Prevalence of NCD Risk Factors Among the Adult Family Members of Students of School (Phase – A)

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Abstract

Background: *Like other developing countries, in our country major causes of mortality is shifted from communicable to non-communicable diseases. NCD already disproportionately affect low and middle income countries, where nearly three quarters of NCD deaths (28 million) occur annually. Management of the existing NCD and upcoming NCD will be a great challenge for the developing countries like us. Therefore a strategy of prevention of NCD is very important.*

Materials and methods: *This was a community based prospective interventional study, carried out in Mornea high school and Alef Uddin Sarker high school of Rangpur sadar. In the first phase, from each school 100 students from different classes were selected randomly. Then adult family members of these students were surveyed to see the prevalence of NCD risk factors. In second phase (ongoing) school health education will be given in Mornea high school (randomly chosen) monthly basis for 12 months and the students will share these with their family members. On the other hand the other school's students will not provide any health education. One of the guardian from each family will chosen for confirmation of the sharing of information of school health education acquired by students over phone after each class. After one year prevalence of NCD risk factors will be surveyed again to know whether there are any significant differences of outcome of school health education.*

Results: *In this study we have been able to study of 356 adult people of both sexes. From the Mornea high school 197 (55.3%) and Alef Uddin Sarker high school 159 (44.7%). Mean age of the study population was 47.33 years and female was more than male 66.3%. Awareness of NCD was found in only 10.4% of the study population. Overall 96.63% had NCD risk factors, 30.90% had two risk factors and 50.26% had 3 or more risk factors. Overall prevalence of smoking was 36.8%, among them 20.5% were current smoker. 33.1% of the study population used to take smokeless tobacco. Among the survey population only 14.3% used to take vegetables 7 days/week. 32.6% (116) people were physically inactive and 6.7% (24) had sedentary lifestyle. Only 5.3% of the people were obese and 66.57% had central obesity. Prevalence of hypertension and diabetes among the study population was 28.9% and 4.77% respectively. Among the known hypertensive 72.7% (16) used to take antihypertensive drug regularly and blood pressure was controlled in only 27.3%. Among the known diabetic mean duration were 4.12 years and 62.5% (5) of the patients used to take the antidiabetic drug regularly.*

Conclusions: *In our study, awareness of NCD is very low but high prevalence of NCD risk factors, which are modifiable. So, an appropriate intervention is needed to modify the risk factors and thus prevention of NCDs.*

Keywords: *Non-communicable diseases (NCDs), school health education, risk factors*

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Introduction:

Non-communicable diseases (NCDs), also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression. The 4 main types of non-communicable diseases are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary

disease and asthma) and diabetes. Tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol increase the risk of NCDs.[1] These behaviors lead to four key metabolic/physiological changes that increase the risk of NCDs: raised blood pressure, overweight/obesity, hyperglycemia (high blood glucose levels) and hyperlipidemia (high levels of fat in the blood). In terms of attributable deaths, the leading metabolic risk factor globally is elevated blood pressure (to which 18% of global deaths are attributed) [2] followed by overweight and obesity and raised blood glucose. Low- and middle-income countries are witnessing the fastest rise in overweight young children.[1] NCDs are already a major importance in developed countries and are rapidly becoming a major public health threat in the developing world.[3] NCDs were estimated to have contributed to almost 60% of deaths in the world and among them about 80% occur in the developing countries.[4] Like many other countries, Bangladesh has been experiencing an epidemiological transition from communicable disease to NCDs[5] due to economic development and increased level of control and treatment of infectious diseases.[6] Some 51% of deaths in Bangladesh are due to non-communicable diseases and other chronic health conditions.[7] According to the mortality profile of Bangladesh, 2014 highest mortality from circulatory system disease (33.20%), followed by certain conditions originating in the perinatal period (15.93%), respiratory system disease (13.90%), nervous system disease (3.89%) and digestive system disease (0.53%).[8]

Hospital based study in department of Medicine; Rangpur Medical College has shown that 81.57% of the death was due to NCDs.[9] An important way to reduce NCDs is to focus on lessening the risk factors associated with these diseases. Low-cost solutions exist to reduce the common modifiable risk factors (mainly tobacco use, unhealthy diet and physical inactivity, and the harmful use of alcohol) and map the epidemic of NCDs and their risk factors.[1] This study was carried out to find out a low cost, easily affordable solution to reduce NCD risk factors and ultimately the development of NCD.

Materials & methods:

This was a community based prospective interventional study, was carried out in Mornea high school and Alef Uddin Sarker high school of Rangpur district. Prior to start the study, we have taken permission from the divisional director of health, Rangpur and divisional education officer, Rangpur. Assuming unknown prevalence of NCD risk factors in adult population of Rangpur division a sample size of 385 was calculated to give the true prevalence with a precision of 5% with 95% confidence level. But due to economical constraints

100 students will be taken from each school and adult population of these students's family were studied. Random sampling method was used. From the 8 upazillas of Rangpur district, Ganggasara and Kaunia were selected by simple random sampling. Then from the list of secondary high school of the Ganggasara upazilla Mornea high school and from Kaunia upazilla Alef Uddin Sarker high school were selected for our study. 100 students were taken by random sampling from each school. Then adult family members of these students were surveyed to see the prevalence of NCD risk factors. At present we are taking lecture on non communicable diseases, its risk factors, preventive methods and possible complications of NCDs among these 100 students of Mornea high school. On the other hand the Alef Uddin Sarker high school's students will not provide any health education. One of the guardian from each family will chosen for confirmation of the sharing of information of school health education acquired by students over phone after each class. After one year prevalence of NCD risk factors will be surveyed again to know whether there are any significant differences of outcome of school health education.

Measurement of blood pressure:

Data collection and measurement of blood pressure was done by a non-medical stuff (trained for 7 days prior to start collection of data). During the course of the interview, the stuff made two measurements of blood pressure on each participant with a validated aneroid sphygmomanometer using a standardized technique. Study participants were instructed to refrain from drinking any caffeinated beverage, smoking half-hour preceding the interview. Both blood pressure measurements were obtained after the subject rested for at least 5 min in a seated position. In cases where the two readings differed by over 10 mm of Hg, the stuff obtained two more reading, and the four measurements were averaged to classify blood pressure. Hypertension was defined on the basis of Joint National Committee (JNC) VII criteria. If average blood pressure remains ≥140/90 mm Hg, the person was labeled to have hypertension. Persons having systolic BP between 120-139 mm Hg and / or diastolic BP between 80-89 mm Hg was labeled as pre-hypertension.

Measurement of anthropometry:

Body weight was measured (to the nearest 0.5 kg) with the subject standing motionless on the weighing scale, feet about 15 cm apart, and weight equally distributed on each leg. Subjects were instructed to wear minimum outerwear (as culturally appropriate) and no footwear while their weight was measured. Height was measured (to the nearest 0.5 cm) with the subject in an erect position against a vertical surface, and with the head positioned so that the top of the external

auditory meatus leveled with the inferior margin of the bony orbit. Body mass index (BMI) was calculated by dividing body weight in kilogram by square of height in meter.

Blood glucose test:
Blood glucose was tested by glucometer. The people who is taking the antidiabetic drug/insulin currently and random blood glucose ≥11.1 mmol/l labeled as diabetes mellitus.

Smoker:
Those who currently smoke or have smoked tobacco in any form (cigarette, birri etc.) in last 6 months.

Ex-smoker:
Ex-smoker who gave up smoking at least 6 months before.

Smokeless Tobacco (SLT):
SLT are raw tobacco leafs taken other than inhalation route (usually taken with betel nut or use in inner aspect of lower lip).

Obesity:
BMI level ≥30Kg/M^2 (according to WHO).

Central obesity:
The absolute waist circumference >102 centimeters in men and >88 centimetres in women and the waist-hip ratio >0.9 for men and >0.85 for women.

Methods of data collection:
Initially, an appointed research assistant (non-medical) briefed about the objectives, benefits, risks and burdens of this study to the individual family member of the student. Only positive respondents were selected as research participant consistent with the selection criteria. A written informed consent was taken from each of the selected subject. The study did not involve any social, mental or physical risk to the patients.

Statistical analysis:
The interested variables was processed, edited and analyzed by SPSS windows version 17.0. The sociodemographic data of the study population were expressed in frequency distribution and their observed difference was tested by one sample 't' test and 'chisquare' test. P value <0.05 was considered as statistically significant with the 95% confidence interval.

Results:
In this study, out of 356 adult people of both sexes 197 (55.3%) were from From the Mornea high school and 159 (44.7%) from Alef Uddin Sarker high school. Mean age of the study population was 47.33 years and female was more than male 66.3% (Table I).

Table I: *Socio-demographic characteristics of the study people of both school (n=356)*

Variables	Mornea high school	Alef Uddin Sarker high school	Total
Age			
Mean age (SD)	48.11 years (±16.89)	46.35 years (14.80)	47.33 (16.003)
Age range	18- 110 years	20- 90 years	18- 110 years
Sex Male	73 (37.1%)	47 (29.6%)	120 (33.7%)
Female	124 (62.9%)	112 (70.4%)	236 (66.3%)
Level of education			
Illiterate	111 (56.3%)	83 (52.2%)	194 (54.5%)
5 or less class	51 (25.9%)	27 (17%)	78 (21.9%)
>5-10 class	26 (13.2%)	31 (19.5%)	57 (16%)
>10-12 class	6 (3%)	10 (6.3%)	16 (4.5%)
Graduate and above	3 (1.5%)	8 (5%)	11 (3.1%)
Occupation			
Housewife	110 (55.8%)	102 (64.2%)	212 (59.6%)
Agriculture	61 (31%)	19 (11.9%)	80 (22.5%)
Business	5 (2.5%)	9 (5.7%)	14 (3.9%)
Service	2 (1%)	10 (6.3%)	12 (3.4%)
Retired	7 (3.6%)	4 (2.5%)	11 (3.1%)
Others	12 (6.1%)	15 (9.4%)	27 (7.6%)
Monthly income			
<5000 taka*	166 (84.3%)	117 (73.6%)	283 (79.5%)
5001-10000 taka	18 (9.1%)	23 (14.5%)	41 (11.5%)
10001-15000 taka	9 (4.6%)	9 (5.7%)	18 (5.1%)
>15000 taka	4 (2%)	10 (6.3%)	14 (3.9%)

*1 dollar = 82 taka.

Table II: Comparison of the NCD risk factors of the participant of both the schools

Variable	Mornea high school (n=197)	Alef Uddin Sarker high school (n=159)	Total (n=356)
Current smoking	24.4% (48)	15.7% (25)	20.50% (73)
Smokeless tobacco	38.6% (76)	26.4% (42)	33.1% (118)
Low vegetables intake (<4 days/week)	65% (128)	54.7% (87)	60.4% (215)
Low physical activity	32.5% (64)	32.7% (52)	32.6% (116)
Sedentary lifestyle	7.6% (15)	5.7% (9)	6.7% (24)
Obesity	4.6% (9)	6.3 (10)	5.3% (19)
Central obesity	66% (130)	67.3% (107)	66.57% (237)
Hypertension	33% (65)	23.9% (38)	28.93% (103)
Diabetes mellitus	3.04% (6)	6.91% (11)	4.77% (17)

Awareness of NCD was found in only 10.4% of the study population. Overall 96.63% had NCD risk factors, among them 30.90% had two risk factors and 50.26% had 3 or more risk factors. Overall prevalence of smoking was 36.8%, among them 20.5% were current smoker. Mean duration of smoking was 16.71 pack year. Among the smoker majority were male (73.3% vs 26.7%). 33.1% of the study population used to take smokeless tobacco, mean duration of intake was 13.54 years. Unlike smoking smokeless tobacco consumption was more in female (65.3% vs 34.7%). In our study none of the study population had history of intake of alcohol. 34.3% of the study population used to take added salt during meal, majority of them was female (63.9%). Among the survey population only 14.3% used to take vegetables 7 days/week and majority 72.5% of the people took vegetables 2-4 days/week. 90.2% people used to take red meat (beef and mutton). Among them more than half of the people 53.1% used to take red meat once in a week, 22.2% took 2-4 days/week and 14.6% of the people took meat once in a month. 98.3% patient used to take chicken. 51% used to take chicken once in a week, 39% took 2-4 days/week and 7.6% of the people took meat once in a month. 75.8% of the study people used to take battle nut, among them 23.3% took every day in a week.

29.7% (106) of the female used hormonal contraceptives (in the form of OCP, injectable and depot preparation), among them majority were used OCP (17.1%). Overall 32.6% (116) people were physically inactive and 6.7% (24) had sedentary lifestyle. Regular exercise (30 minutes of walking) was found in only 21.9% of the people. Based on body mass index 18.8% (67) of the population were underweight, 61.5% (219) were normal weight, 14.3% (51) were overweight and 5.3% (19) were obese. 66.57% of the people had central obesity, out of them 14.88% were male and 51.68% were female.

Mean blood pressure was systolic 130.21 mm of Hg and diastolic 81.28 mm of Hg. Among the study population 28.9% (103) were hypertensive, 6.17% (22) were known hypertensive and 22.75% (81) were newly diagnosed and 48.3% were pre-hypertensive. Among the hypertensive 69.9% were female. Mean duration of hypertension was 4 years. Among the known hypertensive 72.7% (16) used to take antihypertensive drug regularly and blood pressure was controlled in only 27.3% (6). Mean blood glucose was 6.35 (mmol/L. Prevalence of diabetes was 4.77% (17), among them previously diagnosed 2.24% (8), newly diagnosed (on the basis of RBS 11 mmol/l or more) 2.52% (9). Among the diabetic 47.05% (8) were male and 52.95% (9) were female. Among the known diabetic mean duration was 4.12 years and 62.5% (5) of the patients used to take the antidiabetic drug regularly.

Discussion:

In our study we were able to collect data of 356 adult people of both sexes, response rate was intermediate. Because we have surveyed family of 200 students, so at least we had to collect 2 adults from each family. Though we have ensured the family on the previous day of our visit via phone call and to visit to collect data in between 5 to 8 PM so that they could present at that time. Poor response may be due to some of the earning member of the family use to go to work and some go out of the local area for their job purpose. For the same reasons female participants were more than male (66.3% vs 33.7%). In our study, prevalence of smoking was 36.8%, which was higher than a study[11] done in Rangpur (23.9%) and also higher (26.2%) than a data from nationwide study.[10] This may be due to tobacco cultivation here, so tobacco products are available and cheap in this area. Though traditionally smokeless tobacco (SLT) was not been emphasized for its harmful health effect in Bangladesh, it is

considered to have equal potential to impair health and can lead to scores of chronic diseases. In our study, 33.1% of the study population used to take smokeless tobacco, our result is almost similar (31.7%) found in other study[10] done in Bangladesh. Unlike smoking, smokeless tobacco (SLT) consumption was more in female (65.3% vs 34.7%).

Excessive salt intake is an important risk factor for developing hypertension. In our study 34.3% of the study population use to take added salt during meal, another study[11] found 50% of the peoples used to take added salt. This may be due to the steps taken by the Government for reduction of NCD risk factors. Though a study[10] has shown that vegetable consumption was particularly better in Bangladeshi population, our study found 72.5% of the people took vegetables 2-4 days/week, which is suboptimal. However we did not assess the amount of vegetables. Low physical activity is considered as an important predictor of many chronic diseases, most notably heart disease, stroke, obesity, type 2 diabetes, some types of cancers, and osteoporosis[12]. Beyond its role in the development of obesity, physical inactivity and associated poor cardio-respiratory fitness pose direct health risks[13]. The global estimate for prevalence of physical inactivity among adults is 17%.[14] In our study physical inactivity was found in 32.6% of the people which is higher than previous studies 27%.[10]

Obesity is one of the important risk factor for hypertension. Friedman et al[15] carried out a 6-year follow-up study on hypertension and obesity; and found that obesity and weight gain were clear precursors of hypertension. In our study obesity was found more than other study[10] conducted in our country (5.3% vs 3.6%). Central obesity was found in our study 66.57%, which was 53% in a community based study[11] of this region. It is noteworthy that central obesity is a special characteristic of south Asian population in general.[16] Waist circumference provides an indication about the central obesity and has been suggested to be a risk factor more specific to cardiovascular disease as visceral fat is considered as a predictor of morbidity and mortality.

Hypertension is a disease of its own as well as a risk factor for other major disease such as stroke, coronary heart disease, heart failure and renal insufficiency. It is very common in Bangladeshi people but its detection and treatment status is far from adequate.[10] In our study 28.9% were hypertensive, Ratindra et al[11] found even higher prevalence of hypertension in this region 33.3% in 2012. But this is much higher than the finding[10] (17.8%) of a nationwide survey report of 2010. Control of hypertension is essential for ensuring cardiac, cerebral and renal health. In this regard rational intake of prescribed antihypertensive drug, where

indicated, is mandatory.[10] In a study[17] in USA, blood pressure was control in 24% of all hypertensive's, in our study 72.7% used to take antihyperetnsive drug regularly and blood pressure was controlled in only 27.3%. In our country prevalence of DM was 3.9%[10], our study has found almost similar findings 4.77%, but among them 37.5% of the patients did not take the antidiabetic drug regularly. NCD risk factors are usually seen in clusters. In our study overall 96.63% had NCD risk factors, among them 30.90% had two risk factors and 50.26% had 3 or more risk factors. NCD risk factor survey[10]-2010 in Bangladesh found almost similar findings, where about 98.7% have at least one risk factor, 77.4% had two or more risk factors and 28.3% had 3 or more risk factors. An important difference was an increase of clustering of risk factors, 3 or more risk factors was increased from 28.3% to 50.26%. NCD associated risk factors are largely modifiable. Therefore, by identifying and preventing the risk factors, NCDs such as coronary heart disease and stroke would be prevented by 80%, cancer by 40% and type 2 diabetes by 90%. In addition, one third of all cancers could be prevented by eating healthy food, maintaining normal weight and being physically active throughout the lifespan.[18,19]

Conclusions:

In our study, awareness of NCD is very low but high prevalence of NCD risk factors, which are modifiable. So, an appropriate intervention is needed to modify the risk factors and thus prevention of NCDs.

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