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Prevalence of Risk Factors of Non-Communicable Diseases (NCDs) Among Vulnerable Tribal Groups (PVTGs) in the Intensive Area of Rayagada District of Odisha, India

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Abstract

The tribal population in India too have high rates of hypertension and other risk factors of NCDs. Rayagada district, situated in the southern part of Odisha is home to diversified communities including scheduled castes and scheduled tribes with about 57% of the tribal population. It's hard-to-reach scattered geographical areas, most of these populations remain inaccessible to various benefits, information, education and communication activities. The study was a cross-sectional study conducted after the intuitional ethical approval. The study duration was from 1st May to 30th June 2022. A systematic random sampling method was used to collect the data from a calculated sample size of 3600 individuals. A predesigned and pretested questionnaire containing four sections used to collect the required data. The study tool was incorporated in Epicollect 5.0 and data was collected through android phones. A total of 3625 individuals were interviewed with 60.5% female subjects. Most (98%) were married and belonged to Hindu religion (97%). Majority (98%) of the respondents were BPL card holders. About 57 % were chewing tobacco and 26% were alcoholic. The prevalence of diabetes and hypertension was 2 % and 20 % respectively. More than 80% were physically active, 28% were under weight and 9 % were overweight. The education level was found to be very low that may be responsible for poor food choices. Higher tobacco consumption in the tribal community has a deleterious effect and more chances of getting non-communicable diseases.

Keywords: Prevalence, Non-Communicable disease, Risk factors, Vulnerable, Tribal.

Introduction

Non-Communicable Diseases (NCDs) are going to be a global burden by 2030. In 2016, nearly 70% (40·5 million) of the 56·9 million deaths worldwide were due to NCDs. Of these, more than a third was among people aged between 30 and 70 years, with an estimated 15·2 million (38%) deaths (1). The morbidity and mortality due to NCDs in the most productive phase of life is a serious challenge to Indian society. Fifty percent of all deaths and 62% of the total disease burden can be attributed to NCDs in India and their contribution to the burden of disease is projected to increase further during the next 25 years (2, 3). Most chronic diseases are equally prevalent in poor and rural populations. Although a wide range of cost-effective primary and secondary prevention strategies are available, their coverage is generally low, especially in poor and rural populations (4). In most countries, people who have a low socioeconomic status and those who live in poor or marginalized communities have a higher risk of dying from NCDs. Smoking rates, blood pressure, and several other NCD risk factors are often higher in groups with low socioeconomic status (5).

The tribal population in India too have high rates of hypertension and other risk factors of NCDs (6-8). Use of tobacco, alcohol and unhealthy dietary habits have been reported to be high among men and women in the tribal populations (9). Various factors attributed to poor tribal health outcomes in India are habitat, difficult terrain, ecologically

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variable niches, illiteracy, poverty, isolation, superstition and deforestation (10).

Rayagada district, situated in the southern part of Odisha is home to diversified communities including scheduled castes and scheduled tribes with about 57% of the tribal population. The tribal communities mainly belong to the Khonds and the Soras and are identified as Particularly Vulnerable Tribal Groups (PVTGs) (11). Irrespective of several interventions and programs for these communities, the district administration faces several challenges in terms of health, nutrition, education, and awareness. Because of its hard-to-reach scattered geographical area, most of these populations remain inaccessible to various benefits, information, education, and communication activities (12). Curative services are reported to function better in the district headquarters but not at the primary care centres due to a lack of trained workforce, a weak referral system, and poor community awareness (13).

Our objective of this study is to assess the prevalence of NCD risk factors among particularly vulnerable tribal groups (PVTGs) in the intensive area of Bissamcuttack block in the Rayagada District of Odisha.

Methodology

Study design

The study was a cross-sectional study. The study was approved by institutional ethical with reference no. Ref.no/IEC/IMS.SH/SOA/2022/394.

Study duration

The duration of the study was from 1st May to 30th June 2022.

Study population

Rayagada district has 11 blocks. The Bissamcuttack block with a population of about 69,639 was chosen as the study area due to high concentration of PVTGs (14). This survey was conducted as a part of a specially planned project titled 'Doorstep care for improving maternal, child, and adolescent nutrition and awareness on NCDs for ST-SC population with special focus on PVTGs'. The target population constituted adults in the age group of more than 30 years in the catchment area.

Sample size

Considering the total adult population of nearly 33461 in the catchment area, with a prevalence of hypertension from previous studies of 27.19% (ASSOCHAM study, unpublished, (15), with 99% confidence interval at 2% precision, the sample size was calculated as 3000. With a non-response rate of 20% the sample was inflated further to 3600.

Sampling technique

A systematic random sampling method was used. There were 4 primary health centres (PHC) in the block. A total of 8 sub centres with two sub centres from each of the PHCs were chosen randomly. Approximately, 12381 eligible subjects of aged more than 30 years were listed among total 56 anganwadi centres under 8 sub centres. Out of 56 anganwadi centres only 43 centres included for sampling and 13 were excluded as hard to rich and politically unstable area. In each angan wadi centre a screening camp organised by the help of local health workers with prior information for the desired target 90 persons per camp randomly. After getting the required sample size, the selected participants were invited to participate in the study. Data collection and the measurements were carried out at the respective anganwadi centres.

Study tool

A predesigned and pretested questionnaire was developed by adopting screening questions from NPCDCS Handbook for Counsellors, MOH, Government of India; and from the Module for MPW on prevention, screening, and control of common NCDs by MOH, Government of India (16). The questionnaire contained 44 items under 5 sections. The first section captured general information including the type of fuel used and addiction to tobacco and alcohol. The second section elicited information on both family history and past history of designated NCDs like diabetes, hypertension & cancers etc. or a history of medications for the same. The third section contained screening questions for NCD symptoms including stress. Questions on status of physical activity (PA) and dietary habits were in the section 4. In the end, physical examination was carried out including record of common anthropometric measurements, random blood

sugar, blood pressure and examination of the oral cavity and breast in section 5.

Data collection

Data was collected by one community facilitator and two volunteers for each of the sub centre along with the local accredited social health activist (ASHA) and Anganwadi workers. The study tool was incorporated in Epicollect 5.0, i.e., a web-based software for data collection. Data was collected through android phones. All field workers were trained on how to use the tool.

Data analysis

The Epicollect data was imported to Microsoft Excel format then analyzed by using SPSS version 27 (registered with the Department of Community Medicine, IMS & SUM Hospital, Bhubaneswar). For descriptive statistics, categorical data were expressed in terms of number and percentages and continuous data in terms of mean and standard deviation. Cross tabulation was done using crude odds ratio to find any significant association.

Results

The demographic, behavioural and clinical risk factors are described in the Table 1. There was a total of 3625 respondents, with 2186 (60.5%) female subjects. More number (32.8%) of the respondents belonged to the age group 30-40 yrs. Most (98%) were married and belonged to Hindu religion (97%). Majority (98%) of the respondents were BPL card holders. Around 67.7% were illiterate, followed by 24% of the respondents completed primary education. By profession most of them were farmers (34%) followed by daily labourer (33%). Most of the respondents used cow dung as fuel (63%) and only 15% used LPG.

Regarding addiction, 20% currently smoked, and among them most (40%) smoked twice a day followed by 20% of subjects smoked thrice a day. In contrast chewing tobacco was found among 57% respondents and among them most (30%) chewed tobacco once daily. Very few subjects (9%) agreed to have stopped tobacco use recently. Similarly, among the respondents 26% took alcohol and among them only 7% were daily or habitual drinker.

About 95% respondents had no family history of NCDs. Most (94%) of the respondents had no history of NCD or no history of taking any medication for the same. Evaluation of the presumptive symptoms of diabetes revealed that 33% had symptoms like blurred vision, tingling sensation, delayed wound healing etc.

Table 1: Demographic, behavioral and clinical risk factors among the study population

Demographic Variables				
Age group				
30 – 39 years	464 (39.0)	725 (61.0)	1189 (32.8)	0.249
40 – 49 years	393 (41.4)	556 (58.6)	949 (26.2)	
50 – 59 years	298 (41.2)	425 (58.8)	723 (19.9)	
> 60 years	284 (37.2)	480 (62.8)	764 (21.1)	
Currently married	1409 (39.5)	2155 (60.5)	3564 (98.3)	0.127
Religion				
Hindu	1403 (39.7)	2128 (60.3)	3531 (97.4)	0.440
Christian	34 (40.5)	50 (59.5)	84 (2.3)	
Others	02 (20.0)	08 (80.0)	10 (0.3)	
Education				
Illiterate	836 (34.1)	1618 (65.9)	2454 (67.7)	0.0001*
Primary	429 (48.8)	451 (51.2)	880 (24.3)	
Secondary	169 (60.1)	112 (39.9)	281 (7.8)	
Higher secondary & above	05 (50.0)	05 (50.0)	10 (0.3)	

Holding a BPL card	1426 (39.9)	2144 (60.1)	3570 (98.5)	0.014*
Occupation				
Agriculture	764 (62.6)	456 (37.4)	1220 (33.7)	0.0001*
Manual labour	80 (6.6)	1127 (93.4)	1207 (33.3)	
Unemployed/Home Maker	49 (60.5)	32 (39.5)	32 (0.9)	
Others (Service/Business etc.)	546 (48.9)	571 (51.1)	571 (15.8)	
Behavioural risk factors				
Type of fuel used				
(More than one response)				
Wood or Cow dung	1187	1847 (60.9)	3034 (83.7)	0.286
Kerosene	(39.1)	770 (59.6)	1293 (35.7)	
LPG/Biofuel	523 (40.4)	39 (52.7)	74 (2.0)	
	35 (47.3)			
Smoking	394 (55.6)	315 (44.4)	709 (19.6)	0.0001*
Chewing Tobacco	932 (45.3)	1125 (54.7)	2057 (56.7)	0.0001*
Habit of drinking Alcohol				
No/Stopped for 12 months	914 (31.9)	1948 (68.1)	2862 (79.0)	0.0001*
Yes, but infrequent	472 (69.0)	212 (31.0)	684 (18.9)	
Yes, daily	53 (67.1)	26 (32.9)	79 (2.2)	
Physical activity	182 (29.1)	444 (70.9)	626 (17.3)	0.0001*
Frequency of Fruits/Veg				
No	34 (47.2)	38 (52.8)	72 (2.0)	0.417
1 or 2 times a week	1198	1829 (60.4)	3027 (83.5)	
3 to 5 times a week	(39.6)	319 (60.6)	526 (14.5)	
	207 (39.4)			
Extra salt intake	978 (39.9)	1475 (60.1)	2453 (67.7)	0.758
Junk food consumption				
No	11 (57.9)	8 (42.1)	19 (0.5)	0.004*
Sometimes	718 (42.1)	988 (57.9)	1706 (47.1)	
Frequently	710 (37.4)	1190 (62.6)	1900 (52.4)	

**P-<0.05*

Evaluation of the presumptive symptoms of oral cancers revealed that about 7% had difficulty in opening of mouth, while on examination 5% had white patches in their mouth. Shortness of breath was reported by 12% of the respondents. About a quarter of the respondents (24%) admitted that they were under stress. Very few (2%) had random blood sugar of more than 200. Systolic blood pressure (SBP) of more than 140 mm hg was found in 25% of the surveyed population, while diastolic blood pressure (DBP) of more than 90 was found in 20% of respondents) (Table 2). On evaluation of body mass index (BMI), 28% were found to be under weight and only 9% were pre-obese (Figure 1 and Figure 2).

More than 80% of the respondents admitted that they were physically active with an engagement in moderate to severe physical activity for a minimum of 30 minutes/day, 5 days week. The source of food for most of the families was from the local market and from public distribution system i.e., 46% and 20% collect their food from local market as well as from forest and kitchen garden. About 82% agreed that they took sufficient fruits or vegetables in their diet. Most of the respondents (83%) took adequate fruits and green leafy vegetables two times a day. Fifty two percent agreed to have taken junk food rarely and 47% took junk foods once or twice per week. Around 32% respondents took extra salt with their diet. Major food group combinations were found to be cereals with vegetables (53%) followed by cereals with pulses (30%) (Table 3).

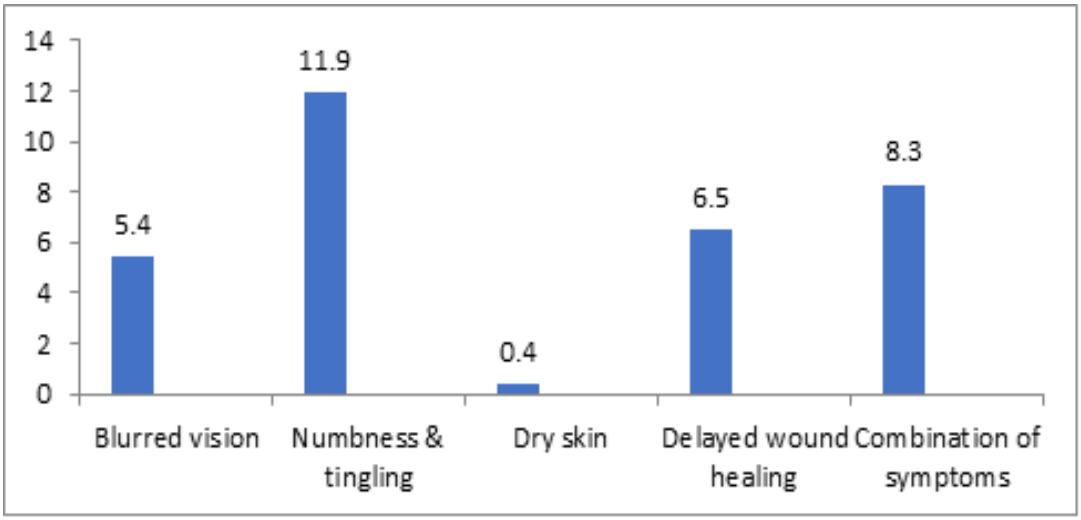

Figure 1: Distribution of symptoms of diabetes mellitus (in percentage)

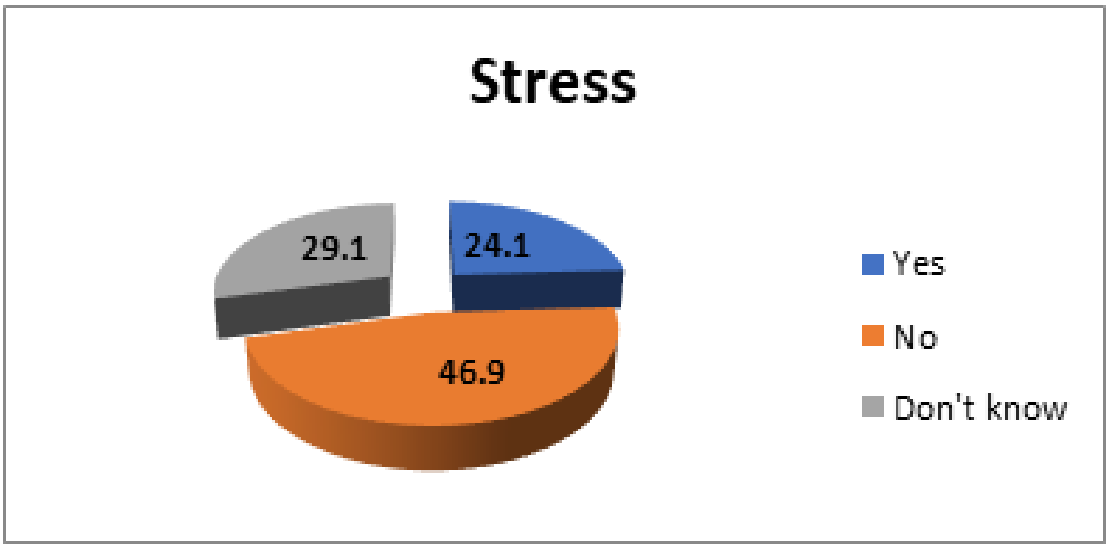

Figure 2: Distribution of stress among study population

Table 2: Association of socio demographic factors and habit with clinical risk factors

Sl. No.	Demographic & Behavioral parameter	Diabetes (RBS > 200)	Hypertension (B.P> 140/90)	Overweight BMI >25 kg/m²	Abdominal Obesity WC > 102cm
1	(Number of subjects)		Crude Odds Ratio (95% CI)		
	Age Group				
	<50yrs (2138)	1	1	1	1
	>50yrs (1487)	5.47 (3.23 - 9.25)	2.41 (2.07 - 2.81)	0.92 (0.59-1.44)	1.24(0.76-2.01)
2	Gender				
	Female (2186)	1	1	1	1
	Male (1439)	1.03 (0.66-1.60)	1.46 (1.24-1.72)	0.79 (0.50-1.25)	0.51 (0.29-0.88)

3	Marital status				
	Unmarried (61)	1	1	1	1
	Married (3564)	1.01 (1.01-1.02)	1.90 (0.93 -3.87)	0.32 (0.11-0.92)	0.54 (0.13 -2.29)
4	Education				
	>10th standard (242)	1	1	1	1
	<10th standard (3299)	0.86 (0.34-2.15)	1.67 (0.90-1.60)	1.66 (0.82 -3.36)	1.61 (0.72 -3.56)
5	BPL card				
	No (55)	1	1	1	1
	Yes (3570)	2.48 (0.76-8.12)	1.67 (0.93-3.01)	0.77 (0.10-5.69)	1.01 (1.01 -1.02)
6	Junk food				
	No (1706)	1	1	1	1
	Yes (1900)	0.54 (0.34-0.86)	1.17 (1.01-1.37)	1.06 (0.68-1.64)	1.77 (1.08-2.91)
7	Extra Salt				
	No (2390)	1	1	1	1
	Yes (1151)	1.44 (0.87-2.37)	1.20 (1.02-1.42)	0.81 (0.51-1.27)	1.53 (0.87-2.70)
8	Physical Activity				
	No (626)	1	1	1	1
	Yes (2999)	0.42 (0.19 - 0.93)	1.37 (1.13-1.66)	1.31 (0.77-2.23)	1.39 (0.77-2.48)
9	Smoking				
	No (2854)	1	1	1	1
	Yes (687)	0.67 (0.41-1.11)	0.70 (0.57-0.85)	1.82 (0.93-3.54)	2.10 (0.95-4.62)
10	Chew tobacco				
	No (1568)	1	1	1	1
	Yes (2057)	1.38 (0.89-2.13)	1.02 (0.86 -1.20)	1.68 (1.09-2.60)	2.23 (1.35 -3.68)

Table 3: Consumption of fruits and vegetables and major food groups among study population

Character	Frequency	Percentage
Frequency of fruits and vegetable consumption		
Never	72	2.0
1-2 times a day	3027	83.5
3-5 times a day	522	14.4
>5 times a day	4	0.1
Consumption of food groups		
Only Cereals	398	10.9
Cereals with pulses	1112	30.5
Cereals and vegetables	1951	53.5
Others	189	5.1

Discussion

Assessing the NCD risk factors and screening of particular vulnerable tribal group is first type of study in the State of Orissa. Most of the respondents belonging to 30-50yr age group indicates older people were reluctant to respond. Female respondents are more because during visit of health workers male were away from home because of work or other activities. On the ground of BPL card holder, it can be concluded that most of the families were poor. Education level is very low as 68% were illiterate and only 12% above the high school which is similar to study conducted by P Sanjeev among kani tribe, i.e., 76% were illiterate (17). Cow dung used as fuel by most of the respondents which may be the cause of symptoms of lung disease or COPD like shortness of breath which was 12% in this study. Regarding addiction chewing tobacco (30%) is more common than smoking (20%) or alcohol (27%) which is directly related to oral cancer symptoms like difficult to open mouth and white patch inside mouth was found to be 7% & 5% respectively. Similar study done by Thankapan *et al.,* where smoking and alcohol were found to be 28% and 15% respectively (18). Nearly 24% respondents admitted that they are under stress and also 25% were found to be hypertensive which may be directly related. On evaluation of BMI about 28% found to be underweight which need further evaluation and 9% over weight. In another study conducted by Negi *et al.,* and Mishra *et al.,* overweight was found to be 38% and 15% respectively which is very high value in comparison to current study (19, 20). Similarly, the prevalence of hypertension in our study population (20%) was also found to be less than that was reported 40% and 30% by Mashreen *et al.,* and Prabhakaran et al respectively (21, 22).

The odds ratio from cross tab analysis suggested, male sex, higher age and the habit of tobacco consumption are found to have higher chances of getting non communicable diseases, whereas higher education, marital status and better socioeconomic status were found to be protective factors (23, 24). Cereals with vegetables are the commonest food groups. The intake of fruits & vegetables and physical activity was found to be adequate, i.e., 80%.

Conclusions and recommendations

The education level was found to be very low that may be responsible for poor food choices. Awareness generating campaigns specifically focusing on NCD prevention must be looked at. Adequate deliverance of National programs on early detection and prevention of NCD would supplement to handle the observed community specific risk factors like tobacco, alcohol, obesity at grass root level. Stress, mental health issues and their sequels like hypertension can be dealt through structured counselling and health education. Nutritional surveillance and assessment would be helpful not only to observe the under nutrition but also to identify the concurrent nutrition transition in the PVTGs.

Abbreviations

Nil.

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Authors' contribution

Bikash Chandra Nayak: Concept,data acquisition, data analysis; Smaraki Mohanty: literature search, manuscript edit; Guru Krushna Mohapatra: Manuscript preparation, manuscript review; Satyajit Mohanty: literature search, manuscript review; Venkatarao Epari (VE): Concept, manuscript edit, manuscript review; Swapan bikas Saha: Concept, manuscript review; Snehaprava Mahapatra: literature search, data analysis.

Conflict of interest

Nil

Ethical approval

The study was approved by institutional ethical with reference no. Ref.no/IEC/IMS.SH/SOA/2022 /394.

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