Original Article :

Cardiovascular risk factors of tea garden workers from a district of West Bengal, India.

Ashfaque Ahmed1, Shamima Yasmin2

1. Assistant Professor, Department of Cardiology, KPC Medical College, Kolkata, West Bengal, India

2 . Assistant Professor ,Department of Community Medicine, Medical College Kolkata, West Bengal, India

Received on Aug 28, 2023, accepted for publication on March 06, 2024, dx.doi.org/10.5455/mjhs.2024.02.012

Corresponding author:
Dr Shamima Yasmin
Assistant Professor ,Department of Community Medicine,Medical College Kolkata, West Bengal,India
Email: 2021shamima@gmail.com - Phone: 919674287575

OPEN ACCESS Distributed under Creative Commons CC BY-NC-ND 4.0

Abstract

Background and Aims:
Cardiovascular risk factors in tea gardens have been seldom studied. The risk factors for these marginalized population needs attention for public health interventions. OBJECTIVES /AIMS: To assess the risk factors for cardiovascular diseases among tea garden workers in the Alipurduar district of West Bengal, India.

Methods:
An observational, descriptive cross-sectional study was conducted among 463 tea garden workers working in a district of West Bengal, India to assess risk factors for cardiovascular diseases. Proforma was filled along with clinical examination and evaluation of records. Diseases classified as per ICD-10. Statistical analysis was done with Microsoft excel 10.

Results:
Most of the study participants were from marginalized society (81.2% tribals). 76% were female. More than 50% (55.9%) were illiterate. 67.2% were from lower income group. As per ICD-10 classification, 24.2% have some non-communicable disease. Risk factors like addiction was quite prevalent (67.2% for tobacco and 57.1 % for Alcohol).

Conclusions:
Risk factors for cardiovascular disease are quite prevalent among the marginalized population, which needs high priority for intervention.

Keywords:
Non-communicable disease, cardiovascular risk factors, tea garden workers, hypertension.

Introduction

Noncommunicable diseases (NCDs) are of major concern for both rich and poor populations nowadays. India being largest populous country of the world [1] bears the brunt of both communicable and non-communicable disease burden.[2] India being an agricultural country has a lot of workers in agricultural industry. Tea being one of the important industries of West Bengal. The tea garden workers are mostly local people, tribals and very poor. Although the Indian tea industry occupies a significant and distinct position in the Indian economy[3] with a large number of workers not many studies are present to describe the morbidity of these poor tea garden workers. Non-communicable diseases (NCDs) are of major concern of global importance with cardiovascular diseases (CVDs) contributing to 48% of deaths due to NCDs in India.[4]

Though studies have been conducted in urban and rural areas, data related to tribal communities is limited. The vicious cycle of poverty, undernutrition, unhygienic environment, illiteracy, and various morbidities adversely affects health status.[5]

A study on assessing NCD risk factors among tribals of Assam using the WHO-STEPS questionnaire revealed alarming results: tobacco use, alcohol use and unhealthy diet habits were high and common which required an integrated approach to reduce the risks.6

Considering these facts in mind, the present study was planned with the objective to know the cardiovascular risk factors of the tea garden workers.

Materials and Methods

Study Design and Setting

The study was conducted in the tea gardens of the Alipurduar district of West Bengal, India. Three gardens were selected randomly.

Study Participants

Adult workers of the tea garden who consented were included in the study. They were mainly tribals.

Sample size and Sampling Technique

Estimating the proportion of morbidity to be 0.5%.95% confidence level, 5% absolute allowable error and 10% non-response rate. The sample size is 422 using the formula $n=z\alpha 2pq/L$.[2] Selection was done by Multi-stage random sampling technique. 150 workers from each garden were selected. 463 workers were examined in all.

Ethical Issues and Necessary Approval

The 'Institutional Ethical Committee' of the Midnapore Medical College, West Bengal, India, approved the study. IEC NUMBER AND DATE (IEC /2016/ dat-

ed 29.11.16) Necessary permission from the management of the selected tea gardens were taken. Informed consent was obtained from the tea garden workers who participated.

Data Collection and Measurements

After obtaining informed consent, trained and qualified team of doctors interviewed the tea garden workers by using a pre-tested and pre-designed semi-structured questionnaire. They also performed relevant clinical examination. All the available medical records were checked. NCDs were classified and coded as per the 10th revision of the international classification of the diseases (ICD 10) [7].

Blood pressure (BP) was recorded. Hypertension / blood pressure was classified according to the 'JNC-8' classification.8Anthropometric measurements were measured by a digital weighing scale and potable stadiometer as per standard techniques.[9] Body mass index [BMI] was calculated. For interpretation of BMI recommendation made by the WHO for Asians was used.[10]

Statistical analysis: Statistical analysis was done in Microsoft Excel. Categorical variables were expressed in percentage and mean ± SD were found for continuous variables. Appropriate tests were done where required.

Results

Out of the 463 workers, the mean age was 37.97±13 years. 76% were female. 81.2% were tribals and more than half (55.9%) were illiterate. The average family income was 3475.59.

TABLE 1: Socio demographic profile of study participants(N=463)

Variables		Number studied	Percentage
	Overall	463	100
Age Group (Years):	18-30	168	36.3
	31-44	146	31.5
	45-59	104	22.5
	≥ 60	45	9.7
Sex	Male	111	24.0
	Female	352	76.0
Caste	Others	87	18.8
	Scheduled Tribe	376	81.2
Education	>10	80	17.3
	Class 5-10	100	21.6
	Class1-4	24	5.2
	Illiterate	259	55.9
Monthly Income	Highest Quartile	36	7.8
	Third Quartile	32	6.9
	Second Quartile	84	18.1

Variables		Number studied	Percentage
	Overall	463	100
	Lowest Quartile	311	67.2

24.2% has some non-communicable diseases, which are risk factors for cardiovascular disease. They are classified as per ICD-10 coding in table 2.

TABLE 2: ICD10 coded non communicable diseases among study participants(N=463)

DISEASES	ICD 10 CODING	Number	Percentage
NCDs (Hypertension, Stroke, CVDs, Type 2 Diabetes Mellitus etc.)	I10,25,42,64; E11	112	24.2

Table 3 shows 17.3% and 6.9% of the study participants were found in stage-I and stage-II hypertension, respectively, according to the 'JNC-8 classification'. 57.8% of them found pre-hypertensive. These figures are quite high and need urgent interventions.

TABLE 3: Classification of blood pressure as per JNC 8 criteria(N=463)

Variables		Number	Percentages
Classification of Blood Pressure#	Normal	84	18.1
	Prehypertension	267	57.7
	Stage-I	80	17.3
	Stage-II	32	6.9

Table 4 shows the risk factors of cardiovascular disease. 5.2% were overweight despite heavy work. 47.7% had a diet with less than 5 servings of fruits and vegetables. Their main diet was rice and potatoes. Tobacco and alcohol users were 67.2%and 57.1 % respectively. Waist circumference and waist-hip ratio was abnormal for 24.4 % and 20.3% respectively.

TABLE 4: Some Risk factors of non-communicable disease among study participants (N=463)

BMI	< 18.5	176	38.0
	18.5- 22.9	263	56.8
	>22.9	24	5.2
Waist circumference	NORMAL	350	75.6
	ABNORMAL	113	24.4
Waist hip ratio 2	NORMAL	369	79.7
	ABNORMAL	94	20.3
TOBACCO EVER USERS	YES	311	67.2
	NO	252	32.8
ALCOHOL EVER USERS	YES	269	58.1
	NO	194	41.9
DIET LESS THAN 5 SERVINGS OF FRUITS AND VEGETABLE	YES	221	47.7
	NO	242	52.3

Discussion

This cross-sectional descriptive study among tea garden workers revealed that most of the workers were female. (76%, 352 out of 463). 81.2% were tribals i.e. hailing from marginalized communities with low literacy (55.9% illiterate) and poverty. Their mean family income was Rs. 3475.59 ± 1840.10 and 67.2% were in lowest income quartile. A study on tea garden workers of Assam,[11] a neighbouring state of West Bengal, India also reiterates similar findings of inadequate wages (75% had wages less than 6100 per month) and 68.33% up to middle school education. The Assam study had workers mostly from other backward classes. (58.33%)

36.1% of the study population were undernourished which is comparable with a study in northern part of West Bengal (36.4%).[12] A cross sectional study conducted to assess the BMI of tea garden workers revealed that 74.95% of female workers had BMI less than normal. [13]Another study reveals 69.9% undernutrition.[14]

Although the majority of workers were females, addiction was quite prevalent 67.2% for tobacco and 57.1 % for alcohol. Another study of Assam revealed addiction to tobacco at 73% and alcohol at 50% among tribal female.[6] A study among tea garden worker in 2013 revealed Tobacco consumption was higher among tea garden workers as compared with general population (85.2% vs. 41.7%).[5]

Regarding diet 52.3% revealed consumption of less than 5 servings of fruits and vegetables; their main diet was carbohydrate based with rice and potatoes. A study in 2016 to assess cardiovascular risk factors among tribals of India, 43.4% were hypertensive.[4] Although it was beyond the scope of this study to evaluate their dietary pattern, it is an important finding and requires further investigations. The probability of developing CVD is associated with unhealthy dietary patterns including less intake of fruits and vegetables. [15,16,17,18]

In terms of cardiovascular risk factors in the present study, 24.2% were diagnosed as hypertensive and 57.7% were pre-hypertensive, revealing the iceberg of hypertension. They hardly knew about their hypertensive status.

A study by N. C Hazarika also revealed that hypertension among tea garden workers is large, despite the community not being obese, 60.8% were hypertensive in the said study.[13]

A study by P.K. Borah in 2018 among Tea Garden workers revealed high (60.8%) prevalence of hypertension (HTN), which may be due to consumption of extra salt.[19] A mixed method study in 2021 on health care utilization of tea garden workers re-

vealed a multitude of barriers inhibiting healthcare services utilisation in spite of 47.3% and 15.3% having non-communicable and communicable diseases respectively.[20]

In the present, hypertension prevalence was lower than other tribal population in India, although similar to general population of India. Similar findings are seen in another study in 2013 among tea garden workers, here prevalence of hypertension was similar (44.4% vs. 45.2%) to general population but among those who had hypertension, prevalence of undiagnosed hypertension was higher in tea garden workers (82.8% vs. 74.4%)[5]

Conclusions

From the study it can be concluded that risk factors of cardio vascular disease are prevalent among these tribal population mostly female tea garden workers in spite of undernutrition, poverty, and heavy work. The iceberg of hypertension is something to worry and require timely strategies Tobacco and alcohol use, two of the major cardiovascular risk factors were high and awareness generation is the need of the hour.

Conflict of Interest

NIL

Funding

NIL

References

1. UN DESA Policy Brief No. 153: India overtakes China as the world's most populous country | Department of Economic and Social Affairs [Internet]. [cited 2023 Jun 23]. Available from: https://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-no-153-india-overtakes-china-as-the-worlds-most-populous-country/
2. India's escalating burden of non-communicable diseases - PubMed [Internet]. [cited 2023 Jun 23]. Available from: https://pubmed.ncbi.nlm.nih.gov/30292427/
3. The Tea Industry in India | IBEF [Internet]. India Brand Equity Foundation. [cited 2023 Jun 23]. Available from: https://www.ibef.org/blogs/the-tea-industry-in-india
4. Kandpal V, Sachdeva MP, Saraswathy KN. An assessment study of CVD related risk factors in a tribal population of India. BMC Public Health. 2016 May 25;16(1):434.
5. Mahanta TG, Joshi R, Mahanta BN, Xavier D. Prevalence of modifiable cardiovascular risk factors among tea garden and general population in Di-

brugarh, Assam, India. J Epidemiol Glob Health. 2013 Sep;3(3):147–56.

6. Misra PJ, Mini GK, Thankappan KR. Risk factor profile for non-communicable diseases among Mishing tribes in Assam, India: results from a WHO STEPs survey. Indian J Med Res. 2014 Sep;140(3):370–8.
7. Free 2023 ICD-10-CM Codes [Internet]. [cited 2022 Oct 2]. Available from: https://www.icd10data.com/ICD10CM/Codes
8. James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, et al. 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report From the Panel Members Appointed to the Eighth Joint National Committee (JNC 8). JAMA. 2014 Feb 5;311(5):507–20.
9. Arlappa N. Metabolic syndrome among elderly care-home residents in southern India: A cross-sectional study. WHO South-East Asia Journal of Public Health. 2016 Apr 1; 5:62–9.
10. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies - PubMed [Internet]. [cited 2023 Jun 24]. Available from: https://pubmed.ncbi.nlm.nih.gov/14726171/
11. Role of tea garden workers in rural development of Assam [Internet]. [cited 2023 Jun 24]. Available from: https://www.thepharmajournal.com/special-issue?year=2020&vol=9&issue=7S&ArticleId=4910
12. Banik SD, Bose K, Bisai S, Bhattacharya M, Das S, Jana A, Purkait P. Undernutrition among adult Dhimals of Naxalbari, West Bengal: comparison with other tribes of eastern India. Food Nutr Bull. 2007 Sep;28(3):348-52.
13. Biswas D, Hazarika NC, Hazarika D, Doloi P, Mahanta J. Study on Nutritional Status of Tea Garden Workers of Assam with Special Emphasis to Body Mass Index (BMI) and Central Obesity. Journal of Human Ecology. 2002 Jul 1;13(4):299–302.
14. Medhi GK, Hazarika NC, Shah B, Mahanta J. Study of health problems and nutritional status of tea garden population of Assam. Indian J Med Sci. 2006 Dec;60(12):496–505.
15. Artinian NT, Fletcher GF, Mozaffarian D, Kris-Etherton P, Van Horn L, Lichtenstein AH, et al. Interventions to promote physical activity and dietary lifestyle changes for cardiovascular risk factor reduction in adults: a scientific statement from the American Heart Association. Circulation. 2010

Jul 27;122(4):406–41.

16. Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet. 2015 Jan 10;385(9963):117–71.

17. Anand SS, Hawkes C, de Souza RJ, Mente A, Dehghan M, Nugent R, et al. Food Consumption and its Impact on Cardiovascular Disease: Importance of Solutions Focused on the Globalized Food System: A Report from the Workshop Convened by the World Heart Federation. J Am Coll Cardiol. 2015 Oct 6;66(14):1590–614.

18. Casas R, Castro-Barquero S, Estruch R, Sacanella E. Nutrition and Cardiovascular Health. Int J Mol Sci. 2018 Dec 11;19(12):3988.

19. Borah PK, Kalita HC, Paine SK, Khaund P, Bhattacharjee C, Hazarika D, et al. An information, education and communication module to reduce dietary salt intake and blood pressure among tea garden workers of Assam. Indian Heart J. 2018;70(2):252–8.

20. Rajput S, Hense S, Thankappan KR. Healthcare utilisation: a mixed-method study among tea garden workers in Indian context. Journal of Health Research. 2021 Jan 1;36(6):1007–17.