Original Research Article

A study of non-communicable diseases risk factors among the tribal population of Lefunga block, Tripura: cross sectional study

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ABSTRACT

Background: The burden of non-communicable diseases such as diabetes and coronary heart disease is increasing both globally and in India. The present study was conducted to estimate the prevalence of risk factors associated with non-communicable disease and to study the association of the risk factors with non-communicable disease among tribal population of Lefunga Block of Tripura.

Methods: A cross-sectional study was conducted in Lefunga block during April to June 2017 among 150 Indigenous tribal population of Tripura. Multistage random sampling was used. A predesigned, pretested, semi-structured modified WHO STEPs questionnaire was used. Chi square and Multiple Logistic Regression was done to see association.

Results: Mean age was 39.03±12.76 years. Majority (66.7%) were females and (44.7%) had studied up to secondary. (26%) were tobacco smokers and (68%) were tobacco chewing. (36%) were alcoholic. (89.3%) had exercising for <2.5 hrs. 68% were taking vegetables >10 times/ week and 88.7% were taking fruits <5 times/week. (26%) were overweight, (45.3%) had abdominal obesity and 31% were hypertensive. 93.3% were aware of the harmful effects of tobacco consumption. Multiple logistic regression analysis showing factors associated with male were more likely to had higher abdominal obesity and alcohol user >50 yrs, government employee. With smoking, male having more chances of smoking and Age group of 20-30 yrs and 31-40 yrs.

Conclusions: The mean age was 39.03±12.76 years. (26%) were overweight, (45.3%) had abdominal obesity and (31%) were hypertensive. NCD clinic, IEC should be increased.

Keywords: NCD, Tribal, Lifestyle risk factors, WHO STEPS questionnaire

INTRODUCTION

The burden of non-communicable diseases (NCDs) such as diabetes and coronary heart disease is increasing both globally and in India. In 2008, of the 57 million global deaths, 36 million or 63% were due to NCDs and out of which CVDs were responsible for 47.9% deaths which is the largest proportion of NCD related deaths.¹ It may be said that not only developed countries will be affected by NCD, the developing countries will also equally, even more, will be affected.² The rate of increase of NCD in developing countries is almost double in comparison to developed countries.³ It seems reasonable to argue that people with changing lifestyles due to growing urbanization are associated with adverse NCD risk factors irrespective of their habitat.³ From rural 6.7% of women and 58.9% of men consume alcohol. 12.8% women and 14.9% men are overweight and obese (BMI>25 kg/m²) in rural area of 15-49 age group and same for men is 13.4%.⁴
However, there is paucity of information regarding the non-communicable diseases risk factors among tribal population of Tripura. Hence the present study has been conducted to estimate the prevalence of risk factors associated with non-communicable disease among tribal population of Lefunga block of Tripura and to study the association of the risk factors with non-communicable disease among tribal population of Lefunga block of Tripura.

METHODS

This was a cross-sectional study conducted in a rural community Lefunga block during April to June 2017 among 150 Indigenous tribal population of Tripura. Indigenous tribes viz. Debbarma, Koloi, Jamatias were populated in these areas. The study was conducted among 150 indigenous tribal residents of the area considering a Prevalence of risk factor for NCD to be 11% reported by Oommen from a cross sectional study among Rural and Urban area of Tamil Nadu, with an absolute precision of 5 per cent at 5% level of significance.

Multistage random sampling technique was used in the present study. Lefunga block had 10 villages out of which 5 villages were selected by simple random sampling in 1st stage. Then in the 2nd stage, from each village, 30 families were selected (as per Panchayat family registers) by systematic random sampling method considering every 2nd house. Data were collected through house to house visit. A predesigned, pretested semi-structured modified version of WHO STEPS questionnaire was used. Due to limited resources, biochemical analysis (STEPS 3) was not conducted. STEPS 1 included information on age, sex, education, marital status, tobacco use, alcohol consumption, consumption of fruits, vegetables and physical activity. In STEPS 2 height, weight, waist circumference and blood pressure were measured. Weighing machine, constant tension tape and stadiometer were used to measure weight, waist circumference and height, respectively. Blood pressure was measured using Omron digital automatic blood pressure monitor three times. The average of the last two readings was taken as the final reading for that participant. All the measurements were taken according to the STEPS protocol. Re-calibration of equipment was done at regular intervals pregnant woman. Persons below 18 years, Bed ridden patients with debilitating illness and who did not give consent were excluded from the study. Individual data collections were kept anonymous and strict confidentiality was maintained.

Data analysis was done by SPSS V19.0. Descriptive statistics were expressed in frequencies and percentages. Chi square test was applied to test the association of different variables. P<0.05 was considered statistically significant. Multiple logistic regression analysis was applied to identify the risk factor association with demographic profile. Those variables which were found to be significantly associated with NCD risk factor by using Chi square test and Fisher exact test were only used as predictor variable in multiple logistic regression analysis. The study was conducted after obtaining permission from institutional ethics committee of Agartala Govt. Medical College.

RESULTS

Table 1 showed that the total number of respondents was 150. The mean age of the respondents was 39.03±12.76 years with a range of 20-70 years. The sample had 66.7% females and 33.3% males. Majority of the study participants were married, studied upto secondary school (44.7%) and 52% were not involved in any occupation at the time of study.

Table 1: Demographic characteristics of respondents.

| Characteristics       | Respondents (N) | % |
|-----------------------|-----------------|---|
| Sex                   |                 |   |
| Male                  | 50              | 33.3 |
| Female                | 100             | 66.7 |
| Age group (in years)  |                 |   |
| 20-30                 | 56              | 37.3 |
| 31-40                 | 38              | 25.3 |
| 41-50                 | 24              | 16  |
| >50                   | 32              | 21.3 |
| Marital status        |                 |   |
| Married               | 136             | 90.7 |
| Unmarried             | 6               | 4.0  |
| Widow                 | 8               | 5.3  |
| Religion              |                 |   |
| Hindu                 | 128             | 85.3 |
| Christian             | 22              | 14.7 |
| Literate              |                 |   |
| Illiterate            | 23              | 15.3 |
| Literate              | 18              | 12.0 |
| Primary School        |                 |   |
| Secondary School      | 32              | 21.3 |
| Higher Secondary & Above |        | 44.7 |
| Occupation            |                 |   |
| Homemaker             | 78              | 52.0 |
| Unskilled labourer    | 37              | 24.7 |
| Skilled labourer      | 14              | 9.3  |
| Govt. employee        | 8               | 5.3  |
| Self employed         | 13              | 8.7  |

Table 2 shows that the different behavioural risk factors association with demographic profile in which tobacco can be consumed either in the form of smoking or chewing. Here 26% of the respondents were found to consume tobacco in the form of smoking. Out of them 11% smoked ≤4 bidis/day and 33% started smoking in the early age group. Majority (68%) were taking tobacco in the form of chewing, 59.3% were fond of eating pan
masala and 48.7% respondents started chewing tobacco after the age of 19 yrs. 36% of respondents were engaged in the drinking activity where 31.3% drink country liquor. 89.3% respondents are doing exercise for <2.5 hrs, 68% people are taking vegetables more than 10 times per week and 88.7% people are taking fruits less than 5 times.

### Table 2: Behavioural risk factors of non-communicable diseases.

| Characteristic                  | Frequency (N) | Percentage (%) |
|--------------------------------|---------------|----------------|
| **Tobacco smoking**            |               |                |
| Smoking                        |               |                |
| Yes                            | 39            | 26             |
| No                             | 111           | 74             |
| No of bidis per day            |               |                |
| <4                             | 16            | 10.7           |
| 4-8                            | 14            | 9.3            |
| >8                             | 9             | 6              |
| Age of starting (in years)     |               |                |
| ≤19                            | 13            | 33.3           |
| >19                            | 26            | 66.7           |
| **Tobacco chewing**            |               |                |
| Chewing tobacco                |               |                |
| Yes                            | 102           | 68             |
| No                             | 48            | 32             |
| Age of starting of chewing     |               |                |
| tobacco (in years)             |               |                |
| ≤19                            | 29            | 19.3           |
| >19                            | 73            | 48.7           |
| **Tobacco Form**               |               |                |
| Pan masala                     | 89            | 59.3           |
| Sambhu (khaini)                | 6             | 4.0            |
| Ghutkha                        | 4             | 2.7            |
| Others                         | 3             | 2.0            |
| **Alcohol**                    |               |                |
| Drinking alcohol by the        |               |                |
| respondents                    |               |                |
| Yes                            | 54            | 36             |
| No                             | 96            | 64             |
| Age of starting alcohol        |               |                |
| (in years)                     |               |                |
| ≤19                            | 10            | 6.7            |
| >19                            | 44            | 29.3           |
| **Alcohol form**               |               |                |
| Country                        | 47            | 31.3           |
| Others                         | 8             | 5.3            |
| **Exercise**                   |               |                |
| Exercise in hrs                |               |                |
| ≤2.5                           | 134           | 89.3           |
| >2.5                           | 16            | 10.7           |
| **Vegetable intake**           |               |                |
| Vegetable intake per week      |               |                |
| ≤5                             | 19            | 12.7           |
| 5-10                           | 29            | 19.3           |
| >10                            | 102           | 68             |
| **Fruits intake**              |               |                |
| Fruit intake per week          |               |                |
| ≤5                             | 133           | 88.7           |
| 5-10                           | 17            | 11.3           |

### Table 3: Clinical risk factors of non-communicable diseases.

| Characteristics     | Frequency (N) | Percentage (%) |
|---------------------|---------------|----------------|
| **BMI**             |               |                |
| Underweight         | 14            | 9.3            |
| Normal              | 98            | 63.3           |
| Pre- obese          | 35            | 25.3           |
| Obese class I       | 2             | 1.3            |
| Obese class II      | 1             | 0.7            |
| **Waist- hip ratio**|               |                |
| Normal              | 82            | 54.7           |
| High Risk           | 68            | 45.3           |
| **Blood pressure**  |               |                |
| Normal              | 50            | 33.3           |
| Pre hypertension    | 55            | 36.7           |
| Hypertension stage I| 33            | 22.0           |
| Hypertension stage II| 12          | 8.0            |
Table 3 shows that the overweight was seen in 26%, abdominal obesity in 45.3% and 31% were suffering from hypertension. Table 4: 93.3% of the respondents were aware of the harmful effects of tobacco consumption. 72.7% said they received this awareness from electronic media.

Table 4: Awareness on harmful effect of tobacco consumption.

| Characteristics                      | Frequency (N) | Percentage (%) |
|--------------------------------------|---------------|----------------|
| Harmful effect of tobacco             |               |                |
| Yes                                  | 140           | 93.3           |
| No                                   | 10            | 6.7            |
| Source of information on              |               |                |
| Electronic media                     | 109           | 72.7           |
| Harmful effect of tobacco             |               |                |
| Health worker                        | 6             | 4.0            |
| Printed media                        | 6             | 4.0            |
| Relatives/friends                    | 13            | 8.7            |
| Would advice someone to quit tobacco |               |                |
| Yes                                  | 98            | 65.3           |
| No                                   | 52            | 34.7           |

Table 5: Multiple logistic regression analysis showing factors associated with body mass index.

| Characteristics   | Normal/underweight | Obese | Odds ratio (95% C.I.) | P value |
|-------------------|--------------------|-------|-----------------------|---------|
| Sex               |                    |       |                       |         |
| Male              | 32                 | 18    | 0.642 (0.238-1.731)   | 3.81    |
| Female            | 79                 | 21    | 1                     |         |
| Occupation        |                    |       |                       |         |
| Household         | 63                 | 15    | 2.712 (0.678-10.843)  | 0.158   |
| Unskilled labourer| 28                 | 9     | 2.579 (0.681-9.767)   | 0.163   |
| Skilled labourer  | 10                 | 4     | 2.178 (0.440-10.784)  | 0.340   |
| Govt. employee    | 3                  | 5     | 0.495 (0.081-3.033)   | 0.447   |
| Self employed     | 7                  | 6     | 1                     |         |

Table 6: Multiple logistic regression analysis showing factors associated with waist hip ratio.

| Characteristics       | Normal | High risk | Odds Ratio (95% C.I.) | P value |
|-----------------------|--------|-----------|-----------------------|---------|
| Sex                   |        |           |                       |         |
| Male                  | 44     | 6         | 13.753 (4.254-44.462) | 0.000   |
| Female                | 38     | 62        | 1                     |         |
| Occupation            |        |           |                       |         |
| Household             | 32     | 46        | 2.247 (0.448-11.269)  | 0.325   |
| Unskilled labourer    | 24     | 13        | 1.739 (0.354-8.528)   | 0.495   |
| Skilled labourer      | 12     | 2         | 5.654 (0.637-50.211)  | 0.120   |
| Govt. employee        | 6      | 2         | 3.107 (0.302-31.973)  | 0.341   |
| Self employed         | 8      | 5         | 1                     |         |

Table 5 showed that factors associated with body mass index in which body mass index is not significantly associated with sex and occupation in Multiple Logistic Regression analysis.

Table 6 showed that Multiple Logistic Regression analysis showing factors associated with waist hip ratio in which males had 13 times more chances of higher abdominal obesity [13.75(95% CI 4.254-44.462)] as compared to female.

Table 7 showed that multiple logistic regression analysis showing factors associated with alcohol in which alcohol consumption is significantly associated with males in which males had six times more chances of alcoholic [6.307(95% CI 2.241-17.749)] as compared to female. There were 74% less chance of consuming alcohol as compared to age group of more than 50 yrs [0.267(95% CI 0.084-0.842) with a p value of 0.024. government employee had 87% less chances of Alcohol consumption [0.128(95% CI 0.015-0.220)] as compared to self employed.
Table 7: Multiple logistic regression analysis showing factors associated with alcohol consumption.

| Characteristics      | Yes  | No   | Odds ratio (95% C.I.) | P value |
|----------------------|------|------|-----------------------|---------|
| Sex                  |      |      |                       |         |
| Male                 | 35   | 15   | 6.307(2.241-17.749)   | 0.000   |
| Female               | 20   | 80   | 1                     |         |
| Age group (in years) |      |      |                       |         |
| 20-30                | 11   | 45   | 0.267(0.084-0.842)    | 0.024   |
| 31-40                | 14   | 24   | 0.713(0.223-2.279)    | 0.568   |
| 41-50                | 15   | 9    | 1.840(0.505-6.706)    | 0.356   |
| >50                  | 15   | 17   | 1                     |         |
| Occupation           |      |      |                       |         |
| Household            | 14   | 63   | 0.371(0.076-1.821)    | 0.222   |
| Unskilled labourer   | 22   | 15   | 0.815(0.179-3.708)    | 0.791   |
| Skilled labourer     | 9    | 5    | 1.187(0.189-7.467)    | 0.855   |
| Govt. employee       | 2    | 6    | 0.128(0.015-0.220)    | 0.043   |
| Self employed        | 8    | 5    | 1                     |         |

Table 8: Multiple logistic regression analysis showing factors associated with hypertension.

| Characteristics      | Normal | Hypertension | Odds Ratio (95% C.I.) | P value |
|----------------------|--------|--------------|-----------------------|---------|
| Sex                  |        |              |                       |         |
| Male                 | 10     | 40           | 0.785 (0.277-2.223)   | 0.648   |
| Female               | 40     | 60           | 1                     |         |
| Occupation           |        |              |                       |         |
| Household            | 36     | 42           | 2.454 (0.543-11.096)  | 0.244   |
| Unskilled labourer   | 7      | 30           | 0.759 (0.163-3.525)   | 0.725   |
| Skilled labourer     | 3      | 11           | 0.914 (0.148-5.625)   | 0.923   |
| Govt. employee       | 1      | 7            | 0.468 (0.040-5.497)   | 0.545   |
| Self employed        | 3      | 10           | 1                     |         |

Table 9: Multiple logistic regression analysis showing factors associated with tobacco smoking.

| Characteristics      | Yes | No  | Odds ratio (95% C.I.) | P value |
|----------------------|-----|-----|-----------------------|---------|
| Sex                  |     |     |                       |         |
| Male                 | 24  | 26  | 7.282 (2.020-26.254)  | 0.002   |
| Female               | 15  | 85  | 1                     |         |
| Age group (in years) |     |     |                       |         |
| 20-30                | 4   | 52  | 0.075 (0.016-0.356)   | 0.001   |
| 31-40                | 7   | 31  | 0.244 (0.062-0.965)   | 0.044   |
| 41-50                | 10  | 14  | 0.500 (0.136-1.833)   | 0.296   |
| >50                  | 18  | 14  | 1                     |         |
| Literacy             |     |     |                       |         |
| Illiterate           | 12  | 11  | 1.523 (0.145-16.010)  | 0.726   |
| Literate             | 8   | 10  | 2.000 (0.206-19.391)  | 0.550   |
| Primary school       | 7   | 25  | 0.886 (0.095-8.259)   | 0.916   |
| Secondary school     | 10  | 57  | 0.607 (0.078-4.722)   | 0.633   |
| Higher secondary & above | 2 | 8   | 1                     |         |
| Occupation           |     |     |                       |         |
| Household            | 13  | 65  | 0.995 (0.154-6.441)   | 0.996   |
| Unskilled labourer   | 17  | 20  | 1.327 (0.252-6.994)   | 0.739   |
| Skilled labourer     | 4   | 10  | 0.744 (0.098-5.672)   | 0.775   |
| Govt. Employee       | 1   | 7   | 0.166 (0.011-2.596)   | 0.200   |
| Self employed        | 4   | 9   | 1                     |         |
Table 8 showed that factors associated with hypertension in which hypertension is not significantly associated with sex and occupation in multiple logistic regression analysis.

Table 9 showed that Multiple Logistic Regression analysis in which Tobacco smoking is significantly associated with male having 7 times more chances of smoking [7.282(95% CI 2.020-26.254)] as compared to female. Age group of 20-30 yrs had 93% less chances [0.075(95% CI 0.016-0.356)] as compared to >50 years of age and 31-40 yrs had 76% less chances [0.244(95% CI 0.062-0.965)] as compared to >50 years of age.

**DISCUSSION**

The study was conducted by Kandpal on a tribal population in which 36% were males and 64% females.7 In our present study, all the individuals are equal to or above 20 years of age, of which 33.3% are males and rest 66.7% are females. Bhagyalaxmi conducted on the prevalence of risk factors of NCD in a district of Gujarat, it was found that 10% of the study subjects were skilled labour.8 In our study, it was found that 14% were skilled labour. Kandpal on Rang Bhotias which showed that 37.5% consumed alcohol, among this 78.8% of males and 14.1% of females were found to consume alcohol.9 Our present study, showed that 36% of the study subjects consumed alcohol. Among which 70% of males and 20% of females were found to consume alcohol. Bhagyalaxmi conducted on prevalence of risk factors of NCDs in a district of Gujarat, it was observed that 23.8% were smokers.8 In our study, it was found that among the study subjects 26% were smokers. In a study conducted by Prabhakaran on the employees of a large industry area near Delhi, they found that 70% were hypertensive.9 Similar study, by Gupta on the urban population of Delhi reported that 73.9% were hypertensive.10 In our study, it was observed that 66.7% of the study subjects were hypertensive. Misra conducted on Mishing tribe, showed 26% had BMI >25 Kg/m2.11 Another study, was conducted by Chadha in Delhi, showed 27.8% were having BMI >25 Kg/m2.12 In our study, it was observed that 25.3% had BMI>25 Kg/m2. Kanniyappan conducted in south India showed 47.8% had waist-hip ratio above normal.13 In our study, the proportion of men and women having waist-hip ratio >1.0 and >0.85 respectively was significantly higher of about 45.3%. Our study showed high prevalence of hypertension among the study subjects. Similarly, Prabhakaran and Gupta in their studies that hypertension was the most prevalent risk factor for development of CVDs.9,10 The overall prevalence of hypertension was higher in individuals who consumed alcohol. In our study, the prevalence of CVD risk factors was found higher among those who consumed alcohol. Kandpal in which it was also reported that there was higher risk of developing CVD with alcohol consumption.2 Bhagyalaxmi in her study reported that smoking tobacco was also a risk factor for development of NCDs, which in our study was also found to be a significant risk factor for developing NCDs.8 A study by Mishra and Kanniyappan also reported BMI and waist-hip ratio as equally significant risk factor for development of CVDs.11,13

**CONCLUSION**

The tobacco and alcohol use, two of the major NCD risk factors were high in this population. A strong negative behaviour was the low level of physical activity among this population which could be the reason for low level of overweight and abdominal obesity, hypertension. Unhealthy diet was more prevalent among the illiterates which could be resolved by better education. Awareness on harmful effect of tobacco of health was higher and treatment and control of hypertension was lower probably due to inadequate access to health care.

**Recommendations**

Increase in number of NCD clinic. Enforcement of laws against use of tobacco and alcohol should be made more stringent. More information, education and communication activity regarding promotion of physical activity and balanced diet.

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