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Prevalence of Risk Factors of Non Communicable Diseases - A Community Based Study in a Rural Area of Murshidabad District of West Bengal, India

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ABSTRACT

Background: Globally about 36 million people die due to NCDs (Non-communicable diseases), which account for 63% of total deaths. Cardiovascular diseases account for 48% of the NCDs.
Objective: To estimate the prevalence of risk factors of NCDs among the residents of a block of Murshidabad district of West Bengal
Methods: This observational cross sectional community based study was conducted in a rural area of a district in West Bengal, India with the objective to find out the prevalence of risk factors of NCDs like obesity, diabetes mellitus, hypertension, dyslipidemia and addiction to tobacco and alcohol. A total of 390 subjects were studied using questionnaire and anthropometric measurement and biochemical tests.
Results: Mean age of the sample population was 42±8.4 years. Current use of tobacco smoking was 36 % among males and 6% of men were current alcohol users. Tobacco use was significantly more among males. About 87% of study subjects took more salt and 28% use more oils than recommended. Seventy one percent of study population could not afford >5 servings of fruits and vegetables per day. Most of the females (68%) had Low level of physical activity when compared with men (37%). Overweight was seen in 38% and 46% had dyslipidaemia. Hypertension was more prevalent (25%) than Pre-diabetes (19%) or Diabetes (11%).
Conclusion: The present study highlighted high burden of risk factors of NCDs in the rural community of West Bengal. Community based intervention for screening for these risk factors and health behaviours followed by awareness program can only curb the burden.

Key words: Diabetes, Hypertension, NCDs, Prevalence, Risk factors, Rural, Tobacco

INTRODUCTION

Non communicable diseases (NCDs), such as cardiovascular diseases (like heart attacks and stroke), Diabetes Mellitus, cancers, chronic respiratory diseases are prevalent worldwide. NCDs affect low- and middle-income countries including our country India, where nearly 80% of NCD deaths occur.[1] About 36 million people die globally due to NCDs which account for 63% of total deaths. Cardiovascular diseases account for 48% of these cases followed by Cancer (21%), chronic respiratory diseases (11.7%), Chronic digestive diseases (6.1%), Diabetes Mellitus (3.5%).[1]

India has dual burden of both communicable and Non-communicable disease. In India 53% of total deaths occur due to NCDs.[2] NCDs are projected to be the leading cause of mortality exceeding the combined deaths of communicable and nutritional diseases and maternal deaths by 2030[1] An ICMR study revealed the prevalence of diabetes in India as 7.3% (rural 5.2% and urban 11.2%)[3], where as a systematic review showed that the overall

prevalence for hypertension in India was 29.8% with significant differences were noted between rural and urban parts [27.6% and 33.8%].[4]

The behavioural risk factors for NCDs include obesity, tobacco and alcohol use, sedentary lifestyle and unhealthy diet where as the immediate risk factors constitute increased blood pressure and blood glucose with dyslipidaemia. Tobacco use is considered as a single largest risk factor for NCDs and its prevalence is still high in India (23.6%) compared to global prevalence of 22%.[5] In India one out of every 10 individuals aged 18 years and above have raised blood sugar, where as every fourth individual is suffering from high blood pressure.[5] Moreover diabetes itself is considered as an important risk factor for cardiovascular disease viz. coronary heart disease and stroke. Study on NCDs and its risk factors are rare in the setting of Murshidabad district, especially at a community setting. So the present study was conducted with the objective to estimate the prevalence of risk factors of NCDs among the residents of a block of Murshidabad district of West Bengal.

MATERIALS AND METHODS

Type of study: Observational, descriptive study with cross sectional design

Place of Study: Community based study, conducted in four villages of Nabagram block, Murshidabad district of West Bengal, India. Nabagram is the rural field practice area of Department of Community Medicine, Murshidabad Medical College

Duration of study: 3 months (From June 2019-September 2019).

Study population: Residents of the villages who were 18 years and above were included in the study.

Sample size: The sample size was calculated using the formula $n = z^2 pq/L^2$, where z is the statistic for a level of confidence, p is the prevalence of the parameter under consideration, q is (1-p) and L is the precision. Considering value of z at 95% confidence interval as 1.96 (hence $z^2 = 3.84$), the prevalence (p) of hypertension as 35.6% from a similar study conducted in rural Howrah [6], an absolute precision (L) of 7%, the estimated sample size was 356 considering a design effect of 2. The ultimate sample size was calculated as 390, considering a non response rate of 10%.

Sampling technique: A multistage random sampling technique was adopted. Nabagram block was selected purposively as it is the field practice area of the Department of Community Medicine, Murshidabad Medical College. From the list of villages adjacent to the primary Health centres, four villages were selected randomly for feasibility of collection of blood samples from the study subjects. The desired sample size was obtained from those villages by probability proportionate to sample size (PPS) considering only one adult member from a household. The first household was selected randomly by lottery method. Thereafter consecutive sampling was done until the sample size was covered considering males and females in alternate households as far as practicable. The population and proportion of males and females in the selected villages was obtained from the office of the Panchayat, Nabagram.

Study variables: Age, sex, literacy, religion, addiction to tobacco and alcohol, physical activity status, BMI status, dietary intake of fruits and vegetables, oil and salt intake, hypertension, diabetes and dyslipidaemia.

Study tools: It included a predesigned, pretested schedule based to WHO STEPs surveillance, weighing scale, non stretchable measuring tape, Sphygmomanometer, Glucostix and Glucometer, measuring scoop for assessment of salt intake.

Study technique: Ethics committee clearance was taken from the appropriate authority before the study. Interview of the study subjects was done after taking informed consent, followed by the anthropometric measurements for weight, height and measurement of blood pressure. Laboratory investigations for fasting blood

glucose and serum cholesterol and triglyceride was performed at PHC.

Information on sociodemographic variables and behavioural risk factors, such as tobacco-use, alcohol-use, physical exercise, and diet, were obtained by using a predesigned, pretested schedule translated in the local language.

Physical measurement, such as height and weight, was recorded to calculate BMI (kg/m^2).For Asian Indian population 18.5 to 22.9 BMI is normal, 23 to 24.9 is considered as overweight and BMI of ≥25 is considered as obesity.[7,8]Regarding dietary intake, high salt intake was defined as daily per capita salt intake >=5 g/day. [9] Intake of 5 or more servings of fruits and vegetables was defined as adequate dietary consumption of fruits and vegetables.[10] High oil consumption was considered when the percapita oil consumption exceeded>=25 ml in a day.[11] Data pertaining to these variables were obtained through 24 hours recall. Physical activity was considered as adequate if it was ≥ 150 minutes per week.[12] Blood pressure was measured using OMRON digital equipment recommended by Indian Council of Medical Research (ICMR). Two readings were taken at an interval of 5 minutes, and the average value of the measurements was used for the analysis. Blood pressure was analysed as per JNC 7 guidelines considering S.B.P <120 mm of Hg and diastolic blood pressure <80 mm of Hg as normal.[13]

Biochemical estimation like fasting blood sugar level, plasma cholesterol and triglyceride levels of all the study subjects were done in a common laboratory. Fasting blood glucose values > 110 g/l and >126 g/L were considered as prediabetes and diabetes mellitus respectively.[14] Plasma cholesterol >200 g/dl and /or serum triglyceride >150 g/dl were considered as markers for dyslipidaemia.[15]

Analysis of data: Data were entered and analysed in the MS Excel and expressed using simple proportions. Chi squared tests were performed. P value at 95% confidence level was considered to be significant.

RESULTS

The socio demographic profiles for the study population were presented in Table I. Mean age of the study population was 42±8.4 years. Among them 56% were male, 57% were Hindu and 87% were literate. Most of the males belonged to the age group of 50 to 59 years while most of the females belonged to 30-39 years.

Table I: Distribution of study population according to socio demographic variables

Study variables	Male (n= 219)	Female (n= 171)	Total (n= 390)	P value
Age group				
18- 29	24 (11)	14(8)	38(10)	X^2= 8.172 p=0.0854
30- 39	45 (21)	52(30)	97(25)	
40- 49	56 (26)	47(28)	103(26)	
50- 59	64 (29)	45(26)	109(28)	
≥ 60	30 (14)	13(07)	43(11)	
Religion				
Hindu	124(57)	98(57)	222(57)	X^2= 2.1309 p=0.344
Muslim	69(32)	60(35)	129(33)	
Others	26 (12)	13(08)	39(10)	
Literacy				
Illiterate	22(10)	30 (18)	52 (13)	X^2= 4.672 p=0.03
Literate	197 (90)	141 (82)	338 (87)	

Figures within bracket indicates percentages

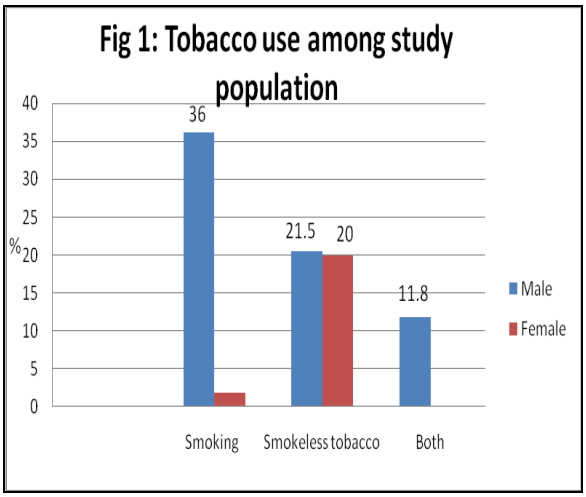

Fig 1& table 2 showed distribution of Behavioural risk factors. About 36% of males were smoking tobacco. Use of smokeless tobacco was almost same among males and females (about 20%). Gurako was the commonest form of tobacco used among females (63.1%) followed by jarda (48.3%). Alcohol abuse was not noted among the females. Current user of tobacco was seen as 56.6% and 21.6% among males and females respectively, the difference was seen statistically significant (X^2= 48.48,

p=0.000001). Beedi smoking was found to be the commonest form of tobacco among men (71.1%) while snuff was the commonest non-smoking tobacco among the same. Average age of initiation of smoking was 16 years and median intake of cigarettes/ beedies per day was seen to be 6 (range 2-20).

Table 2: Distribution of study population according to Behavioral risk factors

Study variables	Male (n= 219)	Female (n= 171)	Total (n= 390)	P value
Tobacco* (current)				
Non user	95 (43.4)	134(78.4)	229 (58.7)	X^2= 48.48 P<0.000001
Users	124(56.6)	37(21.6)	161(41.3)	
Alcohol	**41 (18.7)**	-	**41(18.7)**	-
Dietary factors				
Salt intake≥ 5 g/ day	182 (83.1)	156(91.2)	338(86.7)	X^2= 5.48 p=0.01
Salt intake<5 g/ day	37 (16.9)	15(8.8)	52 (13.3)	
Fruits and vegetables <5 servings/day	134 (61.1)	142(83)	276(70.8)	X^2= 22.18 P<0.0001
Fruits and vegetables ≥5 servings/day	85 (38.9)	29(26.5)	114(29.2)	
Oil >=25ml/day	73 (33.3)	37(21.6)	110(28.2)	X^2= 6.48 p=0.01
Oil <25 ml/day	146(66.7)	134(78.4)	280(71.8)	
Physical activity				
<150 min per week	82(37.4)	116(67.9)	198(50.7)	X^2= 35.48 p=0.0001
>=150 min per week	137(62.6)	55(32.1)	192(49.3)	

*Multiple response

Table 3: Distribution of study population according to physiological risk factors

Study variables	Male	Female	Total	P value
Diabetes	18 (10.4)	14 (12.3)	32 (11.2)	X^2= 0.442 p=0.801
Pre diabetes	32 (18.5)	23(20.2)	55 (19.1)	
Normoglycaemic	123(71.1)	77 (67.5)	200(69.7)	
Total**	**173 (100)**	**114 (100)**	**287(100)**	
Normotension	90 (41.1)	92 (53.8)	182 (46.7)	X^2= 6.283 p=0.043
Prehypertension	68 (31.1)	43 (25.1)	111(28.5)	
Hypertension	61 (27.9)	36 (21.1)	97 (24.8)	
Total	**219 (100)**	**171(100)**	**390(100)**	
Normal BMI	112(51.1)	81(47.4)	193(49.5)	X^2= 3.23 p=0.357
Overweight(BMI>22.9)	58 (26.6)	39 (22.8)	97 (24.9)	
Obesity(BMI >25)	24 (10.9)	28(16.4)	52(13.3)	
Underweight	25(11.4)	23(13.4)	48 (12.3)	
Total	**219 (100)**	**171 (100)**	**390 (100)**	
Dyslipidemia				
Cholesterol >200 mg	68(39.3)	34(29.8)	102(35.2)	X^2= 1.988 p=0.158
Triglyceride >150 mg	33(19.1)	30(26.3)	63(21.9)	
Dyslipidaemia	86 (49.7)	47 (41.2)	133(46.3)	
Non dyslipidaemic	87(50.3)	67 (58.8)	154 (53.7)	
Total	**173 (100)**	**114 (100)**	**287(100)**	

**Out of 390 subjects, 287 went for laboratory investigations/or were known cases.

Salt consumption was significantly higher among females compared to males (91%vs 83%), on the contrary the males reported significantly higher intake of (≥5 servings) of fruits and vegetables per day compared to females (39% vs 26%, p=0.0001). Oil intake was significantly more among men compared to women (33% vs 21.6%). More than two thirds of females undertook physical activity <150 mins per week which was significantly less than that observed among males (68% vs 37.4%) (Table 2)

It is evident from table 3 that the prevalence of prehypertension and hypertension was significantly higher among males compared to females. No significant difference was noted across gender with respect to the glycaemic status, BMI and dyslipidaemic status.

DISCUSSION

The present community based study was conducted to find out the prevalence of risk factors of non communicable diseases in a rural setting among adults aged 18 years and above. Rani M. et al[16] showed that, in India 30% of the population >15 years of age-47% men and 14% of women-either smoked or chewed tobacco, which amounts to about 195 million people . In our study we found women did not smoke tobacco or

alcohol and current use of tobacco smoking was 36% among males. Use of smokeless tobacco was almost same among males and females (about 20%). The finding was similar to the study in Bidar[17] where 30% were using tobacco or tobacco products, majority (98%) were males. In a rural area of Haryana, use of smokeless tobacco was seen comparatively less among females (only 1.2%).[18] Again in a rural area of Kerala[19], tobacco use of was found less (24%), whereas the same author found it very high among Mishing tribe of Assam[20] (84%; men 94%; women 73%), but in the latter case age group taken was different from other studies i.e. 25- 64 years. Pattanayak et al[6] found it as 70% vs 30% in rural Howrah of West Bengal. Alcohol use rate was also seen very high among Mishing tribes (67%, men 82%; women 50%).[20] The present study observed it very less as only 18% among males, absent in females similar to Bidar.[17] But in Haryana and Kerala, alcohol use rate was comparatively higher among females.[18,19]

So far as dietary habit was concerned, 87% of the population used to take more salt than recommendation and 28% consumed more oil in the present study. The availability of unhealthy foods like fried foods (CHOP- local language) and high cost of healthy foods were associated with unhealthy eating habits. A population survey in India and a systematic review had pointed out that mean intake of salt in Indian population was more than recommendation.[21,22] Bhattacharya et al had also reported low knowledge and practice about salt intake in a study in North India.[23]

About 71% of participants (61% males and 83% females) had taken less than five servings of fruits and vegetables per day in the present study, which was comparable to the findings of 68% in Assam.[20] Picture is worse in Haryana and in urban Delhi.[18,24] Only 1.8% of females could afford to consume more than 5 servings a day in Haryana.[18] Fruits and vegetables are very costly. Most of our people cannot afford to have that.

In the present study, only 49% had performed the physical activity as per recommendation, females were less active than males (32% vs 63%), as similar to the study in Haryana and Howrah.[18,6] In rural Kerala and Mishing tribe of Assam however more than 85% had habit of moderate to vigorous activity[19,20], where as totally reverse picture was seen in urban Delhi.[23]

As overweight and obesity are considered as risk factors, 38% in the present study were found to have high BMI similar to Bidar[17], compared to only 9% males and 15% of females in Haryana and 20% in Kerala.[18,19] Urban Delhi had the worst picture of having 72.5% people with high BMI.[23] The habit of consumption of more oil and fleshy food instead of more vegetables and less activity in the present study population might be the contributory factors.

The present study found prevalence of prehypertension and hypertension as 28.5% and 25% respectively with significantly more among males. Prevalence was comparable to the study in Assam, Bidar and rural Kerala, but without any difference across the gender.[17,19,20] In rural Haryana, only 10.7% of men and 7.9% of women were seen to be hypertensive.[18], whereas in Howrah more than 45% females were hypertensive.[6] Systematic review on hypertension had also shown the regional differences.[4]

Prevalence of prediabetes and diabetes was seen as 19% and 11% respectively in the present study with no gender wise difference, which can be compared to the as a whole prevalence of diabetes (20.6% & 19.8%) in Kerala and Delhi.[19,23] However the ICMR study showed a lower prevalence in India.[3] In Bidar it was seen higher than 50% but the difference might be due to self reported occurrence of diabetes.[17]

Dyslipidaemia was considered to be an important risk factor of NCDs. In the present study, 35% and 22% of study population had high cholesterol and high

triglyceride level with 46% prevalence of dyslipidaemia without any gender difference. In the study in urban Delhi[23] it was found to be 34% and 40% respectively. Reverse picture was seen in a rural area of Kerala with 56% and 18.8% respectively.[19] Very few studies were seen measuring the lipid profile of the study population. Reasons of difference might be due to food habits of different localities.

CONCLUSION

The current study showed a higher prevalence of risk factors of NCDs in a rural area of a district of West Bengal. Promotion of healthy dietary habits with regular exercise or activity in addition to cessation of smoking or alcoholism was found to be beneficial for cardiovascular health. Moreover reduction of blood sugar, hypertension, BMI and dyslipidaemia had also found to have a remarkable impact on reduction of prevalence of NCDs. These health behaviours have also etiological role in other NCDs like pulmonary and liver diseases or cancer. National Program for Prevention and Control of Diabetes, Cardiovascular diseases & Stroke (NPCDCS) has given importance on screening of NCDs at grass root level. Ayushman Bharat program has also proposed to launch Heath and Wellness centre in each PHC for early diagnosis and treatment. Promoting interventions for healthy behaviours at the community setting through BCC activities can only curb the high burden of the risk factors of NCDs.

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