



Research Article

A cross-sectional observational study on socio-demographic and health status of SC population in selected villages of Gwalior and Bhind Districts

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Abstract

Background: In India, the Scheduled Castes (SCs) constitute a significant portion of the population, historically marginalized due to social and economic factors. The Scheduled Castes (SC) make up 15.62% of Madhya Pradesh's total population, highlighting their significant presence in the state. Understanding the socio-demographic and health status of the SC population is crucial for formulating effective policies and programs aimed at addressing their unique needs and improving their overall well-being. **Objective:** The study aimed to generate demographical and epidemiological data of Scheduled Caste (SC) people in the selected area, along with screening of adult SC population for hypertension, anemia, diabetes and obesity. **Materials and Methods:** The study was conducted in nine SC populated villages of Gwalior and Bhind districts of Madhya Pradesh during the period of 2020-21. For this purpose, the study team conducted door to door survey and data was collected methodically from participants after informed consent through a standardized format. Data regarding population, personal hygiene, food habits, occupation, addictions etc. was collected. The collected data underwent thorough analysis using descriptive statistical methods, encompassing measures of frequency and data position. **Results:** The data showed inadequate drainage, drinking water purification at home, insufficient health care services and low literacy rate specially in woman. Majority of the people were not having any non-communicable diseases. Hypertension/CVD was the commonest non-communicable disease. 92.1% of population had normal Body Mass Index and Obesity was observed in only 0.2% population. Males were found to be more anemic than females. **Conclusion:** By shedding light on the socio-demographic and health-related disparities faced by the SC population in Gwalior and Bhind districts, it can be concluded that literacy rate should be improved in females and more attention to be paid towards anemia in males. Hypertension or prehypertension was also reported in considerable population which may be due to COVID outbreak and again a study regarding its prevalence may be planned. These diseases may be attributed to poor personal hygiene, lack of health awareness including hazards of addictions, low socio-economic conditions and insufficient primary health care services.

Keywords: Ayurveda Mobile Health Care Programme, Bhind, Gwalior, Health Demography, Madhya Pradesh, Schedule Caste Sub Plan.

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Introduction

Scheduled Castes (SCs) in India represent a historically marginalized group facing significant socio-economic disparities,

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including inadequate access to healthcare services. Studies have shown that SC individuals often seek healthcare due to issues such as malnutrition, lack of access to clean drinking water, poor hygiene practices, and inadequate environmental sanitation (1). These health challenges are exacerbated by factors such as illiteracy, poverty, lack of awareness about preventive healthcare measures, and a reluctance to utilize available health facilities

The Scheduled Caste (S.C.) population in Madhya Pradesh is recorded at 11,342,320, constituting 15.62% of the total population (2). In Gwalior district specifically, the S.C. population

is 393,068 with 210,354 SC males and 182,714 SC females (3). Of this population, 161,091 live in rural areas (4). In Bhind district, the S.C. population is 3,74,799, out of which 90,300 S.C. individuals reside in urban areas, while 2,84,499 live in rural areas (5). The above statistics shows the substantial proportion of SC population in India which shows the importance of determination of their demographic and health status. Poor sanitation infrastructure and contaminated water sources contribute to the high incidence of waterborne illnesses, including diarrheal diseases and typhoid fever (6,7).

This cross-sectional observational study aims to provide a comprehensive understanding of the socio-demographic characteristics and health status of the SC population residing in selected villages of Gwalior and Bhind districts. By examining factors such as education, occupation, housing conditions, and healthcare utilization patterns, the study seeks to identify the underlying determinants of health disparities among SC communities in these regions.

Objectives

The primary objectives of the study included collecting comprehensive information pertaining to study the Socio-Economic status, living conditions, educational status, dietetic habits and lifestyles of scheduled caste population along with screening of non-communicable diseases in the community.

Materials and methods

Study design: This is an observational, cross-sectional survey study planned after due approval from the institutional ethical committee and local authorities of selected areas.

Ethical Approval No. 2-5/2020-21/RARIDD-Gwl/Tech/658 dated 29.06.2020

Study Setting: Six villages (Behat, Mughalpur, Dhamnika, Khediraimal, Bhavanpur and Chirpur) from Gwalior district and three villages (Sherpur, Banipur, Chharenta karvas) from Bhind district with majority of SC population were taken under this programme.

Time frame: The study was conducted for a period of during July 2020 to March 2021 after obtaining the approval of the Institutional Ethics Committee.

Study Population: People belonging to the Scheduled Caste population of selected villages/ areas and willing to participate in the survey were included in the study.

Sample size: A random sample size of about 6000 SC population was selected to know the general health-related socio-demography and 2000 adult SC population for screening of Hypertension, Diabetes, Anemia and Obesity which represented the SC population of selected villages.

Sampling method: The method used was convenient sampling data collection method.

Variables: Type of house, Ventilation, Drinking Water Source, Drinking Water Purification, Toilet Facilities, Vector borne disease prevention, Drainage Facility, Fuel for cooking, Marital status, Educational Status, Dietary habits, Addiction, Hygiene, Exercise trends, non-communicable diseases, Disability status and Personal health information.

Statistical method: A descriptive statistical method was applied, incorporating numbers, measures of frequency, percentage and data position.

Study tools: Structured questionnaires were utilized to gather demographic details, lifestyle choices, and health-related information from the participants.

Data Collection Method: Before initiating the study, the program details and survey schedule were communicated to the local authorities in these areas to ensure the program's effective implementation. The dedicated trained team conducted weekly tours in the selected villages to gather essential demographic details through structured aligned with the objectives of the program, encompassing socio-economic status, living conditions, educational status, dietary habits, lifestyles, and health care-seeking behavior of SC women and children.

The collected information covered various aspects, including (i) Status of basic house facilities in the village, such as the type of house, ventilation, drinking water source, purification methods, toilet facilities, vector-borne disease prevention, drainage, and cooking fuel used. (ii) Socio-demographic data, encompassing age, sex, marital status, education, occupation, dietary habits and addiction. (iii) Adults were screening for Anemia, Hypertension Diabetes and Obesity.

Hypertension: Blood pressure measurements were obtained using an Oscillo-metric digital automatic device (AccuSure). Two measurements were taken at one-minute intervals on the participant's right upper arm after 2 minutes of seated rest. The mean of the two recordings was used for analysis.

Obesity: Height was measured wearing light clothing and without shoes with a standard height- measuring tape with marking upto 0.1 cm and Weight was measured using electronic weighing scales to the nearest 0.1 kg. BMI was calculated from their height and weight (kg/m²).

Diabetes: Random Blood Sugar levels were checked using capillary blood and testing done by GlunNeo Lite (Osang Healthcare)

Anemia: hemoglobin was measured using capillary blood taken from the fingertip and directly tested using Mission Hb Hemoglobin testing meter. For capillary testing, care was taken to remove the first drop of blood with a sterile cotton swab, and avoid undue pressure on the finger to prevent hemodilution. The instrument was calibrated regularly as per Instructions given by manufacturer.

Utmost care was taken regarding covid protection by using all measures as per the government guidelines.

Bias: Data was collected through structured proforma having both closed and open-ended questions to counter recall bias. Screening was performed using the same type of apparatus/ instrument and followed the same standard procedures.

Observations and Results

Total 185 visits were conducted to survey 1253 houses covering total 6279 adult population with 3397 males and 2882 females. All adult population willing to undergo respective screening procedure was carried out. [Table 1]

Table 1: Distribution on population surveyed (n=6279)

Gender	Numbers	Percentage
Male (above 18 years)	3397	54.10%
Female (above 18 years)	2882	45.90%
Total (n)	6279	100%

Basic Household facilities

The data shows that 28.6% houses were kutchha houses and 33.8% houses were having inadequate ventilation. 79.3% families were using non-purified water with tube well/ borewell/ wells being the primary source of drinking water (60.3%). In regard to sanitation facilities 92.6% households were having attached pukka toilets

either inside or outside the house. A significant portion of families (91.3%) did not employ preventive measures for vector-borne diseases. Open drainage system was observed in 46.2% and indiscriminate disposal in the open was observed in 52.3% households. In terms of cooking fuel, LPG was the most commonly used fuel in the majority of houses (84.5%). [Table 2]

Table 2: Showing basic household information (n=1253)

Sr. No.	Information	Items	Number	% out of house surveyed
a)	Type of House	Pucca	212	16.9
		Semi Pucca	683	54.5
		Kutchha	358	28.6
b)	Ventilation	Adequate	830	66.2
		Non Adequate	423	33.8
c)	Drinking Water Source	House Tap	52	4.2
		Public tap/Community plant	424	33.8
		Tube well or borehole or well	755	60.3
		River/Dam/Lake/Canals/streams/Spring etc.	16	1.3
		Tanker Supply	0	0.0
		Packaged Drinking water	6	0.5
d)	Drinking water purification	Boil	6	0.5
		Alum	3	0.2
		Add bleach/ Chlorine	1	0.1
		Cloth Straining	248	19.8
		Electronic water purifier	1	0.1
		Let it stand and settle	0	0.0
		None	994	79.3
e)	Toilet facilities	Inside House	509	40.6
		Outside House	652	52.0
		Open field	90	7.2
		Public toilets	2	0.2
f)	Vector born disease prevention	Normal Net	93	7.4
		Insecticide /treated nets	1	0.1
		Coils	8	0.6
		Vaporizer	7	0.6
		Mosquito repellent cream	0	0.0
		Electric devices	0	0.0
		None	1144	91.3
g)	Drainage facility	Open/ Surface drainage	579	46.2
		Closed/ Covered drainage system	19	1.5
		Indiscriminate disposal in the open	655	52.3
h)	Fuel for cooking	LPG	1059	84.5
		Biogas	25	2.0
		Wood coal/ Cow dung cake	167	13.3
		Solar	1	0.1
		Electricity	0	0.0
		Other	0	0.0

Marital status and Educational Status

Table 3: Showing marital status of adult surveyed population

Age Group	Marital Status								Total
	Married		Unmarried		Widow		Divorce/Separate		
	M	F	M	F	M	F	M	F	
18-30 years	819	997	622	175	5	4	4	2	2628
31-40 years	722	612	53	3	10	30	3	5	1438
41years and Above	980	797	36	3	139	250	4	4	2213
Total (n%)	2521 (40.14)	2406 (38.32)	711 (11.35)	181 (2.88)	154 (2.45)	284 (4.52)	11 (0.17)	11 (0.17)	6279 (100)

Out of 6279 adult population, 40.14% males and 38.32% females were married with majority of married females in 18-30 years age group and married males in 41 years and above age group [Table 3].

The data shows that maximum numbers of adult illiterate people were women 1117 (17.78%). Among them maximum illiterate females were in the age group 41 years and above. Very few people specially females had attained education upto graduation level. [Table 4].

Table 4: Showing Age and Educational Status of adult surveyed population

Age Group	Educational Status												Total
	Illiterate (adult)		Primary School (upto 5th)		Middle School (upto 8th)		High School (upto 10th)		Inter-mediate (12 th /Diploma)		Graduate & Above		
	M	F	M	F	M	F	M	F	M	F	M	F	
18-30 years	67	164	108	386	400	393	368	125	236	62	271	48	2628
31-40 years	128	230	125	254	238	123	161	26	70	11	66	6	1438
41years and Above	457	723	226	235	232	76	104	11	78	5	62	4	2213
Total (n%)	652 (10.4)	1117 (17.8)	459 (7.3)	875 (13.9)	870 (13.9)	592 (9.4)	633 (10.1)	162 (2.6)	384 (6.1)	78 (1.2)	399 (6.4)	58 (0.9)	6279 (100)

Physical Activity Status, Diet and Addiction Status

The Physical activity was scored on the basis of energy expenditure during various activities as follows:

- Bed Ridden (No change in Breathing/ Heart rate)-No physical activity
- Mild (Minimal increase in Breathing/ Heart rate- Leisure walking/ strolling, Sedentary work like shopkeeper, tailor, priest, housewife etc. with minimal movement or light activity like teacher, vendor, minimal household work cooking, washing utensils, general sweeping-cleaning, light gardening etc.
- Moderate (Noticeable increase in Breathing/ Heart rate)- Brisk walking, Moderate activity like agricultural worker, cattle caretaker, construction helper, household chores like churning curd, fuel wood collection etc.
- Vigorous (Large increase in breathing & heart rate but not out-of-breath)- Running, Vigorous activity like carrying or lifting heavy loads, digging or construction work, manual laborer, ploughing farmer, stone cutter etc.

Table 5: Showing Physical Activity Status of adult surveyed population

Age Group	Physical Activity								Total
	Vigorous		Moderate		Mild		Bed-Ridden		
	M	F	M	F	M	F	M	F	
18-30 years	637	29	722	160	89	987	2	2	2628
31-40 years	373	19	369	110	46	521	0	0	1438
41years and Above	547	20	477	143	132	889	3	2	2213
Total (n%)	1557 (24.8)	68 (1.1)	1568 (25)	413 (6.6)	267 (4.3)	2397 (38.2)	5 (0.1)	4 (0.06)	6279 (100)

The data shows that more males (49.8%) were doing vigorous and moderate physical activity while maximum females (38.17%) were doing mild physical activity [Table 5].

Almost equal inclination towards vegetarian and non-vegetarian diet was observed. According to the data available, majority of people (80.5%) were not having any addiction while maximum numbers of addicted persons had addiction for Gutkha/Pan masala [Table 6].

Table 6: Showing Diet and addiction Status

Variables	18-40 years (n=4066)		Above 41 years (n=2213)		Total (n=6279) (100%)
Diet					
	M (n=2238)	F (n=1828)	M (n=1159)	F (n=1054)	
Vegetarian	1076 (48.1%)	970 (53.1%)	538 (46.4%)	548 (47.3%)	3132 (49.9%)
Non-Vegetarian	1162 (51.9%)	858 (46.9%)	621 (53.6%)	506 (43.7%)	3147 (50.1%)
Addiction					
Tobacco	95 (4.2%)	1 (0.1%)	189 (16.3%)	7 (0.7%)	292 (4.7%)
Gutakha /Pan masala	491 (21.9%)	8 (0.4%)	226 (19.5%)	6 (0.6%)	731 (11.6%)
Alcohol	7 (0.3%)	0	8 (0.7%)	0	15 (0.2%)
Smoking	70 (3.1%)	3 (0.2%)	112 (9.7%)	4 (0.4%)	189 (3.0%)
None	1575 (70.4%)	1816 (99.3%)	624 (53.8 %)	1037 (98.4 %)	5052 (80.5%)

Prevalence of non-communicable diseases

Data showed that 95.3% of the people were not having any non-communicable diseases while Hypertension/CVD was the commonest non-communicable disease. [Table 7]

Table 7: Showing Prevalence of Non-Communicable diseases among surveyed adult population

Age Group	Number of screened population		Non- Communicable Diseases														Total
			HTN/ CVD		Diabetes		Cancer		Stroke		COPD/ Asthma		Osteoarthritis		None		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M/F
18-30 years	1450	1178	29	25	0	0	0	0	0	0	0	0	0	0	1421	1153	2628
31-40 years	788	650	25	14	0	1	1	0	0	0	0	0	0	2	762	633	1438
41years and Above	1159	1054	89	73	2	5	0	0	1	0	2	3	9	10	1057	963	2213
Total (n%)	3397 (54.17)	2882 (45.83)	143 (2.2.8)	112 (1.78)	2 (0.03)	6 (0.09)	1 (0.01)	0	1 (0.01)	0	2 (0.03)	3 (0.04)	9 (0.14)	12 (0.19)	3240 (51.60)	2749 (43.78)	6279 (100)

Screening of Hypertension, Anemia, Diabetes and Obesity

Out of total 4427 people screened for Hypertension, 5.76% of population was found to be hypertensive with maximum people in 41years and above age group. Considerable number of people (25.4%) were found to be pre hypertensive of which maximum people were 18-30 years age group [Table 8].

Table 8: Showing Hypertension Screening Status among surveyed adult population
Reference-Criteria for diagnosing Hypertension (8)

Age Group	Number of Screened Population		Hypertension Grading										Total
			Normo – tensive		Pre – hypertensive		Stage 1 HTN		Stage 2 HTN		Isolated systolic hypertension (ISH)		
	M	F	M	F	M	F	M	F	M	F	M	F	
18-30 years	1000	839	701	656	270	158	29	25	0	0	0	0	1839
31-40 years	557	478	347	346	185	118	25	12	0	1	0	1	1035
41years and Above	798	755	491	505	218	177	81	67	4	3	4	3	1553
Total (n%)	2355 (53.20)	2072 (46.8)	1539 (34.8)	1507 (34.0)	673 (15.2)	453 (10.2)	135 (3)	104 (2.3)	4 (0.1)	4 (0.1)	4 (0.1)	4 (0.1)	4427 (100)

Total 3592 people were screened for anemia out of which males were found to be more anemic than females. [Table 09].

Table 9: Showing Anemia Screening Status among surveyed adult population Reference-Hemoglobin level to diagnose anemia (G/dl) (9)

Age Group	Number of Screened Population		Haemoglobin Status								Total
			No Anaemia		Mild		Moderate		Severe		
	M	F	M	F	M	F	M	F	M	F	
18-30 years	827	658	223	272	392	182	210	203	2	1	1485
31-40 years	452	372	126	173	212	113	114	86	0	0	824
41years and Above	673	610	164	268	304	207	201	134	4	1	1283
Total (n%)	1952 (54.3)	1640 (45.7)	513 (14.3) (14.29)	713 (19.8)	908 (25.3)	502 (13.9)	525 (14.6)	423 (11.8)	6 (0.2)	2 (0.1)	3592 (100)

Out of total 3651 people screened for Diabetes, majority of the people had normal glucose levels, while impaired Glucose Tolerance was observed in 6.0% males and 4.2% females. [Table 10].

Table 10: Showing Diabetes Screening Status among surveyed adult population
Reference-Criteria for Diagnosing Diabetes (10,11)

Age Group	Number of Screened Population		Diabetes Status						Total
			Normal		Impaired glucose tolerance		Diabetes		
	M	F	M	F	M	F	M	F	
31-40 years	788	650	718	599	70	50	0	1	1438
41years and Above	1159	1054	1006	947	151	102	2	5	2213
Total (n%)	1947 (53.3)	1704 (46.7)	1724 (47.2)	1546 (42.3)	221 (6.0)	152(4.2)	2 (0.1)	6 (0.2)	3651(100)

The data shows that majority of SC people were having Normal BMI. 2.9% SC population was under weight, 4.8% people were overweight and Obesity was observed in only 0.2% people [Table 11].

Table 11: Showing Nutrition and Obesity Status (n=6279)

Reference: WHO BMI classification (12)

Age Group	Number of Screened Population		BMI grading												Total
			Underweight (Below 18.5)		Normal (18.5—24.9)		Overweight (25.0-29.9)		Obesity I (30.0-34.9)		Obesity II (35.0-39.9)		Obese III (>=>40)		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M/F
18-30 years	1450	1178	48	51	1337	1103	65	22	0	2	0	0	0	0	2628
31-40 years	788	650	10	16	727	611	50	22	1	1	0	0	0	0	1438
41years and Above	1159	1054	29	28	1026	978	100	42	3	6	0	0	1	0	2213
Total (n%)	3397 (54.2)	2882 (45.8)	87 (1.4)	95 (1.5)	3090 (49.2)	2692 (42.9)	215 (3.4)	86 (1.4)	4 (0.06)	9 (0.14)	0	0	1 (0.01)	0	6279 (100)

Discussion

Key Results

The results indicated that still some of households were 'kutcha' structures and considerable number of households were lacking sufficient ventilation which acts a factor for contributing to household air characteristics like dampness, humidity and allergens (13). Majority of the people were drinking unpurified water from tubewell/borewell or well and public taps as the main water source. In terms of sanitation, nearly all surveyed houses were found to have toilets either inside or outside the house which showed a good impact of awareness but inadequate drainage systems and indiscriminate disposal of waste in open was found which may be the cause for infectious diseases and also serve as breeding ground for vectors (14,15).

Majority of families were not using preventive measures against vectors for which awareness may be generated among people against vector borne diseases. Majority of the people were using LPG as main fuel for cooking which shows the better availability of LPG fuel in rural areas (16,17)

Regarding the education in this community, the study revealed that merely 7.5% people were graduate and above and out of these only 0.9% were females which indicates the need of higher educational institutions in the areas giving special emphasis on female education.

The data shows males were doing more vigorous and moderate physical activity than females which may be attributed to their occupation being mostly agricultural and labor work. Maximum females were indulged in mild physical activity as women mostly do household work in these areas. Maximum numbers of population had normal BMI and obesity was observed in only 0.2% population. The lesser numbers of overweight or obese person were due to more physical work trends among villagers and as such normal glucose levels were also found in majority of people and only 10.2% having impaired glucose tolerance and 0.3% having diabetic status.

According to the data available, maximum people were addicted for Gutkha/Pan masala. Maximum number of people with non-communicable disease were having Hypertension/CVD of above 41 years and above age group. The addiction of tobacco and smoking increase the risk of hypertension/ CVD (18). Males were more affected with anaemia than females with 18-30 years age group to be more affected which indicates need for supplementation of haematinics in male community also (19).

The findings from this research shed light on various key aspects pertaining to the demographic features and health conditions of the scheduled caste population. The gathered data unveils noteworthy trends and patterns, enhancing our comprehension of fundamental household facilities, consumption of non-edible substances, and the prevalence of non-communicable diseases like hypertension/ cardiovascular diseases, diabetes, anemia and obesity.

Limitations

The voluntary nature of participation resulted in some individuals declining to take part, and the survey's timing might have overlooked certain household members due to conflicting work schedules, potentially introducing selection bias. Additionally, the study's reliance on a convenience-based sample restricts the extent to which findings can be generalised to the broader section of Scheduled Caste population. Lastly, the reliance on respondent interviews in the study raises concerns about the possibility of misreporting, given the potential influence of recall bias. It is crucial to recognise that the study was conducted within a specific timeframe, which may not fully capture seasonal variations or long-term changes in socio-demographic and health factors among the Scheduled Caste population.

Interpretation

The findings offer a comprehensive overview of the socio-demographic background, educational status, lifestyle choices, and health status within the SC community. Additionally, valuable insights into their living conditions and the accessibility of education and healthcare services are provided. The data indicates the increasing the prevalence of Non-Communicable Diseases (NCDs) such as high blood pressure and diabetes among the SC population, emphasizing the need for targeted interventions to address these health challenges across different age groups within this community.

Generalisability

While the study yields valuable information, it focuses on a specific geographical area raises concerns about the generalisability of the findings to diverse SC populations in various locations. It is essential to note that the findings may be context-specific and applicable primarily to the particular SC population and location where the study was conducted. The study's focus on specific villages and demographics within the SC population raises concerns about the broader generalisability of its outcomes to other populations or regions.

Conclusion

There is need for special attention to be given on sanitation and cleanliness of villages surveyed in the study so that communicable and skin related diseases can be prevented. Thus, we hope that the present study will stimulate and pave the way for further thinking while making policy regarding research in the field of empowerment and upliftment of scheduled caste population along with understanding and management of health conditions. Campaigns can be run to prevent or treat Malnutrition, Anaemia and Joint related disorders.

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Conflicts of interest

None

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