

## Prevalence of Risk Factors of non-Communicable Diseases Among Undergraduate Medical Students of A Tertiary Care Setting of West Bengal.

Dr Nirmalya Manna<sup>1</sup>, Dr Arup Chakraborty<sup>1</sup>, Dr Goutam Dhar<sup>2</sup>, Dr Arun Basu<sup>3</sup>,  
Dr Raju Singh<sup>3</sup>, Dr Suman Chatterjee<sup>3</sup>

<sup>1</sup>(Assistant Professor, Department of Community Medicine, Medical College, Kolkata, India), <sup>2</sup>(Associate Professor & Deputy Director of Medical Education, Government of West Bengal), <sup>3</sup>(PGT, Department of Community Medicine, Medical College Kolkata)

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**Abstract:** Adolescent age group is most important period for proper intervention to prevent occurrence of different non-communicable diseases in adulthood. An observational, descriptive institution based study with cross-sectional design was carried out among undergraduate medical students to find out the prevalence of different risk factors of non-communicable diseases. A predesigned, pretested, semi structured questionnaire was used for collecting background information from the respondents. 203 students were participated in the study. History of addiction was present among 7.88% of the total study population. 3.5% of the study population was smoking tobacco and 6.4% were consuming alcohol. 5.4% of the study population had consumed extra salt daily. 58.1% of study population did not have normal blood pressure and 30% was obese. Tobacco product and alcohol consumption should be discouraged. Healthy dietary pattern and regular physical exercise are to be followed.

**Keywords:** risk factors, non-communicable disease, addiction

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### I. Introduction

Non communicable disease may be defined as an impairment of bodily structure and or function that necessitates a modification of the patient's normal life and has persisted over an extended period of time.<sup>1</sup> They have complex etiology, are associated with multiple risk factors, have long latent period, leave residual disability, usually non-contagious and require special training for rehabilitation. In India 53% of all deaths and 44% of all disability adjusted life years lost in 2004 were due to non communicable diseases. The prevalence of non communicable disease is showing an upward trend in India. The impact of non communicable diseases on the lives of the people is serious in terms of economic loss to country, loss of life and loss of potentially productive years of life, disability, family hardship and poverty. In 2008, 36 million global deaths were due to non-communicable diseases of which cardiovascular diseases were responsible for the largest proportion followed by cancers, chronic respiratory diseases, digestive diseases and diabetes. The number of global deaths due to non-communicable diseases is expected to increase to 52 million by 2030. The world health organization has already warned of increasing NCDs among adolescents as a major health problem.<sup>2</sup> The importance of this age group also lies in the fact that many serious diseases in adulthood have their roots in adolescence. Research has documented that adolescence is the appropriate time period for appropriate intervention.<sup>3</sup> Teenagers start making individual choice and develop personal lifestyles. Many of these lifestyle choices are related to risk factors for non-communicable diseases, such as diet patterns, development of obesity, physical inactivity, cigarette smoking, alcohol consumption etc. These risky behaviours can result in disease outcomes such as cancer, obesity, hypertension, type 2 diabetes, which are among the leading causes of death in developing and developed countries. Also it is easier to inculcate healthy behavior of individuals at a young age rather than to modify behaviours at later ages or after the onset of disease.<sup>4</sup> So with such a prevailing international and Indian scenario it was felt imperative to estimate the prevalence of different risk factors of non-communicable diseases among the undergraduate students of Medical college & hospital Kolkata. The study had following objectives;

1. To determine the study population according to socio-demographic variables
2. To find out the prevalence of different risk factors of non-communicable diseases among the study population

### II. Materials And Methods

It was an observational, descriptive institution based study with cross-sectional design. The study was conducted among the undergraduate students of Medical College & Hospital, Kolkata. Purposive sampling method was followed for selection of study subjects. MBBS students of 2<sup>nd</sup> and 4<sup>th</sup> semester were considered as study population. Duration of the study was 2 months. A predesigned, pretested semi structured questionnaire

was used for collecting background information from the respondents. Study variables were age, gender, religion, income, residence, occupation, types of addiction, dietary pattern, level of physical activity etc. Physiological measurements were undertaken regarding height, weight, blood pressure etc. The study was initiated after obtaining clearance from the Institutional ethics committee. A pilot study was conducted among the students of 6<sup>th</sup> semester to assess the feasibility, acceptability and reliability of the tool. Students of 2<sup>nd</sup> and 4<sup>th</sup> semester, who were willing to participate in the study and were present on the day of data collection, were included in the study. Informed verbal consent was taken from each student and they were ensured about the confidentiality. Absentees and unwilling and those who were sick on the day of examination were excluded. Body weight was measured with the subject standing motionless on the weighing scale and with the weight distributed equally on each leg. Height was measured (to the nearest 0.5 cm) with the subject standing in an erect position against a vertical scale and with the head positioned so that the top of external auditory meatus was level with the inferior margin of the bony orbit. Nutritional status was assessed through weight for height according to WHO criteria. Blood pressure was recorded in the right arm, in a sitting position, to the nearest 1 mmHg, using an electronic Omron blood pressure monitor. Two readings were taken 5 minutes apart and the mean of the two was taken as the blood pressure. General examination of all the students was carried out in good natural light. Wherever any health problem was detected, the students were explained the problem and guided about the further course of action. Questions and concerns of the participants were also addressed at the end of the session. No follow-up visit was planned to track the absentees to maintain the confidentiality of the questionnaire and truthfulness of the responses. Questionnaire with incomplete responses were excluded from the study. Finally 203 questionnaires with complete responses were compiled in Excel sheet and were analyzed by using Epi Info™ Version 3.5.1.

### III. Results

Majority of the study population (83.2%) were in adolescent age group (10 – 19 years). Mean age and standard deviation of the study population was 18.74±0.79 years. Out of 203 students, majority was male (61.1%). Majority of the students (87.2%) belonged to Hinduism followed by Islam (10.3%). About 83.7% of the students were urban resident. Presently 25.8% students were residing in hostels followed by PG residents (18.6%). 47.3% study population's father were graduate and 43.3% were post graduate. 67.9% of the study population's father were semiprofessional; followed by 28.6% being professional. The average monthly income of the 71.5% of the study population was found to be less than Rupees 100000. History of addiction was present among 7.88% of the total study population. 3.5% of the study population was smoking tobacco and 6.4% were consuming alcohol. 3 students consumed on an average 6 cigarettes per day. Majority of smokers (71.4%) smokers had initiated smoking out of curiosity. About 57.1% of the smokers had received advice to stop smoking from friends but had not given an effort to stop smoking during the last year. 6.4% of the study population had a history of alcohol consumption and majority among them had initiated alcohol consumption in between 16 – 18 years. The most common reason behind initiation of alcohol was curiosity (76.9%). Majority of alcohol consumers consumed alcohol less than once in a month. The source of influence during the time of initiation of alcohol was for self experience (38.5%) but majority of them (84.6%) did not make an effort to stop consumption of alcohol. Only 29.1% of the study population had consumed fruits and 69.5% consumed vegetables daily in the last week. 6.4% of the study population had the habit of daily consumption of fast food. 5.4% of the study population had consumed extra salt daily. More than half of the study population (52.2%) spent 11 - < 15 hours daily in sitting and reclining position and only 35.5% spent < 2 hours on household activities on a typical day. 57.6% of the study population did not do vigorous intensity physical exercise while 89.5% of the performers did vigorous intensity physical exercise for a duration less than 3 hours. According to JNC 8 Classification<sup>5</sup>, 58.1% of study population did not have normal blood pressure where as 30% of study population was obese.

### IV. Figures And Tables

**Table: 1** Addiction history of the study population (n = 203)

Addiction history	Number	Percentage
Addiction status (n = 203) *	187	92.1
No addiction	7	3.5
Smoking tobacco	3	1.5
Chewing tobacco	13	6.4
Alcohol consumption		
Average daily consumption of cigarette (n = 7)	2	28.5
4	2	28.5
5	3	43.0
6		
Reasons of Initiation of smoking (n = 7) *	5	71.4
Curiosity	3	43.0

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Peer pressure	2	28.5
Release stress		
Source of advice to stop smoking (n = 7) *	1	14.2
Doctor	4	57.1
Friends	2	28.5
Parents	1	14.2
Relatives	1	14.2
Media		
Effort to stop smoking during last year (n =7)	3	42.9
Yes	4	57.1
No		
Frequency of alcohol consumption ( n = 13)	1	7.7
4 – 6 days per week	1	7.7
1 – 3 days per week	3	23.1
1 – 3 days per month	8	61.5
< 1 day per month		
Source of influence during time of initiation of alcohol consumption (n = 13) * Friends and peer group	4	30.8
Hostel mates	2	15.4
Media	1	7.7
Self experience	5	38.5
Breakup in relationship	2	15.4
Source of advice to stop alcohol consumption (n = 13) *	1	20.0
Health professionals	2	40.0
Friends	2	40.0
Parents	1	20.0
Media		
Effort to stop alcohol consumption during last year (n = 13)	2	15.4
Yes	11	84.6
No		

\*Multiple responses

**Table 2: Dietary pattern of the study population (n = 203)**

Dietary pattern	Number	Percentage
Intake of fruits in last one week	22	10.8
Nil	64	31.5
1 – 3 days	58	28.6
4 – 6 days	59	29.1
Daily		
Intake of vegetables in last one week	2	1.0
Nil	22	10.8
1 – 3 days	38	18.7
4 – 6 days	41	69.5
Daily		
Intake of fast food in last one week	44	21.6
Nil	110	54.2
1 – 3 days	36	17.8
4 – 6 days	13	6.4
Daily		
Intake of extra salt in last one week	143	70.4
Never	31	15.3
1 – 3	18	8.9
4 – 6	11	5.4
Daily		

**Table 3: Physical activity status of the study population (n = 203)**

Physical activity	Number	Percentage
Average time spent on sitting and reclining on a typical day (hours)	< 8	2
	8 – < 11	76
	11 – < 15	106
	≥ 15	19
Average time spent on household activities on a typical day (hours)	< 1	32
	1 – < 2	72
	2 – < 3	64
	3 – < 4	19
	≥ 4	16
Performance of vigorous intensity physical exercise	Yes	86
	No	117
Number of days of vigorous intensity physical exercise per week (n = 86)	1 – 3	50
	4 – 6	21
	Daily	15
Duration of vigorous intensity physical exercise per day in hours (n = 86)	< 1	14

1 – < 2	34	39.5
2 – < 3	29	33.7
≥ 3	9	10.5

**Table 4:** Current status of blood pressure of the study population \* (n = 203)

Current status of blood pressure	Number	Percentage
Normal	85	41.9
Pre-hypertension	110	54.2
Hypertension Stage I	8	3.9

## V. Discussion

Though very few similar studies have conducted among medical students, but quite a few number of studies have done to determine the various risk factors among the university & school students in India as well as abroad. Most of the studies have concluded that different cardio logical risk behaviors are widely prevalent among medical as well as university & school students.

In the present study majority of the study population (83.2%) were in adolescent age group (10 – 19 years). Mean age and standard deviation of the study population was 18.74±0.79 years. Out of 203 students, majority was male (61.1%). Majority of the students (87.2%) belonged to Hinduism followed by Islam (10.3%). About 83.7% of the students were urban resident. Presently 25.8% students were residing in hostels followed by PG residents (18.6%). In a similar study done among the medical students in New Delhi in 2009 -2010, found 91.2% belonged to 17-22 years age group with mean age of 20 (±3.6) years. The proportion of males (62.4%) was higher than females (37.6%)<sup>6</sup>. Another study conducted among 800 university students from non health (mainly sciences) courses of Gitam University in India. Among the students 541 (67.6%) were males and 259 (32.4%) females in the age range of 17-20 years (mean age 18.2 years, SD=1.0)<sup>7</sup>. Other school based study with an objective to quantify the prevalence of overweight and its risk factors in adolescent children in urban India, conducted among 4700 school students in the age group of 13-18 years with male female ratio of 2382:2318, highlighted that high prevalence of overweight in adolescent children in urban India and also life style factors influenced BMI in adolescent age<sup>8</sup>.

It is already established that, history of addiction is positively associated with development of cardiological disease<sup>9</sup>. In the present study history of addiction was present among 7.88% of the total study population. 3.5% of the study population was smoking tobacco and 6.4% were consuming alcohol. Three students consumed on an average 6 cigarettes per day. Majority of smokers (71.4%) smokers had initiated smoking out of curiosity. About 57.1% of the smokers had received advice to stop smoking from friends but had not given an effort to stop smoking during the last year. 6.4% of the study population had a history of alcohol consumption and majority among them had initiated alcohol consumption in between 16 – 18 years. The most common reason behind initiation of alcohol was curiosity (76.9%). Majority of alcohol consumers consumed alcohol less than once in a month. The source of influence during the time of initiation of alcohol was for self experience (38.5%) but majority of them (84.6%) did not make an effort to stop consumption of alcohol. Among the medical students of New Delhi, only 7.0% of students used any form of tobacco which is almost same as per the present study findings. Use of both tobacco and alcohol significantly increased with increase in semester of students and significantly more number of boys than girls consumed tobacco and alcohol. Tobacco smoking and alcohol consumption reportedly increased among medical students between the year of entry and the final year<sup>6</sup>. Other studies have found that, alcohol intake was associated with higher odds of overweight, abdominal obesity, hypertension and hypertriglyceridaemia but was associated with lower odds of diabetes mellitus<sup>10</sup>.

The present study found that only 29.1% of the study population had consumed fruits and 69.5% consumed vegetables daily in the last week where as 6.4% of the study population had the habit of daily consumption of fast food. Only 5.4% of the subjects had consumed extra salt daily which is far less than the other studies. Though other studies have found lower consumption rate of fruits and vegetables but the present study highlighted that majority students had consumed vegetables daily in last week. This may be due to the fact that the students were more conscious regarding the healthy diet. The similar study among the medical students in New Delhi found, only 12% of students consumed minimum 5 servings of fruits & vegetables daily. Frequent (either once or more on daily basis in past week) consumption of carbonated soft drinks was reported by 23.7% students and of fast foods by 32.0% students. High salt intake by adding extra salt or by eating items, such as sauces/ pickles, and others, was reported by 53.0%<sup>6</sup>. In a school based study conducted in Kunnur district of Kerala regarding the awareness about the risk factors of non communicable disease, it has been seen that the daily consumption of fruits and vegetables is very low but more number of students have soft drinks daily<sup>11</sup>. In STEP wise risk factor surveillance survey in Tamil Nadu, India, to analyse the relationship between the urban environment and major NCD risk factors, among 3705 participants, only two participants in the survey consumed at least five portions of fruit and vegetables daily, on average. There was no significant difference in the prevalence of low fruit and vegetable consumption across urban groups, either for men or for women.

However, a positive association ( $P < 0.05$ ) was found between urbanicity and the mean number of portions of fruit and vegetables consumed per day by both men and women, before and after age adjustment<sup>12</sup>. In another study titled “Non-communicable Disease Risk Factors among Young People in Palau” between 18 -24 years of age found, one fourth of the participants did not eat at least one serving of fresh fruit and vegetables in a day. Only 9.2% of participants ate 5 servings of fresh fruit and vegetables or more per day, which is the WHO recommended lower limit<sup>13</sup>. The present study revealed 41.9% students were normotensive, 54.2 % Pre hypertensive and 3.9% were stage I hypertensive according to JNC 8 criteria. In a study to detect risk factors of non-communicable disease among young people described about one in six male subjects was hypertensive. The prevalence of hypertension was much higher in males than in their female counterparts (17.6% vs 1.7%:  $P < 0.001$ )<sup>13</sup>. In another Indian study done in Gujarat, highlighted that, population affected with metabolic syndrome was mostly male (65.4%) and older ( $33.00 \pm 5.33$  years). Blood pressure was compared between subjects had presence or absence of metabolic syndrome revealed Systolic Blood Pressure:  $137.96 \pm 16.91$  versus  $121.45 \pm 14.69$ , Diastolic Blood Pressure:  $86.60 \pm 9.18$  versus  $78.15 \pm 9.18$  among first & second group respectively<sup>14</sup>. A community based study in Kerala found prevalence of hypertension among urban, rural & slum population were 34.9%, 32.5 & 30.6% respectively<sup>10</sup>. In the present study, more than half of the study population (52.2%) had spent 11 - < 15 hours daily in sitting and reclining position and only 35.5% spent < 2 hours on household activities on a typical day which supports the findings of other study. 57.6% of the study population did not do vigorous intensity physical exercise while 89.5% of the performers did vigorous intensity physical exercise for a duration less than 3 hours. In other similar study, physical activity for at least 30 min/day for 5 or more days was reported by 35.8% students, while occasional or nil physical activity was reported by 42.6% students. About 25.6% students reported spending more than 4 h in sedentary activities on a typical day. Number of students who were inactive in past week and those spending more hours in sedentary activities significantly increased with increase in semesters of students. Low physical activity and long hours of sedentary work was reported in other studies too carried out among university students (22%–62%). Breaks during continued sedentary activity (i.e. standing up, walking down the hall, and others), regardless of physical activity level or energy expenditure of breaks have been reported to reduce a number of individual CVD risk factors. The importance of performing light activities (e.g. walking/standing) in between long sedentary hours must be emphasized, especially among students of senior semesters<sup>6</sup>. A community based study in Kerala found prevalence of physical inactivity among urban, rural & slum population were 9.5%, 6.3% & 4.5% respectively<sup>10</sup>. In another study conducted among 18-24 years of young found, about 8% of the study population did not have any vigorous- or moderate-intensity physical activities, including activities at work, traveling to and from places, and recreational activities in their daily life<sup>15</sup>. In a school based study conducted in Kerala regarding the awareness about the risk factors of non communicable disease, it has been seen that only a small number of children engaged themselves in daily activities of exercise and games<sup>11</sup>.

## VI. Conclusion & Recommendation

To determine the various risk factors among the medical students in of Kolkata, it has been observed that, though small numbers of students were smoker and alcoholic, but most of them did not put any effort to stop it in last one year despite of receiving the advice. On the contrary to other studies it revealed a better habit of intake of regular vegetables, fruits and salt among the study group. Though majority of them, spent most of the time in sitting & reclining, almost one third of them spent < 2 hours on household activities on a typical day. Majority of the study subjects either pre hypertensive or frank hypertensive, which is alarming and definitely require intervention either in the form of primary or secondary level of prevention. The study also opened the potential area of conducting larger studies by involving students of other medical colleges and preferably in longitudinal mode. Repeated health education and its reinforcement especially in the area of smoking & alcohol de addiction will be an urgent requirement.

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## References

- [1] Park K: Parks, textbook of preventive and social medicine;Bhanot.Jabalpur 2013;6:334-39
- [2] [http://www.who.int/topics/risk\\_factors/en/](http://www.who.int/topics/risk_factors/en/)
- [3] Mano S Selvan, Anura V krupad, primary prevention:why focus on children and young adolescents?Indian journal of Medicine Research 2004;120:511-18
- [4] <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4139989/>
- [5] [www.aparx.org/resource/resmgr/.../CE\\_Hypertension\\_The\\_Silent\\_K.pdf](http://www.aparx.org/resource/resmgr/.../CE_Hypertension_The_Silent_K.pdf)
- [6] N Rustagi, DK Taneja, P Mishra, and GK Ingle: Cardiovascular Risk Behavior among Students of a Medical College in Delhi, Indian J Community Med. 2011 Jan-Mar; 36(1): 51–53.
- [7] Pengpid S, Peltzer K: Prevalence of overweight/obesity and central obesity and its associated factors among a sample of university students in India, *Obes Res Clin Pract.* 2014 Nov-Dec;8(6):e558-70. doi: 10.1016/j.orcp.2013.12.003. Epub 2014 Jan 9

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- [8] Ramachandran A, Snehalatha C, Vinitha R, Thayyil M, Kumar CK, Sheeba L, Joseph S, Vijay V: Prevalence of overweight in urban Indian adolescent school children, *Diabetes Res Clin Pract.* 2002 Sep;57 (3):185-90
- [9] Soumitra Kumar, Saumitra Ray, Tanmay Mahapatra, Kinnari Gupta, Sanchita Mahapatra, Mrinal K. Das, Santanu Guha, Pradip K. Deb, Amal K. Banerjee, and Cardiological Society of India, West Bengal: Cardiovascular risk reduction intervention among school-students in Kolkata, West Bengal – The CRRIS study protocol, *Indian Heart J.* 2015 Jan-Feb; 67(1): 33–39
- [10] K.R. Thankappan, Bela Shah\*, Prashant Mathur\*, P.S. Sarma, G. Srinivas\*\*, G.K. Mini, Meena Daivadanam, Biju Soman & Ramachandran S. Vasani: Risk factor profile for chronic non-communicable diseases: Results of a community-based study in Kerala, India, *Indian J Med Res* 131, January 2010, pp 53-63
- [11] B Divakaran, J Muttapillymyalil, J Sreedharan, K Shalini: Lifestyle riskfactors of noncommunicable diseases: Awareness among school children ,Kids and Adolescents, Vol 47, Issue 5, Page 9-13, Year 2010
- [12] Steven Allender, <sup>a</sup> Ben Lacey,<sup>a</sup> Premila Webster,<sup>a</sup> Mike Rayner,<sup>a</sup> Mohan Deepa,<sup>b</sup> Peter Scarborough,<sup>b</sup> Carukshi Arambepola,<sup>c</sup> Manjula Datta,<sup>b</sup> and Viswanathan Mohan: Level of urbanization and noncommunicable disease risk factors in Tamil Nadu, India, *Bulletin, World Health Organ.* 2010 Apr 1; 88(4): 297–304
- [13] Chifa Chiang, Singeru Travis Singeo, Jr, Hiroshi Yatsuya, Kaori Honjo, Takashi Mita, Edolem Ikerdeu, Renzhe Cui, Yuanying Li, Berry Moon Watson, Gregorio Ngirmang, Hiroyasu Iso, and Atsuko Aoyama : Non-communicable Disease Risk Factors among Young People in Palau, *J Epidemiol.* 2015; 25(5): 392–397
- [14] Sharad R. Jain, Komal H. Shah, Himanshu N. Acharya, Kaushik Barot, and Kamal H. Sharma : Prevalence and Predictors of Metabolic Syndrome in Young Asymptomatic Gujarati Population ,*Int J Chronic Dis.* 2015; 2015: 365217