28	7.73%
Other	07	1.93%
Total	362	100%
Type of Family		
Nuclear family	258	71.27%
Joint family	104	28.73%
Total	362	100%

Table 5: Family history in study subjects (*n* = 362).

Family history in the study subjects	Frequency (No.)	Percentage (%)
Diabetes	167	46.13%
Hypertension	151	41.71%
Obesity	117	32.32%
Mental health disorder	34	9.39%
Rheumatic heart disease	04	6.35%
COPD	17	4.70%
Stroke	14	3.87%
Dyslipidemia	13	3.59%
Coronary artery diseases	12	3.31%
Cancer	23	1.10%

tobacco use, and harmful use of alcohol. With the advancement in society along with scientific and technological progress, there has been a dramatic shift in the way today human beings are leading their lives which is sometimes referred to as a modern way of living. Findings in the present study showed that the majority of students who were doing exercise was 284(78.5%), out of this i.e. 103(35.94%) were doing > 150 minutes/week, and 181 (64.06%) were doing < 150 mins/week, one of the reasons for this behavior is because of institutional recreational activity like indoor & outdoor games and establishment of gymnasiums, yoga training are arranged in the institution campus.

We have found that more proportion of students were non-smokers i.e. 330(91.16%) and non-alcohol users 348(96.13%). Out of 14(3.87%) students who consumed alcohol only 10 students have taken less than 2pegs per week i.e. (71.43%). Two female students agreed that they drink occasionally.

There was a significant association between the consumption of alcohol with gender, with *p* - value {*p* < 0.0001}. The BMI calculated in male (23.08 ± 3.045) and female (22.41 ± 2.571) students was almost equal (Tables 6-8). This along with weight, height waist circumference, and, WHR was statistically significant for NCD development (Table 9). A trend of more

Table 2: Distribution of status of physical exercise (*n* = 362).

Variable		Frequency (No.)	Percentage (%)
Physical Exercise (*n* = 362)	yes	284	78.5%
	no	78	21.5%
Time spent for exercise (*n* = 284)	< 150 mins/week	181	64.06%
	> 150 mins/week	103	35.94%

Table 3: Distribution of Current daily smokers in study subjects & number of cigarette packets used per week by them.

Variable		Frequency (No.)	Percentage (%)
Current daily smoker (*n* = 362)	Smoker	32	8.83%
	Nonsmokers	330	91.16%
Number of cigarette packets per week (*n* = 32)	1 packet	11	33.33%
	2 packets	17	51.52%
	3 packets	04	15.15%

Table 6: Association of NCD risk factors and Gender (N = 362).

NCD Risk Factors		Total	Male		Female		χ2	P - value
			No.	Percentage	No.	Percentage		
Current smokers	YES	32	30	93.75%	02	0.06%	33.665	0.000
	NO	330	133	40.30%	197	59.69%		
Current alcohol users	YES	16	14	87.5%	02	12.5%	12.199	0.000
	NO	346	149	43.06%	197	56.93%		
Fruit intake	< 5 servings	233	106	45.49%	127	54.50%	2.573	0.632
	> 5 servings	80	35	43.75%	45	56.25%		
	NO	49	22	44.89%	27	55.10%		
Vegetable intake	< 5 servings	270	115	42.59%	155	57.40%	5.597	0.133
	< 5 servings	68	33	48.52%	35	51.47%		
	NO	24	15	62.5%	09	37.5%		
physical activity	YES	284	139	48.9%	145	51.0%	8.166	0.004
	NO	78	24	30.76%	54	69.23%		
Mental stress	YES	85	39	45.882%	46	54.117%	0.033	0.856
	NO	277	124	55.2%	153	44.76%		
Junk food	YES	251	110	43.82%	141	56.17%	0.479	0.489
	NO	111	53	47.74%	58	52.25%		

Table 7: Association of NCD risk factors and Age (N = 362).

NCD Risk Factors		Total	18 – 20 years		21 – 26 years		χ2	P - value
			No.	Percentage	No.	Percentage		
Current daily smokers	YES	32	9	28.125%	23	71.875%	0.746	0.388
	NO	330	118	35.75%	212	64.24%		
Current alcohol users	YES	16	05	31.25%	11	68.75%	0.108	0.742
	NO	346	122	35.2%	224	64.73%		
Fruit intake	< 5 servings	233	76	32.61%	157	67.38%	3.22	0.521
	> 5 servings	79	30	37.9%	50	63.29%		
	No	49	21	42.85%	28	57.14%		
Vegetable intake	< 5 servings	270	94	34.81%	176	65.18%	7.867	0.049
	> 5 servings	68	19	27.94%	49	72.05%		
	NO	24	14	58.33%	10	71.4%		
physical activity	YES	284	139	48.94%	145	51.05%	8.166	0.004
	NO	78	24	30.76%	54	69.23%		
Mental stress	YES	85	39	45.88%	46	54.11%	0.033	0.856

Table 8: Association of NCD risk factors and BMI (N = 362).

NCD Risk Factors		Total	BMI (< 24.9)		BMI (≥ 25)		χ2	P - value
			No.	Percentage	No.	Percentage		
Current daily smokers	YES	32	14	43.8%	18	56.3%	19.956	0.000
	NO	330	261	79.1%	69	20.9%		
Current alcohol users	YES	16	11	68.8%	5	31.3%	0.478	0.490
	NO	346	264	76.3%	82	23.7%		
physical activity	YES	284	222	78.2%	62	21.8%	3.501	0.061
	NO	78	53	67.9%	25	32.1%		
Mental stress	YES	85	60	70.6%	25	29.4%	1.760	0.185
	NO	277	215	77.6%	62	22.4%		

Table 9: Physical measurements of study subjects (N = 362).

Physical measurements	Maximum	Minimum	Median	Mean ± SD
Height (cm)	185	150	165	165.12 ± 8.336
Weight (kg)	95	41	61	61.44 ± 9.15
BMI (kg/m²)	32.9	17.4	22.2	22.70 ± 2.79
Waist circumference (cm)	118	54	82	81.43 ± 8.98
Hip circumference (cm)	120	73	96	96.47 ± 8.19
Waist: Hip ratio (WHR)	1.13	0.62	0.8400	0.847 ± 0.06

NCDs among individuals with higher BMI scores is seen as shown in a study by Rocha SV, et al. [7]. The high BMI has been associated with risk factors for hypertension. Individuals with higher BMI scores show physiological changes in the sympathetic nervous system, renin-angiotensin-aldosterone system, endothelial dysfunction, and functional abnormalities. These modifications increase the exposure to hypertension and cardiovascular disease, which can certainly be explained by the increased body fat mass. No association was present between primary diet and BMI in our study.

Conclusion

The current study found a significant prevalence of risk factors for Non-Communicable diseases, emphasizing the importance of interventions to reduce these risk factors. There is a huge opportunity to reduce modifiable risk factors among our future doctors by encouraging them to change their behavior-related lifestyles such as smoking habits, alcohol use, junk food, etc.

Recommendation

Outdoor activities should be encouraged. Smoking in public places, public transport, and indoor workplaces to reduce harmful exposure to non-smokers must be banned. Physical activity should be, at least 30 min per day on most of the days of the week. High-risk subjects in families should be observed and kept in isolation.

Author's contribution

All the authors have contributed to planning, and designing the study, data analysis, writing, and reviewing of the manuscript.

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