A cross-sectional assessment of risk factors of non-communicable diseases among adolescents of rural area in Darjeeling district of West Bengal.

Oishwarya Chakraborty1, Suman Dutta1, Tapas Kumar Mukherjee1, Akriti Gupta1, Ankita Datta1, Anuradha Ghosh1, Husne Tabassum1, Mamita Choudhary1, Manisha Agarwal1, Md Ernammol1, Md Niyaz Akhtarl, Md Tousif Zaman1, Nandita Biswas1, Nilotpal Nandi1, Nijhar De1, Pallav Chakraborty1, Pinal Roy1, Payel Mallick1, Paromita Ray1, Poulami Das1, Priya Mondal1, Rachit Singhania1, Rahul Roy1, Ranav Pal1, Rezaul Haque1, Russel Chowdhury1, Sashi Kala2, Romy Biswas3, Sharmistha Bhattacharjee4

1. MBBS Students (2013-2018) 2. Post Graduate Trainee, Community Medicine, 3. Associate Professor, Community Medicine, Cockbehar Government Medical College, 4. Assistant Professor, Community Medicine, North Bengal Medical College

Abstract:

Introduction: Non-communicable diseases (NCDs), principally cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes are the leading causes of death and disability globally. The basic element of NCD prevention is the identification of the common risk factors and their prevention and control.

Objectives: To determine the prevalence of risk factors of non-communicable disease among adolescents of rural area in Darjeeling district of west Bengal.

Materials and methods: During the month of June 2015 to July 2015, 280 adolescents (10-19 years) were chosen from Kawakhal village, Matigara. They were interviewed and some measurements were taken.

Results: The prevalence of behavioral risk factors like tobacco use, physical inactivity, alcohol, unhealthy diet was 37.2%, 33.3%, 15.4%, 88.5% respectively while that of the prevalence of biological risk factors like overweight, abdominal obesity and hypertension was 31.6%, 3.8% and 31.6%, respectively. The prevalence of behavioral risk factors was seen among 17-19 years of age while the biological risk factors were seen among 10-13 years of age.

Conclusion: A high prevalence of risk factors for non-communicable diseases was found in Siliguri city which emphasizes the need of interventions to reduce these risk factors.

Keywords: Risk factor, non-communicable disease, adolescent, rural.

Introduction

World changes every second of every day which brings about the changes in lifestyle. Modern lifestyle has drastically changed the way we live and the way it has affected our health and fitness. Chronic non-communicable diseases are a major contributor to the burden of disease in developed countries, and are increasing rapidly in developing countries. Mortality, morbidity and disability due to major non communicable diseases account for about 60% of all deaths and 47% of the global burden of disease. Globally, death from non-communicable diseases is expected to climb to 49.7 million in 2020.1

In south Asia, half of the disease burden is attributed to non-communicable diseases. India too, is caught in the midst of transition from the burden of communicable diseases to the burden of non-communicable diseases. An estimated 9.2 million productive years of life were lost in India due to cardiovascular diseases in 2000, with an expected increase to 17.9 million in 2030.2 Chronic non-communicable diseases are largely due to preventable and modifiable risk factors such as high blood pressure, obesity, physical inactivity, psychological factors, unhealthy diet, tobacco use and inappropriate use of alcohol. These factors are associated with lifestyle and behavioral patterns of an individual which are largely results of practices adopted from young age.3

Adolescents represent over 20% of the total population in most countries in the Western Pacific region. They are a vast current and future resource for their countries. Adolescents carry the highest risk of morbidity and mortality from lifestyle associated diseases. Non communicable diseases like Obesity, Diabetes Mellitus, Hypertension and Coronary artery diseases in adults have been related to the prevalence of risk factors in childhood.4

Adolescence is a critical period of mental, social and emotional well-being and development. During adolescence the brain undergo significant developmental changes, establishing neural pathways and behavioral patterns that was last in to adulthood. Adolescence is the life stage when the individuals begin to formulate their health habits, setting patterns that continue in to adulthood. Habits and behaviours picked up during adolescence have lifelong impact.5

Adolescence is a time when new health behaviors are laid

Corresponding author
Dr. Sharmistha Bhattacharjee
Professors’ Quarters No. A5, NBMC Campus, Sushrut Nagar, Darjeeling - 734012
email: sharmistha.bhattacharjee@gmail.com
down, behavior that track in to adulthood and was influence health and morbidity throughout life. Health behaviors in childhood are dominated by parental instruction and shared family values. During adolescence young people begin to explore alternatives or adult health behaviors including smoking, drinking alcohol, drug misuse, violence and sexual intimacy.  

Many studies have documented that people aged 16–24 years tent to engage in behaviors damaging to health to a greater extent than those in other age ranges. These behaviors may result in immediate health problems such as injuries or sexually transmitted diseases as well as increasing the risk of chronic diseases such as heart disease in later life. Promoting healthy behavior among this age group aims to encourage the development of healthy adult life style and thereby reduce the risk of morbidity and mortality in these target areas. 

In 2010, Government of India has launched National Programme for Prevention and Control of Cancer, Diabetes, Cardio-vascular Diseases and Stroke (NPCDCS) aimed to cover 100 districts across 21 states. One of the important components of the programme is to conduct periodically NCD Risk Factor Survey to assess the prevalence of risk factors over-time. 

As per Census 2011, overall 20.4% of the West Bengal population belongs to adolescents Darjeeling district is one of the 19 districts of the state having a considerable proportion of tribal population. 

In this perspective this study is aimed to measure the prevalence of risk factors of NCDs in the adolescent community of rural area of Siliguri Subdivision of Darjeeling District. This study will help in documenting the magnitude and distribution of the risk factors of NCDs in the adolescent population and will help authorities to plan community-based programs/interventions targeting the risk factors, which in turn can lead to a fall in the occurrence of NCDs.

Methods

A cross-sectional descriptive community based study was conducted for one month from June 2015 to July 2015 in rural area of Darjeeling district west Bengal. The sample size of 280 was calculated assuming the prevalence of having non communicable disease as 20%, 95% confidence level and 5% absolute precision. The sample size was calculated using the formula: 

\[ n = \frac{4P(1-P)}{d^2} \]

where:

- \( n \) = sample size 
- \( P \) = anticipated proportion of utilization (20%) 
- \( d \) = absolute precision (5%) 

Thus the calculated sample size comes to be \( n = 4 \times 0.2 \times 0.8/(0.05\times0.05) = 0.64/0.0025 = 256 \). 

Further considering a non-response rate of 10%; the final sample size was \( 256+25=281 \). This was rounded off to 280. Convenient sampling was used to select study subjects.

Procedure for data collection

Interview (Step 1): A structured interview schedule based on STEPs approach of WHO was used, which included information on socio-demographic variables and behavioral NCD risk factors (tobacco use, alcohol use, physical activity and unhealthy diet).

Physical measurements (Step 2)

1. Measurement of blood pressure: According to the standardized technique, BP was measured from the bare right arm of participants, at the level of the heart, while participants remained seated with back support, after at least 5 min of rest. A calibrated mercury sphygmomanometer with appropriate cuff length was used. Two measurements were taken and averaged for analysis.

2. Anthropometric measurements

   - Height measurement: The participants were asked to remove their footwear (shoes, slippers, sandals, etc) and head gear (hat, cap, hair bows, comb, ribbons, etc). They were then asked to stand with feet together, heels against the wall and knees straight. They were asked to look straight ahead and not tilt their head up with eyes at the same level as the ear. The height was measured using non stretchable measuring tape to the nearest of 0.1 cm.

   - Weight measurement: Weight was measured using standard portable weighing machine. The weighing machine was placed on a firm flat surface. Calibration of the scale was done at the beginning of measurement. The scale was balanced with both sliding weights at zero and the balance bar aligned. The scale was checked using the standardized weights and calibration was corrected if the error is greater than 0.2 kg. Then participants were asked to remove their footwear (shoes, slippers, sandals, etc) and socks and heavy outer garments and asked to step onto scale with one foot on each side of the scale. The participant were asked to stand still with face forward and arms placed on the sides. The weight was measured to the nearest of 0.1 kilograms (kg).

   - Calculation of BMI: Body mass index was calculated (weight [kg]/height^2 [m^2]).

   - Measurement of waist circumference: Participants were asked to remove their heavy outer garments and remain in minimal clothing. Participants were asked to breathe normally and stand with their feet fairly close together with their weight equally distributed to each leg. The measuring tape was held firmly, ensuring its horizontal position and loose enough to allow one finger between the tape and the subject's body. This measurement was taken at the end of a normal expiration; with the arms relaxed at the sides; and at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest (hip bone) to the nearest of 0.1 cm.

Behavioral risk factors for non-communicable diseases were defined as follows

1. Tobacco use: Participants were questioned about current smoking (yes/no) such as cigarettes or bidis or use of smokeless tobacco in the last 7 days and frequency of smoking. Smoking or use of smokeless tobacco more than once in last 7 days was considered as risk factor.

2. Alcohol consumption: Participants were questioned about alcohol use and frequency of alcohol use in the past one month. Harmful alcohol consumption (binge drinking) was defined as having consumed one or more standard alcoholic drinks on a single occasion in the last 30 days.

3. Inadequate fruit and vegetable consumption: Participants
were asked to estimate the number of days they consumed fruit and the average number of portions of fruit consumed on one of those days. Similar questions were asked regarding vegetable consumption. The average daily number of portions of fruits and vegetables consumed was calculated from these variables. Daily fruit and vegetable consumption of less than 5 portions was considered to be inadequate, per the WHO recommendations of NCD behavioral risk factor indicators.

4. Physical inactivity: The scale used was minutes per day and number of days per week of practice of moderate physical activities during a typical week. Adolescents who reported doing less than 30 minutes of work for at least 3 days per week were considered as having the risk factor.

Physiological risk factors for NCD were defined as follows:

1. Overweight: World Health Organization (WHO) guidelines for BMI for adolescents were used to classify the study participants.

2. Abdominal obesity: It was measured to complement the definition of obesity using BMI because, although BMI is a widely used measure of obesity and has a well-established association with cardiovascular disease (CVD), diabetes, and cancer risk, there is evidence that abdominal obesity better predicts CVD risk. Per the WHO definition, waist circumference of >102 cm in men and >88 cm in women was defined as having abdominal obesity.

3. Hypertension: Normal BP was defined as an average systolic BP (SBP) and/or diastolic BP (DBP) <90th percentile for age, sex, and height. Prehypertension was identified if the average SBP and/or DBP was >90th and <95th percentile for age, sex, and height, or if the average SBP was >120 mmHg or DBP was >80 mmHg for adolescents. Hypertension (stages 1 and 2) was defined as average SBP and/or DBP >95th percentile, while average SBP and/or DBP >99th percentile plus 5 mmHg indicated stage 2 disease.

Results

Out of 280 populations, 179 were males and 101 were females. The socioeconomic status of most participants falls under category IV of B.G. PRASAD SCALE. Table 1 shows the proportion of risk factors according to age and sex. The behavioral risk factors like use of tobacco and alcohol were predominantly seen in the age group of 17-19 years of age and their prevalence was 37.2% and 15.4% respectively. The prevalence of physical inactivity and unhealthy diet was highest among the age group of 10-13 years being 33.3% and 83.8% respectively.

The physiological risk factors like overweight and hypertension was more common among the 10-13 years of age group with the prevalence of 37.6% and 31.6% respectively. If we go according to gender then both behavioral and physiological risk factors are more common amongst the males than females.

Discussion

The present study makes an assessment of proportion of selected NCDs and risk factors, namely obesity, hypertension, tobacco use, etc. in a rural area of Darjeeling district West Bengal. This study supports findings from other studies that populations living in rural areas are not spared from the impact of risk factors for non-communicable disease.

The current study found the prevalence of current tobacco use as 37.2% among the study population which was quite higher than the national average of 34.6% as revealed by the 2009-2010 Global Adult Tobacco Survey (GATS). Males had a significantly higher rate of tobacco consumption compared to females which was quite expected in this setting. Similar results were found in the STEPS survey in the neighboring countries of Bangladesh and Nepal.

According to the Alcohol Atlas, India has been showing a phenomenal increase in alcohol consumption, with the initiation age on an alarming decrease. The prevalence of alcohol use in the present study was found to be 15.4% which was quite higher than the survey in Bangladesh and Myanmar where only 0.9% and 12.9% respondents consumed alcohol.

More than half of the study population was indulged in an unhealthy diet (83.2%) and physical inactivity which was considerably higher than that found a study done in rural settings of New Delhi. In terms of attributable deaths, the leading physiological risk factor globally is raised blood pressure to which 13% of global deaths are attributed. However, the prevalence of hypertension in India is lower compared to world figures; says the World Health Organization’s 'global health statistics 2012'. In adolescents, hypertension was found to be prevalent among 22.9% of the population with the proportion in males significantly exceeding the proportion in females.

Studies done in different parts of India have supported the fact that adiposity is on an increase in India. The prevalence of overweight was found to be 28.2% with the males dominating the picture as compared to females.

| Table 1: Prevalence of Different Risk Factors in Study Population (N=280) |
|-----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| **Behavioral risk factors** | **Physiological risk factors** | **Behavioral risk factors** | **Physiological risk factors** | **Behavioral risk factors** | **Physiological risk factors** |
| **Age group** | **Use of tobacco** | **Alcohol** | **Physical inactivity** | **Unhealthy diet** | **Overweight** | **Abdominal obesity** | **Hypertension** | **Use of tobacco** | **Alcohol** | **Physical inactivity** | **Unhealthy diet** | **Overweight** | **Abdominal obesity** | **Hypertension** |
| 10-13 years | 8 (6.8%) | 1 (0.9%) | 39 (33.3%) | 98 (83.8%) | 44 (37.6%) | 1 (0.9%) | 37 (31.6%) | 40 (22.3%) | 16 (8.9%) | 47 (26.3%) | 152 (84.9%) | 51 (28.5%) | 3 (1.7%) | 41 (22.9%) |
| 14-16 years | 11 (12.9%) | 4 (4.7%) | 20 (23.5%) | 66 (77.6%) | 18 (21.2%) | 1 (1.2%) | 13 (15.3%) | 27 (15.4%) | 12 (15.4%) | 15 (19.2%) | 69 (88.5%) | 17 (21.8%) | 3 (3.8%) | 14 (17.9%) |
| 17-19 years | 29 (37.2%) | 12 (15.4%) | 15 (19.2%) | 69 (88.5%) | 17 (21.8%) | 3 (3.8%) | 14 (17.9%) | 27 (15.4%) | 12 (15.4%) | 15 (19.2%) | 69 (88.5%) | 17 (21.8%) | 3 (3.8%) | 14 (17.9%) |
| **Gender** | **Male** | **Female** | **Total** | **Male** | **Female** | **Total** | **Male** | **Female** | **Total** | **Male** | **Female** | **Total** | **Male** | **Female** | **Total** |
| **Use of tobacco** | 40 (22.3%) | 8 (7.9%) | 48 (17.1%) | 16 (8.9%) | 1 (1.0%) | 17 (6.1%) | 47 (26.3%) | 3 (1.0%) | 4 (1.4%) | 233 (83.2%) | 79 (28.2%) | 5 (1.8%) | 64 (22.9%) | 16 (8.9%) | 1 (1.0%) | 17 (6.1%) | 47 (26.3%) | 3 (1.0%) | 4 (1.4%) | 233 (83.2%) | 79 (28.2%) | 5 (1.8%) | 64 (22.9%) |

Journal of Undergraduate Medical Research, Volume 1, Issue 1, 2019 (24)
Conclusion
The findings of the present study show that the risk factors for NCD are widely prevalent among rural adolescents. The proportion of risk factors of non-communicable diseases among the adolescents, together with the associated health problems and costs, is a cause of grave concern among health care professionals and parents. Evidence show that primary prevention of these disorders by risk factor education have better benefits compared to secondary prevention for cardiovascular mortality as well as morbidity. A comprehensive school based education strategy and a family based approach should be initiated to prevent such unhealthy practices.

Funding: no funding sources
Conflict of interest: none declared

References