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Research Article

# A cross-sectional health-related socioeconomic demographic study of the tribal population in Kamrup (R) district Assam

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## Abstract

Introduction: Scheduled Tribes, forming a significant segment of India's diverse demographic landscape, often confront health challenges rooted in a complex interplay of factors such as geographic isolation, limited access to healthcare facilities, and socio-economic disparities. Objective: The primary objective was to estimate the health-related socioeconomic demographic profile of the tribal communities of Boko and Chhayagaon block, Kamrup district, Assam. The secondary objective was to estimate the prevalent diseases among the tribal population. Methods: It was a community-based descriptive type, cross-sectional study. Data was collected by face-to-face interviews with the participants of the five selected villages of Kamrup district, Assam, during 2020-2021. Results: During the survey, 1312 households were interviewed. It was observed that 59.98% of houses were kutcha, 55.56% had inadequate ventilation, 69.59% of the population depended upon hand pumps for water supply, and 41.39% of houses used boiling methods to purify drinking water. All the surveyed houses were equipped with a toilet. The households were reported using a net to prevent vector-borne diseases. Approximately 62.9% of the total population reported indulging in different kinds of addictions. Conclusion: These villages have progressed with electrification and LPG adoption, yet challenges in housing quality, healthcare, and higher education access remain. This data forms a strong basis for targeted community development initiatives in housing, health, sanitation and lifestyle improvements.

**Keywords:** Addiction, Boko, Block, Rabha, Sanitation, Ventilation, Water supply.

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## Introduction

"Tribal" or "Indigenous" communities are diverse in culture, language, and tradition. They also differ in terms of access to education and healthcare facilities. The geographical locations where these tribes live further contribute to these diversities. Assam is a state in north-eastern India with a population of approximately 31 million, of which the tribal population is 38,84,371, constituting 12.4% of the state's total population.(1,2) Assam is home to 30 different tribes. Among the Tribes (STs) in the state, the Boro comprise nearly half the total tribal population at 35.1%. Other significant tribes include the Mishing (17.52%), karbi(11.1%), Rabha (7.6 %), Kachari (Sonowal Kachari) (6.5%), and Lalung (5.2%), Garo (4.2%) and Dimsa tribes (3.2%).(3) Kamrup district has a population of around 15 million, of which 182,038 are tribal. (4,5)

Tribal communities often reside in remote and ecologically diverse regions, significantly impacting their lifestyle, access to resources, and overall well-being. Despite seven decades of independence, the nation faces challenges in narrowing the healthcare disparity between tribal and general populations.(6) A lack of material resources and limited access to public utilities and services often characterize their lives. The geographical isolation of their habitats further exacerbates these issues.(7)A comprehensive study of these aspects can help identify the factors influencing their health status, including housing conditions, access to clean water, and sanitation. This information will aid policymakers in making a policy to enhance their living standards and promote sustainable development. Additional studies are required to better understand the demography and health status of tribal communities in the Kamrup (R) district, Assam. Considering all these observations, the Central Council for Research in Ayurvedic Sciences has designed a cross-sectional study to collect data on the demographic, socioeconomic, and health status of the tribal community living in the Boko block of

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Kamrup district, Assam. This study was executed by the Regional Ayurveda Research Institute for Gastro Intestinal Disorders, Guwahati (peripheral institute of CCRAS).

**Objectives**

The primary objective of the study was to assess the health-related socioeconomic demographic profile of the tribal communities. The secondary objective was to estimate the prevalent diseases among the tribal population.

## Methodology

**Study design:** It is a cross-sectional (descriptive type) study.

**Settings:** Five villages within the Boko and Chhaygaon Block of Kamrup (rural) district were selected. The survey was initiated in July 2020, focusing on the villages of Rajapara, Bondapara, Rihabari, Turakpara, and Durapara in the Boko block. The dedicated team conducted weekly visits to capture the health-related socio-economic demographic data in a structured format.

**Participants:** The villages in the "Chhaygaon" and "Boko" blocks of Kamrup (rural), with a Schedule Tribe population of 65-80%, were selected for the study. The target population consisted of the Schedule Tribes. Data was collected from the tribal population using a convenient sampling method.

**Variables:** Details on variables such as living standards, vector-borne disease prevention measures, and demographic attributes (age, gender, income level, education, marital status, etc.) were collected using a structured format.

**Data sources/measurement**: For data collection, the face-to-face interview approach was used to gather comprehensive data on demographic, socioeconomic, and health-related variables among the tribal population. Necessary approval was secured (Institution Ethical Committee approval and permission from the village head) before the commencement of this study.

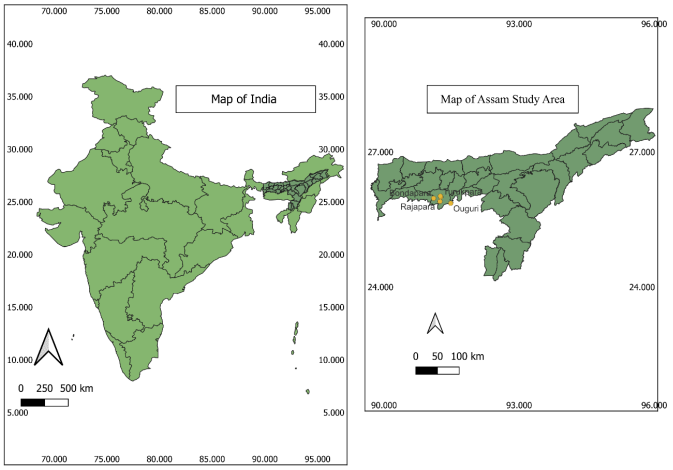
**Bias:** There was a risk of nonresponse bias (when certain individuals do not participate), potentially skewing the results. To mitigate this bias, rapport-building techniques were employed. These techniques involved establishing trust and a positive relationship with participants, encouraging them to engage and provide accurate information.

**Statistical methods:** Descriptive statistics (frequency and proportion) were employed for statistical analysis. Descriptive statistics summarise and provide insights into variables' distribution and characteristics within the study population.

**Study size**: The CCRAS was implementing a research-oriented public healthcare program in tribal-dominated areas. This program provided healthcare services directly to their doorsteps while raising awareness about health, nutrition, and hygiene. As part of the initiative, a survey of 7,000 people was conducted to understand the health-related sociodemographic factors.

**Method to address the missing data:** The team reviewed the questionnaire for any missing responses before the respondent left. This was further verified by the Senior Research Fellow (Ayu). For variables that did not apply to certain segments of the population, the term "Not applicable" was used.

**Survey tools: An open -ended** questionnaire was used to collect data at the village, household, and individual levels. The details of the questionnaire are given below:




1. Village level questionnaire: Data on the village demographics, availability and accessibility of health/educational facilities, connectivity, and environmental parameters was collected.

2. Household-level questionnaire: Information collected includes housing characteristics, water source, and sanitation.

3. Individual-level questionnaires: following age-group-specific questionnaires were prepared to capture major indicators from all health domains. The individual-level questionnaires aimed to provide estimates of key indicators related to infectious and non-communicable diseases.

## Observations

Rajapara, Bondapara, Bherberi (Ouguri, Rihabari), Turukpara, and Durapara villages were located in the Boko block of Kamrup rural district in Assam. These villages were predominantly inhabited by tribal people, comprising more than 60% of the population, primarily from the Rabha and Boro communities. The primary language spoken was Assamese. Although agriculture was the primary occupation, Rajapara had many service holders, while the other villages had a few service holders and businessmen. Commonly cultivated crops include rice, banana, turmeric, mustard, ridge gourd, lady's finger, cauliflower, and brinjal. Rice was the staple food, and most villagers were non-vegetarians, consuming mixed pulses, pork, fish, chicken, and locally grown green vegetables. Many households grew vegetables and brew alcohol and rice beer for special occasions. The village boasted 100% electrification. Educational facilities included 11 LP schools, 01 ME school, 04 high schools, and 01 private junior college. There are 17 Anganwadi centres, 03 sub-centres, 03 PHCs, 02 CHCs, and 01 veterinary hospital. Nearby, Rajapara village hosted a plastic drum manufacturing industry and a Citronella essential oil factory, while Bondapara village had a poultry, plastic, and noodle manufacturing factory.

**Table 1:** A substantial portion of the surveyed households was observed to consist of Kutcha, accounting for 59.98%. A significant portion of households had inadequate ventilation, 55.56 % of which comprised more than half of the surveyed homes. The diversity of water sources among the surveyed households was observed. The majority of the population (69.59 %) depended on hand pumps. 41.39% of houses purified their drinking water by boiling and using simple filters. All surveyed households had toilet facilities outside the home (constructed area) within the premises. The data suggested a uniform pattern of toilet facilities across the surveyed area. All surveyed households rely on mosquito nets to prevent vector-borne diseases, with no

reported use of other methods such as insecticide/treated nets, coils, vaporisers, mosquito repellent cream, electric devices, or no preventive measures. The data suggests a consistent practice of using nets for vector-borne disease prevention across the surveyed area. All the surveyed households had an open or surface drainage system. The predominant cooking fuel source among the surveyed households was LPG, with a significant majority relying on this cleaner and more efficient energy option. The data reflects a notable adoption of modern cooking technologies in the surveyed area.

**Table 1: Data on the standard of living of the participants**

| Sr. No. | Information | Items | Number | % of house surveyed |
|---|---|---|---|---|
| | | | 1312 | |
| a) | **Type of House** | Pukka | 519 | 39.5 |
| | | RCC | 6 | 0.45 |
| | | Kutcha | 787 | 59.9 |
| b) | **Ventilation** | Adequate | 583 | 44.4 |
| | | Non-Adequate | 729 | 55.5 |
| c) | **Drinking Water Source** | House Tap | 37 | 2.8 |
| | | Well/ Pond | 211 | 16.0 |
| | | Handpump | 913 | 69.5 |
| | | River Dam/ Lake/ Canals/ streams/Spring etc | 4 | 0.30 |
| | | Well/ Pond, Hand-pump | 12 | 0.91 |
| | | Packaged Drinking Water | 135 | 10.2 |
| d) | **Drinking water purification** | Boil | 543 | 41.3 |
| | | Alum | 0 | 0 |
| | | Add bleach/Chlorine | 0 | 0 |
| | | Simple filter | 764 | 58.2 |
| | | Electronic water purifier | 1 | 0.07 |
| | | Let it stand and settle | 0 | 0 |
| | | None | 4 | 0.3 |
| e) | **Toilet facilities** | Inside House | 0 | 0 |
| | | Outside House | 1312 | 100 |
| | | Open field | 0 | 0 |
| | | Public toilets | 0 | 0 |
| f) | **Vector born disease prevention** | Normal Net | 1312 | 100 |
| | | Insecticide /treated nets | 0 | 0 |
| | | Coils | 0 | 0 |
| | | Vaporizer | 0 | 0 |
| | | Mosquito repellent cream | 0 | 0 |
| | | Electric devices | 0 | 0 |
| | | None | 0 | 0 |
| g) | **Drainage facility** | Open/ Surface drainage | 1311 | 99.9 |
| | | Closed/ Covered drainage system | 1 | 0.07 |
| | | Indiscriminate disposal in the open | 0 | 0 |
| h) | **Fuel for cooking** | LPG | 1262 | 96.1 |
| | | Biogas | 0 | 0 |
| | | Wood coal/ Cow dung cake | 50 | 3.8 |
| | | Solar | 0 | 0 |
| | | Electricity | 0 | 0 |
| | | Other | 0 | 0 |

**Table 2: Data on age and educational status of the participants**

| Age Group | Educational Status | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Illiterate (adult) | | Primary School (upto 5th) | | Middle School (upto 8th) | | High School (upto 10th) | | Inter-mediate (12th/Diploma) | | Graduate & Above | | |
| | M | F | M | F | M | F | M | F | M | F | M | F | |
| **18-30 years** | 40 | 47 | 79 | 94 | 181 | 210 | 359 | 381 | 151 | 114 | 81 | 85 | 1822 |
| **31-40 years** | 43 | 62 | 89 | 131 | 113 | 143 | 203 | 179 | 54 | 29 | 37 | 28 | 1111 |
| **41years and Above** | 265 | 434 | 201 | 211 | 144 | 97 | 217 | 144 | 63 | 32 | 39 | 6 | 1853 |
| **Total (n%)** | 348 (7.2%) | 543 (11.3%) | 369 (7.7%) | 436 (9.1%) | 438 (9.1%) | 450 (9.4%) | 779 (16.27%) | 704 (14.2%) | 268 (5.5%) | 175 (3.6%) | 157 (3.3%) | 119 (2.4%) | 4786 |

**Table 2** shows that total screened population was 4786, with a relatively equal distribution between males (49.8%) and females (50.7%). Most of the population (20.29%) fell within the high school education category, followed by 18.2% with education up to the middle school level. A significant portion of 18.4% of the population was illiterate.

**Table 3: Data on the marital status of the participants**

| Age Group | Marital Status | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Married | | Unmarried | | Widow | | Divorce/Separate | | |
| | M | F | M | F | M | F | M | F | |
| **18-30 years** | 378 | 602 | 511 | 323 | 2 | 6 | 0 | 0 | 1822 |
| **31-40 years** | 481 | 511 | 58 | 33 | 0 | 28 | 0 | 0 | 1111 |
| **41years and Above** | 863 | 603 | 15 | 31 | 50 | 290 | 1 | 0 | 1853 |
| **Total (n%)** | 1722 (35.9%) | 1716 (35.8%) | 584 (12.2%) | 387 (8.08%) | 52 (1.1%) | 324 (6.8%) | 1 (0.02%) | 0 | 4786 |

**Table 3** shows that majority of individuals in the "18-30 years" age group were either married (53.7%) or unmarried (45.77%). The widowed category had more females (6.8%) than males (1.1%).

**Table 4: Data on the physical activity of the participants**

| Age Group | Physical Activity | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | Vigorous | | Moderate | | Mild | | Bed-Ridden | | |
| | M | F | M | F | M | F | M | F | |
| **18-30 years** | 829 | 837 | 52 | 77 | 10 | 16 | 0 | 1 | 1822 |
| **31-40 years** | 504 | 518 | 27 | 39 | 8 | 15 | 0 | 0 | 1111 |
| **41years and Above** | 647 | 537 | 148 | 213 | 133 | 171 | 1 | 3 | 1854 |
| **Total (n%)** | 1980 (41.3%) | 1892 (39.53%) | 227 (4.7%) | 329 (6.8%) | 151 (3.1%) | 202 (4.2%) | 1 (0.02%) | 4 (0.08%) | 4786 |

**Table 4** shows that 80.8% of people engaged in vigorous physical activity. It suggested that a substantial portion of the population was active but had different activity levels between genders.

**Table 5: Data on dietary habits of the participants**

| Variables | 18-40 years, n (%) | | Above 41 years, n (%) | | Total, n (%) |
|---|---|---|---|---|---|
| **Diet** | **M** | **F** | **M** | **F** | |
| **Vegetarian** | 27 (0.56%) | 105 (2.1%) | 31 (0.64%) | 64 (1.3%) | 227 (4.75%) |
| **Non-Vegetarian** | 1403 (29.3%) | 1398 (29.2%) | 898 (18.6%) | 860 (17.9%) | 4559 (95.25%) |
| **Total** | 1430 (29.8%) | 1503 (31.4%) | 929 (19.4%) | 924 (19.3%) | 4786 |

**Table 5** shows that most of the population, constituting 95.25%, followed a non-vegetarian diet.

**Table 6: Data on addiction prevalent in participants**

| Variables | 18-40 years, n(%) | | Above 41 years, n(%) | | Total, n(%) |
|---|---|---|---|---|---|
| | M | F | M | F | |
| **Addiction** | | | | | |
| **Tobacco** | 87 (1.8%) | 272 (5.6%) | 86 (1.7%) | 213 (4.4%) | 658 (13.74%) |
| **Gutakha /Pan masala** | 90 (1.8%) | 304 (6.3%) | 51 (1.06%) | 158 (3.3%) | 603 (12.59%) |
| **Alcohol** | 780 (16.29%) | 151 (3.1%) | 571 (11.9%) | 159 (3.3%) | 1661 (34.70%) |
| **Smoking** | 32 (0.6%) | 4 (0.08%) | 36 (0.75%) | 3 (0.06%) | 75 (1.56%) |
| **Bhang** | 1 (0.02%) | 1 (0.02%) | 1 (0.02%) | 1 (0.02%) | 4 (0.08%) |
| **Ganja** | 3 (0.06%) | 4 (0.08%) | 1 (0.02%) | 1 (0.02%) | 9 (0.18%) |
| **Opium** | 0 | 1 (0.02%) | 0 | 0 | 1 (0.02%) |
| **None** | 437 (9.1%) | 766 (16%) | 183 (3.82%) | 389 (8.12%) | 1775 (37.08%) |
| **Total** | **1430 (29.8%)** | **1503 (31.9%)** | **929 (19.4%)** | **924 (19.3%)** | **4786** |

**Table 6** shows that approximately 62.9% of the total population reported indulging in different kinds of addictions. Alcohol consumption was the most prevalent form of addiction, constituting 34.7% of the total population. Around 12.59% of the population reported using Gutakha or Pan Masala. This included 2.8% of males and 9.6% of females. Smoking had a relatively low prevalence, of 1.56%, compared to alcohol and gutakha/ pan masala.

**Table 7: Data on the prevalence of non-communicable diseases**

| 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 | |
| **18-30 years** | 891 | 931 | 11 | 10 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 3 | 868 | 917 | 1822 |
| **31-40 years** | 539 | 572 | 13 | 13 | 5 | 7 | 0 | 0 | 2 | 0 | 1 | 0 | 5 | 4 | 513 | 548 | 1111 |
| **41years and Above** | 929 | 924 | 56 | 98 | 36 | 24 | 2 | 1 | 2 | 3 | 5 | 2 | 16 | 23 | 812 | 773 | 1853 |
| **Total (n%)** | 2359 (49.8%) | 2427 (50.7%) | 80 (1.67%) | 121 (2.5%) | 45 (0.94%) | 32 (0.66%) | 2 (0.04%) | 1 (0.02%) | 4 (0.08%) | 3 (0.06%) | 6 (0.12%) | 2 (0.04%) | 29 (0.60%) | 30 (0.62%) | 2193 (45.82%) | 2238 (46.76%) | 4786 |

**Table 7** shows that Hypertension (HTN) or Cardiovascular Disease (CVD) affected 1.67% of the population, and Diabetes mellitus was observed in 2.5% of the population.

**Table 8: Data on recurrent infection (RTI, GI and Skin) in children**

| Variables | 0-10 years, n(%) | 11-18 years, n(%) | Total, n (%) |
|---|---|---|---|
| **Recurrent Infection (For RTI and GI More than 3 episodes in last 6 months) (For Skin infection-any infective lesion in last 6 months)** | | | |
| Respiratory tract infections- | | | |
| Yes | 2 (0.13%) | 1 (0.02%) | 3 (0.2%) |
| No. | 888 (58.34%) | 631 (44.1%) | 1519 (99.80%) |
| Total | **890 (58.4%)** | **632(41.5%)** | **1522** |
| Gastrointestinal tract infections- | | | |
| Yes | 1 (0.02%) | 889 (58.4%) | 890 (58.5%) |
| No | 2 (0.13%) | 630 (41.3%) | 632 (41.52%) |
| Total | **890 (58.4%)** | **632(41.5%)** | **1522** |
| Skin Infections | | | |
| Yes | 40 (2.6%) | 25 (1.6%) | 65 (4.2%) |
| No | 850 (55.8%) | 607 (39.88%) | 1457 (95.72%) |
| Total | **890 (58.4%)** | **632 (41.5%)** | **1522** |

**Table 8** shows that within the entire group of 1522 children, only 3 (0.2%) were reported to have respiratory infections. Gastrointestinal disorders were prevalent among 890 children, representing 55.8% of the population. Additionally, 4.2% of children were identified to have skin infections.

## Discussion

Health is a complex outcome shaped by numerous interacting factors. Economic growth, per capita income, employment rates, literacy and education levels, age of marriage and birth rates, healthcare accessibility, nutrition, availability of safe drinking water, road safety, and environmental conditions all play crucial roles in determining a nation's overall health and well-being. The objective component of well-being pertains to the standard of living and includes factors such as educational level, income, occupational status, housing quality, clothing, and other modern living comforts.(8) Data was collected on the objective component of well-being during the survey. Most surveyed population lived in kutcha houses constructed from unburnt bricks, bamboo, mud, grass, reeds, thatch, and loosely packed stones (9).Compared to the Kamrup rural district, these villages had a slightly lower proportion (55%) of kutcha houses (9). An open space around the house (setback) was available on their premises for cross ventilation. However, many houses did not have doors and windows facing each other for cross ventilation; inadequate ventilation was also observed. Sanitation encompasses a comprehensive range of practices, including the management of disposal of human excreta and solid waste, drinking water and wastewater, home sanitation, personal hygiene, and environmental hygiene. Human excreta pollutes the physical environment and results in many diseases, such as typhoid, parathyroid, diarrhoea, dysentery, etc.(10) The construction of barriers like sanitary latrines can prevent transmission of all these diseases. Householders had sanitary latrine facilities and constructed them in a separate place available on their premises. A majority relying on open drainage systems implies potential challenges in waste management. Households collected dry and wet waste separately; they used the damp waste to produce manure and burned the dry waste in the backyard. Householders relied on tap and well water as their primary sources. Hand pumps served as the main drinking water supply, while residents utilised well water for laundry. Each house had an unsanitary well without proper boundaries, allowing impurities direct access and posing a risk of water contamination. The absence of protective boundaries around the well may result in the direct entry of contaminants. But householders never use well water for drinking purposes. The community use sand for water purification. They employed a water purification method involving two containers. One container was filled with sand, and the other was placed beneath it. Water was poured into the sand-filled container, filtered through the sand, and then collected in the container below. This was their primary technique for purifying water. In the surveyed households, only one water treatment technique (simple water purification) was used, making the water highly susceptible to recontamination. Gastrointestinal disorders were prevalent among 890 children, representing 55.8% of the population. Numerous studies have identified contaminated water as the primary cause of waterborne diseases, attributing this to the presence of pathogenic microorganisms. In rural areas, proper water supply and sewerage systems are absent. In villages, water contamination is often caused by infiltration, leaching, surface runoff through pastures, and the absence of sewerage disposal systems.(11)

No chlorine or other water purification methods (like electronic purifiers) were observed, which underscored the necessity for water hygiene education. There is a potential need to enhance access to purification technologies. Uniform use of mosquito nets for disease prevention signals a consistent practice. However, the absence of alternative methods may indicate a lack of awareness or access to other preventive measures. Most of the householders had LPG in their kitchen. The adoption of LPG for cooking is a positive sign of modernization.

The area's educational institutions comprised a lower primary school, a middle English school, a high school, and a single private junior college. The literacy rate in the villages stands at 81.3%, higher than Assam's overall rate of 72.19%. However, most of the population had an education up to high school, and middle school education was the most prevalent. Notably, there was an absence of government colleges near these villages, resulting in a limited number of graduate students. Most villagers engaged in vigorous physical activities primarily due to their involvement in agriculture, which served as their primary occupation. Diverse varieties of paddy, including aromatic Joha,

waxy Bora, semi-waxy Bhakua, and deep-floating red rice, are available in Assam. Assam is rich in fish resources due to the abundance of rivers and bheels. Assamese traditions involve the consumption of rice accompanied by fish, meat, and eggs.(12) The preference for a non-vegetarian diet among tribal communities in Assam might stem from this factor. Alcohol consumption was the most prevalent form of addiction in the studied population, accounting for 34.70% of the population. The frequency of alcohol consumption was notably higher among males in contrast to females. The high prevalence of alcohol use was associated with the acceptance of alcohol within tribal culture, its connection to significant religious and social ceremonies, and the brewing of certain types of alcohol (such as rice beer) at home, which is considered an integral aspect of tribal family traditions. (13)Tobacco chewing stands as the second most widespread addiction in the studied tribal population. Chellappa LR study revealed that the prevalence of smokeless tobacco consumption is approximately 63.4% among tribes.(14) The consistent use of tobacco has been a prominent tradition within tribal communities. (15) A total population of 4,786 was interviewed, revealing a history of non-communicable diseases such as hypertension (HTN) or Cardiovascular Disease (CVD) in only 1.67% and diabetes in 2.5% of the individuals. This low prevalence could be attributed to two potential reasons. First, the tribal population may lack awareness about non-communicable diseases. Second, they might not utilize the health services offered by sub-centres and primary health centres (PHC) in their respective villages.

**Limitation of study:** Convenient sampling was employed in this study, which presents inherent limitations in accurately representing the target population. Consequently, the findings cannot be broadly generalized.

## Conclusion

The health of a population is influenced by socioeconomic, environmental and cultural factors. The survey reveals that many households face challenges related to housing quality, sanitation and access to healthcare services. Despite the high literacy rates, few people have attained a higher level of education. The lack of nearby government colleges limits higher education opportunities. Thus, data underscores the need for higher education opportunities. Improving health outcomes in this population requires a multifaceted approach that includes better infrastructure, education, and healthcare access.

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**Ethical considerations:** The Central Ayurveda Research Institute, Guwahati's Institutional Ethics Committee (IEC) reviewed and approved the study (Ref. No.2-2/2023-NEIARI/Ghy/Admin/331 dated 17/07/2020). The study's objectives were explained to the participants, and verbal consent was taken. Further, they were informed of their full right to withdraw from participation at any study stage.

**Quality Control:** The Investigator conducted field visits for monitoring purposes and to ensure the quality of data being collected. The team was instructed to upload all the data through e- format provided by CCRAS, New Delhi. A statistician checked for missing/faulty data entry before validating the data collected.

**Conflict of interest:** The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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