

Original Research Article

A cross-sectional study on socio-demographic status and status of non-communicable diseases among tribal community of Tamia block in Chhindwara district

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ABSTRACT

Background: Madhya Pradesh hosts a large tribal population with diverse traditions and socio-demographic characteristics. Tribal communities across India are increasingly affected by non-communicable diseases (NCDs). This study aimed to assess the health status, socio-demographic profile, living conditions, and prevalence of NCDs among the tribal population in selected villages of Tamia block, Chhindwara district.

Methods: An observational cross-sectional survey was carried out between July 2021 and March 2022 (total 09 months) after approval from the Institutional Ethical Committee. A door-to-door household survey was conducted by the Institute's team across 118 field visits, covering 5953 individuals from 1175 households.

Results: The surveyed population had nearly equal male–female distribution, with a higher proportion (28.1%) in the 18–30 years age group. Most households (75.8%) lived in kutchha houses, reflecting poor living conditions. The overall prevalence of anemia was high (54%), with females more affected (47.13%) than males (6.88%). Among NCDs, osteoarthritis (10.52%) was most common, followed by hypertension (5.96%). Access to basic amenities such as safe drinking water, cooking fuel, sanitation facilities, and proper drainage was inadequate. Open drainage systems and poor environmental hygiene further posed risks for disease spread.

Conclusions: The tribal population of Tamia block was found to have unsatisfactory living conditions, limited access to health and education facilities, and inadequate basic amenities, contributing to a higher disease burden. The findings highlight the urgent need for strengthening policies and programs focused on tribal welfare, with emphasis on education, sanitation, and prevention and control of NCDs.

Keywords: Tribal health care, Madhya Pradesh, Household, Non-communicable diseases

INTRODUCTION

There are 104 million tribal people in India. Spread across 705 tribes, they account for 8.6% of the country's total population. Madhya Pradesh being one of the most tribal populated states in India and has the highest tribal

population in the country touching a galloping number of 15.31 million and covering 21.1% of the state's population.¹ Tribal communities cannot be assumed and clubbed together as one homogeneous group. They belong to different socio-cultural and ethnic-lingual groups, having diverse faith and are at different levels of development-economically, educationally, culturally and

politically. They inhabit the different ecological and geo-climatic conditions of varied regions of the country.² Their way of life is culturally distinct, and they mostly reside in isolated rural hamlets in mountainous, forested, or desert places with challenging terrain. Tamia is a hilly block located in the heart of the Chhindwara district. Due to its geographical and attractive beauty, it has come to be considered as a treasure house. It houses an ancient and rare collection of artifacts belonging to the tribes of the district.³ The majority of indigenous people live in poverty with little access to even the most basic amenities, especially health care. In the previous decades, various contributors have worked on communicable disease shown high burden of infectious diseases like malaria and tuberculosis in tribal community but recent study suggested a high burden of NCD leading cause of deaths accounted for most of the deaths (66%), followed by infectious diseases (15%) tribal community in India.^{4,5} There is a need for continuous efforts from all stakeholders of the governance to search NCDs risk factor in tribal community. The Central Council for Research in Ayurvedic Science administered the Tribal Health Care Research Programme (THCRP) across 14 states through 14 affiliated institutes as one of the humongous programs run by Ministry of AYUSH, Government of India for the improvement of the tribal community across the nation.⁶

Objective

The present study aimed to assess the health status, socio-demographic status, living conditions and status of non-communicable diseases among tribal community in selected villages of Tamia block in Chhindwara district, Madhya Pradesh.

METHODS

Study design

This is an observational cross-sectional survey study conducted between July 2021 and March 2022 (total 09 months) with due approval from the institutional ethical committee (IEC clearance number: F.No.: 5-5/2021-22/RARI-Gwl/Tech/547 dated 25.06.2021).

Study setting

A door-to-door survey was conducted by the THCRP team. The seven villages (Mankadei, Jhilpipariya, Jogimuar, Khulsan, Lahgadua, Muttur, and Nagri) of Tamia block in Chhindwara District, Madhya Pradesh were surveyed through 118 visits in the duration of 9 months.

Participants

Total 5953 participant of all age groups and both sex were included for the study belonging to a tribal

community of seven villages of Tamia block by purposive sampling method.

Variables

Qualitative variables

In this current study various socio-demographic variables were included such as age, sex, place of residence, marital status, religion, educational status, caste, socio-economic status, and various types of non-communicable disease and information regarding living condition of the people, types of houses they live, sources of drinking water, sanitary facilities, prevention from vector borne diseases, drainage system, types of fuel used for cooking etc were recorded.

Qualitative variables

Haemoglobin percentage, blood sugar level, height & weight for BMI grading, blood pressure level etc were recorded. All categorical variables were presented in frequencies and percentages.

Data source/measurement

Selected seven villages were visited weekly by a dedicated team of project comprising of doctors and other personnel trained for the field survey to conduct population survey. The officials of health department and administrative of district, block and villages concerned were informed in advance for conducting visit, collecting data, organizing awareness & health camps. The data of individuals, households and villages were captured on health status, socio-demographic status, living conditions and status.

Non-communicable diseases using uniform proforma for the purpose, the team visited tribal population of these seven villages and face to face interviews were conducted using structured questioners regarding all variables. Verbal informed consent was taken from the participants prior to collecting any related information for the study. For those who were younger than age 18, parental consent was obtained. The automatic glucometer gluconolite for random blood sugar level, automatic haemoglobinometer mission for haemoglobin level and manual sphygmomanometer for recording blood pressure were used. Measuring tape and digital weighing scale were used to record BMI grading. Privacy and confidentiality of the interviews and information gathered was assured for all participants.

Bias

The enrolment of participant was done on the basis of information provided by them and/or cast mentioned in their ration card or panchayat document, so chances of selection bias are there. The project staffs were trained to

conduct survey and documentation of data to minimize bias.

Sample size

Considering the prevalence (p) of NCD in selected population is 50%. A margin of error (e) is taken as 2% in the estimation of prevalence. The required sample size is calculated by below formula

$n = ((Z^2)(\alpha/2) \times (p)(1-p)) / e^2$, Where $Z_{(\alpha/2)}$ (Value of normal variate) = 1.96 (α is the level of significance) $n = 2401$.

The sampling will be performed through the cluster sampling procedure so a design effect of 2 is considered in the sample size and required sample size is $2401 \times 2 = 4802$. Adding a non-response rate of 20% in the data collection, required sample size will be $4802 + 961 = 5763$ (Approximately 5800)

Statistical method

Data was coded and entered using Excel software package in the computer. Collected data analyzed with the help of excel by using different quantitative methods and descriptive statistical methods.

RESULTS

A total 5953 study participants were surveyed for this current study. Table 1 summarizes the key socio-demographic characteristics of the participants. Both Male and female were found almost equal in proportion. Participants in age group 18-30 years were found higher in proportion (28.1%) followed by 40 years and above (25.4%). Finding of the table shows that half of the adult participants were married and approximately 47% participants were single. Adult participants with no formal schooling were found higher in proportion (31.7%) as compare to others and participants having higher education (graduate and above) were found second lowest in proportion (4.1%).

In occupation, 27.4% participants were students followed by employed 25%, house maker 21% and unemployed 15.4%. Finding of the Table 1 also shows that 26.32% participants were chewing tobacco followed by Alcohol 14.68%. In this tribe, the predominant dietary choice is non vegetarian, with a relatively low consumption of fruits which has been shown in more than 50% surveyed

population. Finding of the Table 2 shows that 1175 household were covered in this present study, among them 75.8% house hold had kutchha houses, 23.8% had semi pucca houses and significantly lower proportion of the household had pucca houses; more than half (58.1%) of the households were depend for their source of drinking water supply on public tap/community plant followed by tube well/borehole/well (22.5%) and house tap (19.4%); more than half of the participants (54%) had adequate source of ventilation in their houses.

Majority of the household (81.8%) did not using any method for drinking water purification whereas approximately 13% of the household were using cloth and 5.3% were using boiling method for drinking water purification; 41.2% household had no toilet facility i.e., they go for toilet in open field whereas 58.8% household had toilet facility out of which 16.8% of the household had toilet facility inside the house and 42% household had toilet facility outside the house; most of the household had open/surface drainage facility whereas 19.2% of the household had closed/ covered drainage system and three-fourth of the householders was using LPG as a cooking fuel whereas one forth was using wood coal/cow dunk cake as a cooking fuel.

Table 3 shows that more than half (62.7%) of the household were using normal net for prevention of vector born disease whereas one fourth of the household were using coil and 11.4% were not using any prevention for vector born disease. Finding of Table 4 shows that out of total population 918 (22.6%) were overweight having (BMI-25.0-29.9), and 59 (1.46%) people were having grade I obesity (BMI-30-34.9). Finding of Table 5 reveals that out of 959 screened participants for anaemia, 52.13% (6.36 % male and 45.77% female) were anaemic (Hb% level was 8–10.9 g/dl) followed by sever 1.88% anaemic (Hb% level was <8 g/dl).

Out of 953 screened participants for diabetes, most (96.53%) were having random glucose level <140 mg/dl followed by 3.25% participants having random glucose level 140-199 mg/dl (Table 6). Table 7 shows that the physical activity of most of the participants (68.50%) were sedentary followed by 21.30 moderate and 10.20% vigorous activities. Table 8 reveals that Osteoarthritis (10.52%) was one of the most prevalent non-communicable diseases in the area followed by hypertension (5.96%). Table 9 shows that most findings of the non-communicable diseases in the age of 41 years and above.

Table 1: Socio-demographic status of surveyed population in 7 villages.

Variables	Number (%)
Gender	
Male	2995 (50.3)
Female	2958 (49.7)
Age group (in years)	
0-10	1069 (18.0)

Continued.

Variables	Number (%)
11-18	824 (13.8)
18-30	1672 (28.1)
31-40	878 (14.7)
40 and above	1510 (25.4)
Marital status	
Single	2794 (46.9)
Married	2978 (50.0)
Divorce/separate	07 (0.1)
widow	174 (2.9)
Educational status*	
No formal schooling	1886 (31.7)
Below primary	196 (3.3)
Primary to middle	853 (14.3)
High school-intermediate	878 (14.7)
Graduate and above	247 (4.1)
Occupation	
Unemployed	918 (15.4)
Employed	1489 (25.0)
Student	1630 (27.4)
House maker	1251 (21.0)
Others	665 (11.2)
Type of addiction**	
Tobacco chewing	1567 (26.32)
Smoking	399 (6.7)
Alcohol	874 (14.68)
None	4090 (68.7)
Diet	
Non-vegetarian	3060 (51.4)
Rarely fruit consumption	3143(52.7)

*Represent 1329 school going children and 564 were children with no schooling. **Represents multiple response are allowed.

Table 2: Information about type of houses, source of drinking water, ventilation, water purification, toilet facility, drainage facility and fuel used for cooking.

Type of house	Number of house hold	Percentage of house hold
Kutchra	891	75.8
Semi pucca	280	23.8
Pucca	4	0.4
Source of drinking water		
House tap	228	19.4
Public tap/community plant	683	58.1
Tube well or borehole or well	264	22.5
Ventilation in household		
Adequate	635	54
Non adequate	540	46
Method of drinking water purification		
Boil	62	5.3
Cloth straining	152	12.9
None	961	81.8
Toilet facilities		
Inside house	198	16.8
Outside house	493	42.0
Open field	484	41.2
Drainage facility		
Open/ surface drainage	949	80.8

Continued.

Type of house	Number of house hold	Percentage of house hold
Closed/ covered drainage system	226	19.2
Fuel used for cooking		
LPG	873	74.3
Wood coal/ Cow dung cake	302	25.7

Table 3: prevention used for vector born disease.

Vector born disease prevention	Number of households	Percentage
Normal Net	737	62.7
Coils	304	25.9
None	134	11.4

Table 4: Nutrition and Obesity Status (n-4060).

Age group (in years)		Number of screened populations		BMI grading							
				Underweight (Below 18.5)		Normal (18.5-24.9)		Overweight (25.0-29.9)		Obesity I (30.0-34.9)	
		M	F	M	F	M	F	M	F	M	F
Above 18-30	N	860	812	6	11	577	751	263	40	14	10
	%	42.16	40.2	0.7	1.4	67.09	92.49	30.58	4.93	1.63	1.23
31-40	N	438	440	0	7	115	402	309	28	14	3
	%	21.47	21.78	0	1.59	26.26	91.36	70.55	6.36	3.2	0.37
41 and above	N	742	768	35	123	448	608	249	29	10	8
	%	36.373	38.02	4.72	16.02	60.38	79.17	33.56	3.78	1.35	1.04
Total	N	2040	2020	41	141	1140	1761	821	97	38	21
	%	50.25	49.75	1	3.47	28.08	43.37	20.22	2.39	0.94	0.52
	%	100		4.47		71.45		22.61		1.46	

Table 5: Anemia screening status (n-959).

Age group (in years)	Number of screened populations		Haemoglobin status (g/dl)							
			M ≥13	F ≥12	M 11-12.9	F 11-11.9	M 8-10.9	F 8-10.9	M <8	F <8
	M	F								
Above 18-30	27	171	7	63	12	49	6	56	2	3
31-40	55	175	27	34	20	36	7	102	1	3
41 and above	183	348	35	18	98	42	48	281	2	7
Total	265	694	69	115	130	127	61	439	5	13
N (%)	27.63	72.37	7.19	11.99	13.56	13.24	6.36	45.77	0.52	1.36
	100%		19.18%		26.80%		52.13%		1.88%	

Table 6: Random plasma glucose (mg/dl) (n=953).

Glucose level mg/dl		Age group						Grand Total
		31-40 years		41 years & above		Total Number		
		M	F	M	F	M	F	
<140	N	108	108	349	355	457	463	920
	%	11.33	11.33	36.62	37.25	47.95%	48.58%	96.53
140-199	N	1	2	19	9	20	11	31
	%	0.1	0.2	1.99	1.94	2.1%	1.15%	3.25
≥200	N	0	0	0	2	0	2	2
	%	0	0	0	0.2	0%	0.2%	0.2

Table 7: Physical activity status.

Age group (in years)	Physical activity			Total number
	Vigorous	Moderate	Sedentary	
Above 18-30	256	430	986	1672
31-40	123	231	524	878
41 and above	35	204	1271	1510
Total number	414	865	2781	4060
N (%)	10.20	21.30	68.50	100

Table 8: Prevalence of non-communicable diseases among surveyed population (n=4060).

Type of NCD	Number**	Percentage
Hypertension	242	5.96
Diabetes	28	0.69
Stroke	2	0.05
COPD/ Asthma	5	0.12
Osteoarthritis	427	10.52
None	3381	83.28

** Represents multiple response are allowed

Table 9: Age wise distribution between isolated systolic hypertension (ISH) and osteoarthritis.

Age group (in years)	Isolated systolic hypertension (ISH) (≥ 140 / <90)		Osteoarthritis	
	M	F	M	F
Above18-30	3	0	0	0
31-40	14	5	1	2
41 and above	153	81	183	220
Total number	170	86	184	222

DISCUSSION

Because of a number of socio-economic reasons and lack of access to contemporary healthcare services, the health situation of Madhya Pradesh's tribes continues to be a major concern. The present study aimed to assess the socio-demographic status, living conditions and status of non-Communicable diseases among tribal community in selected villages of Tamia block in Chhindwara District, Madhya Pradesh.

The data were collected from diverse tribal populations, confirming the changing disease burden irrespective of geography and cultural differences. Finding of this study revealed that majority of the participants (31.7%) had no formal schooling and this finding is supported by a study conducted in Andhra Pradesh on tribal communities.⁷ There are not much more differences in male and female ratio as previous studies say that male population is slightly higher than female population.⁸ The data of this study showed that tribal population, particularly in this area, had extremely inadequate standards of living for essential household amenities like housing, a source of drinking water, drainage facility, fuel used for cooking, and toilets. This study reveals that prevalence of anemia in the area was 54% (6.88 % male and 47.13% female), which is also observed in previous study conducted in three districts of

Madhya Pradesh including Chhindwara district, anemia disease was found more than 50% in studied population and ratio of female effected was more than male.⁹ Finding of the study revealed that prevalence of osteoarthritis was highest and prevalence of hypertension was second highest. In present study, the age more than 40 years, overweight as per BMI grading, lesser fruit consumption and non-vegetarian diet were found to be risk factors for hypertension by logistic regression, it also reflected in previous study.¹⁰ Increasing age, non-vegetarian diet, least fruit intake is the most important risk factor in most studies.¹¹ Previously research work shown increased age and over weight is strong risk factor associated with osteoarthritis which has been also shown in this study.¹² In the previous decades, the tribal population had a high burden of infectious diseases such as tuberculosis and malaria.¹³ Several recent studies from various tribal regions in India suggest a high burden of NCD risk factors, potentially leading to a high proportion of deaths due to NCD.¹⁴⁻¹⁷

Limitations

The participants and house hold were selected by convenient sampling method, thus there may be limitation of sufficient representation of population. The survey was convened with the help of uniform format as per information provided by the participants so there may be

chance of information bias while drawing conclusion. The study faced inherent limitations due to the limited feasibility of conducting laboratory tests for differential diagnoses or prognosis of various diseases.

CONCLUSION

Current study provides evidence for the need for investment in the health system to cater to the burden of NCDs and the involvement of communities to increase awareness regarding risk factors. In selected villages the living condition of majority of scheduled tribe population was not good. They had inadequate access to education and the basic amenities such as house facility, source of drinking water supply, fuel used for cooking, toilets within or outside the house, etc we're not available adequately. Open drainage system is not good for the healthy environment and may lead to diseases among the tribal community. This study can be helpful for the modification in policies and programs of tribal schemes in the context of education and sanitation as well as prevention and control of non-communicable disease.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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