

A Study on BMI Status, Dietary Habits and Frequency of Food Consumption by Indigenous Tribes

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ABSTRACT **Background:** India is a diverse country with a blend of traditions and cultures inhabited by different people belonging to different communities, one such is the tribal community. The dietary habits of tribals are distinct from rest of the population. Based on this background, study was conducted to assess the dietary habits and frequency of consumption of foods by tribal population of Visakhapatnam district. **Methodology:** It is a community-based study among 100 randomly selected tribal men and women. Stratified random sampling technique was applied to select study population. A prior consent was taken from ITDA Project Officer and subjects. A pre-tested schedule was used to collect the information regarding anthropometry, dietary habits, food frequency, foods during festivals, nutritional deficiencies and nutritional intervention programmes. **Results:** Anthropometric measurements such as height and weight were measured and BMI was calculated. In the study population mean height and weight was 154.3 ± 7.3 cm and 50.7 ± 7.7 kgs respectively. The mean BMI was found to be 21.6 ± 3.3 kg/m². Ambali prepared with ragi flour is the most common breakfast. Intake of fruits was found to be low. Consumption of milk was almost negligible. The prevalence of anaemia in the study conducted was found to be 60.9%. **Conclusion:** Several nutrition intervention programmes have been implemented by the Government of India which have to be strengthened in order to improve purchasing power, making health services more accessible for the overall development of the tribal community.

Keywords: Body Mass Index (BMI), Food frequency, ITDA, Tribal community

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INTRODUCTION

Tribal communities are socially and economically isolated from the rest of the population. In comparison to other population groupings, tribal populations face socioeconomic disadvantages. They are also geographically isolated and can be distinguished from people living in plain areas. India has the second largest tribal population in the world next to Africa^[1] Visakhapatnam district is situated in between 17°15' and 18°32' N latitude and 81°48' and 83°31' E longitude of north eastern part of Andhra Pradesh. Visakhapatnam is the resident of 14 tribes, namely Bagata, Gadaba, Gond, Konda Kammarra, Konda Dora, Kotiya, Khond, Kulia, Mali, Manne Dora, Nooka Dora, Porja, Reddi Dora and Valmiki.

Food is a pre-requisite not only for maintaining good health, but also for proper growth and development. The dietary

patterns of an individual are closely linked to the lifestyle in which he inhabits. However, food habits are strongly influenced by society's thoughts, beliefs, notions, traditions, and taboos. In addition to these socio-cultural barriers, religion, education, and economic factors all influence food behaviours. Nutritional status of the population largely depends on the consumption of food in relation to their needs, which in turn is influenced by the availability of food and purchasing power.^[2]

The aim of this study is to assess BMI status, dietary habits and frequency of food consumption in tribal community of Visakhapatnam district.

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METHODOLOGY

Study Design: It was a community based study which was carried out by adopting three stage stratified random sampling procedure. First, second and third stages were Mandal, village and household respectively. From each of the selected village, a total of 20 households (HHs) were covered. Study area include five villages namely Uggamgoyyi, Sampangaravu, Peddagangagudi, Dumbriguda and chompi. Written permission was obtained from ITDA Project Officer and Administrative Officer for conducting the study and taking help from the village head. Informed oral consent was obtained from the village leaders and heads of the concerned households, before conducting the survey. A total of 100 Tribal men and women of age group (18-60 years) who were willing to participate were included in the study. The data was collected by using a pre tested schedule.

Data was collected from the subjects comprising, demographic and socio-economic particulars. Anthropometric measurements viz., height (cm), weight (kg) were recorded and Body Mass Index was computed. Nutritional deficiency signs were observed by clinical examination. Information regarding dietary habits was obtained using food frequency questionnaire. In addition, special menus and foods consumed during festivals and rare occasions was also collected from subjects. Other ancillary data collected comprise medicinal properties of local foods, coverage of target beneficiaries under national programs and breast-feeding practices among women.

RESULTS

Table 1 shows the sociodemographic profile of selected subjects. In the study population, 48% were male and 52% were female. The age group of the subjects ranged between 18 to 60 years. With respect to literacy, only 40 % were literates, 26% and 19% were educated up to primary and secondary school respectively and only 15% were graduates. The subjects belonged to both nuclear and joint family. Around 34% of the study participants were in the age group of 18 to 35 years, 28% were in the age of 36-45 years and 38% in 46-60 years age. About 40% were illiterates. Around 26% and 19% were educated up to primary and secondary school respectively. Only 15% were educated upto graduation or above. Type of family include both nuclear and joint family in which 17% and 83% of households having family size of 4 and >4 respectively.

Out of 100 subjects 88% were below poverty line and only 18% were above poverty line. Study population in this investigation belonged to Bagata (48%), Prime Tribe Group (PTG) (30%) and Valmiki (22%) community. The study population mainly follow two religions Hinduism and

Parameter	Number (%)
Age Group	
18-35 years	34
36-45 years	28
46-60 years	38
Gender	
Male	48
Female	52
Education	
Illiterate	40
Primary	26
Secondary	19
Higher education	15
Marital Status	
Married	88
Unmarried	12
Occupation	
Farming	86
Coolie	11
Other	3
Family Size	
4	17
>4	83
Economic Status	
Above poverty line	18
Below poverty line	82
Religion	
Hinduism	88
Christianity	12
Community	
Bagata	48
PTG	30
Valmiki	22

Christianity. Majority (88%) belong to Hindu religion and 22% population belong to Christianity. In a study conducted

Parameters	Mean ± SD
Height (cm)	154.3±7.3
Weight (kg)	50.7±7.7
BMI (kg/m ²)	21.6±3.3

by Nayak *et al.* has shown majority (78.7%) belonged to Hindu religion and remaining 21.3% belong to Christianity.^[3]

The major source of drinking water was nearby waterbody. About 98% of the HHs use firewood for cooking purpose. Only 2% of the HHs used liquid petroleum gas (LPG) for cooking. Majority of HHs (95%) had electricity facility. 12% of the HHs had sanitary latrine.

Anthropometric measurements such as height and weight were measured and body mass index was calculated. Table 2 shows anthropometric data of the population. The mean height and weight of the subjects were 154.3±7.3

cm and 50.7±7.7 kg respectively. The mean BMI was 21.6±3.3 kg/m².

Table 3 depicts the frequency of food intake, dietary practices of Tribal community. The staple food of these tribes was found to be ragi and rice. Around 98% of the subjects were consuming them on daily basis in the form of ragi ambali, ragi rotti in combination with honey, rice in the form 'kanji'. Other than these other millets such as korralu and samalu were consumed by few of them who were cultivating them and those who can afford to buy them in the local market. Among pulses timirelu, alasandulu, bobbarlu, ulavalu were commonly consumed. The vegetables consumed were potato, brinjal, bottle gourd, cauliflower which are locally available. Seasonal green leafy vegetables which are indigenous to that area were consumed. None of the respondents were consuming egg and other non vegetarian foods on daily basis. Only 8% of them are consuming milk on daily basis. Locally brewed alcoholic beverages such as toddy, 'jeeru kallu', and rice beer were consumed frequently

Type of Food	Daily (%)	Weekly (%)			Fortnightly (%)	Monthly (%)	Occasionally (%)
		Once	Twice	Thrice			
Rice	85	0	0	15	0	0	0
Ragi	99	1	0	0	0	0	0
Red gram	0	51	24	20	5	0	0
Black gram	0	19	0	0	15	20	46
Vegetables	12	5	11	72	0	0	0
Green leafy vegetables	0	18	33	49	0	0	0
Fruits	0	15	10	5	32	0	38
Egg	0	27	32	12	0	0	0
Sea food	0	0	0	0	19	49	0
Meat	0	64	0	0	15	10	11
Milk	8	0	0	0	17	25	50
Curd	0	0	0	0	0	0	0
Nuts (Groundnuts)	0	0	0	29	71	0	0
Oil	100	0	0	0	0	0	0
Sugar, jaggery, honey	15	0	35	12	28	0	0
Packed foods	0	0	0	0	0	0	0
Beverages	2	0	0	0	58	18	22
Bakery items	0	14	2	0	29	0	55
Junk food	3	28	0	0	12	9	48

by men. On special occasions liquor was found to be consumed even by women.

Nutritional deficiencies observed were anemia, angular stomatitis, glossitis, fluorosis, gum disease, patchy teeth and dental caries. In this study, 7% had angular stomatitis, 4% had glossitis, 11% had fluorosis, 12% had dental caries, and 20% had pallor.

Majority of the women interviewed reported that they initiated breast-feeding within 24 hours after delivery. About 25% of mothers gave liquids to the new born such as plain water, sugar water and honey before initiating breastfeeding. Only about 10% of the mothers stated that they discarded colostrum, mostly on the elder's advice. About 76% of the children started in receiving the complementary feeding at the age of 4-6 months, while the remaining started getting the same during 7-12 months of age. The type of complementary foods commonly used were Ragi (85%), and milk (15%). Mothers don't have any knowledge regarding commercial feeding formulas and none of them fed commercial complementary foods to their children.

Majority (95%) of the women received iron and folic acid (IFA) tablets during pregnancy. However, most of them refused to take tablets. Fear of adverse effects and the assumption that it would be detrimental during pregnancy were two of the most popular reasons stated by women for not taking IFA tablets during pregnancy. Maternal and child health services are introduced into community as a superior alternative to the traditional practices.^[4] Majority (97%) of the women received supplementary feeding provided by ICDS during pregnancy and lactation. Lactating mothers and children below five years were receiving milk and eggs from Anganwadi centres. It is intriguing to note that foods such as eggs and milk which were given all at once to beneficiaries from Anganwadi centres. These foods were found spoiling frequently affecting the consumption owing to lack of storage. Some beneficiaries were even found to sell these food items for earning money.

Tribal community in this study were found to use local medicinal plants in treating various ailments. For example, Nepalam for fever, adda banka for body pains, masipathri for headache, nara mamidi for joint and bone pains, chalava teega for cooling the body, jilledu paalu for treating bloating, namali chekka for stomach pain, dumpa veru for motions, **combination of *Syzygium cumini* (neredu) and *Psidium guajava* (jaamaku)** for treating blood motions. Leaves of *Bauhinia vahli* (addaku) for treating blood dysentery and leaves of *Aegle marmelos* (Maredu) is used for treating jaundice and piles.

DISCUSSION

In the current investigation it was found that majority of tribes belonging to Bagata community followed by Primitive Tribal Groups (PTGs) and Valmikis. Bagata is one of the numerically preponderant and ethnically significant tribes found predominantly in Visakhapatnam district.^[5]

According to the WHO classification of BMI, study subjects were categorized as Underweight (<18.5), Normal (18.50-24.9) and Over weight (≤ 25).^[6] In this study, 28% were underweight; 56% individuals were normal; 14% were overweight and only 2% were obese. All the underweight subjects are especially adolescent girls and women. According to NFHS-3, 46.6% of tribal women had Body Mass Index (BMI) below 18.5, indicating chronic energy deficiency.^[7] It was reported that Monogamy is a general rule and polygamy is also rarely found.^[5] A similar phenomenon was observed in the current study, which revealed that polygamy exists in today's society. From the observations in the present investigation firewood utilisation was found instead of gas stove. In addition it is alarming to note that all the subjects strongly believe that usage of LPG gas causes gastritis. Because of these faulty myths, usage of firewood is still prevalent which emit poisonous gases leading to respiratory problems.

Majority of respondents do not consume milk except a few families having children below 5 years of age who were getting milk from Anganwadi. Only a few of them were having the habit of drinking tea. Most of them were found to drink plain decoction in the morning before going to farm. This shows that the consumption of sugar is almost absent from their routine diet. Hunting was still practiced in the tribal community. Although by virtue of their food habits, all the tribes are non-vegetarians and extremely fond of consuming fleshes of animals and birds, yet its consumption is limited only to ceremonial and festival days. This was mainly due to economic constraints.

Farming is just an act of obtaining food from the hill for that particular day. Food is eaten twice daily, at around 6 a.m. before going to farm and another in the evening before it gets dark. This pattern reduces their consumption of food to two square meals per day contrary to present dietary guidelines of four to six meals per day. It is very disappointing to know that food in this context does not refer to a well-balanced meal that includes all of the essential nutrients. The majority of them eat only ragi and rice throughout the day. Only a few people include vegetables at least once in a day. Food is only consumed twice a day due to poverty. Mothers would sometimes only eat once a day in order to save food for their children. It has been observed that lack of regular

employment has decreased their purchasing power and decreased access to quality food.

Consumption of leafy and other vegetables was found to be good. Around 49% were consuming green leafy thrice in a week. Locally available seasonal fruits such as jack fruit and mangoes were consumed more as they were accessible to these people. It was observed that, only 5% of the subjects were consuming fruits at least three times in a week which was in contrast to results reported by Nayak *et al.*, in same tribal community and Ray SK *et al.*, Agrahar-Murugkar D *et al.*, Qamra S R *et al.*, in their studies in different settings.^[3,8,9,10] Despite of receiving beneficiaries, foods such as egg and milk which are rich in protein and calcium were not properly utilised by the people. Consumption of foods such as cakes samosa, aerated beverages was reported by some people whenever they go to local weekly market 'santa'

Foods Consumed during Festivals and Special Occasions

Tribal communities belonging to diverse ethnic groups have an indigenous traditional culture. Tribal rituals, beliefs constitute rich cultural heritage which is an integral part of Indian culture. Some of the festivals celebrated in the tribes belonging to Eastern ghats are discussed here in this study. 'Itikula Pandaga' is a week-long festival celebrated every year in the month of March as a prelude to signal new agriculture season in the hilly areas of Eastern Ghats. Tribal women collect money from the vehicles passing by their localities by stopping them with a rope known as 'pajeir' in local parlance and the motorists donate generously. During festival time people can go to the forest area for hunting. Later they prepare food with that hunting animals. Meat on special occasions is prepared in a unique manner in which marinated meat is stuffed inside a hollow bamboo stick that serves as an outer covering, and both sides are covered with leaves and placed in the fire for one hour. The finished product is quite tasty and relished by the tribes. The festival is all about dance, community feasts and merrymaking. Modhakondamma festival is the largest tribal festival, conducted for a period of three days in the month of May every year. Famous diety of tribals, Sri Modakondamma is generally offered with a special recipe called 'ragi ladoo' made with ragi flour which is known as prasad. On this special occasion community feasting will be there with many traditional foods and locally fermented toddy 'Jeeru kallu', 'Maddi kallu', 'Rice liquor', 'Jaggery liquor', 'Eetha kallu' and 'Thati kallu'. Korrakotha and Samakotha are the harvest festivals in which farmers do pooja to the fields and prepare pumpkin leaves curry. Chavithi madapal is also another traditional ritual in which prasad is made from all the cereal grains such as rice, foxtail millet, pearl millet and offer to God, which was later consumed by the entire family.

During this people offer hen in the name of 'bali'. Jorla Pandaga is an age-old practice in which people get 'jorla kommalu' from the hills and place them in crop fields to protect against pests and insects. Sankranthi is a three-day festival, on first day 'Bhogi', they do worship addakayalu and prepare curry with a combination of konda pindi dumpa and adda pikkalu.

Poor oral hygiene, poor nutrition and smoking results in various dental problems. In this study there were 27% people suffering with various dental problems. Bhasin (2005) reported that diet of Bhils of Rajasthan is highly nutritionally deficient due to insufficient intake of pulses, vegetables, fruit, milk etc., which results into bleeding and spongy gums, mottled enamel and angular stomatitis.^[11]

In India, nutritional anaemia is a major public health concern affecting women. Prevalence of anaemia is substantially higher in tribal regions because of malnutrition, infections, and lack of sufficient knowledge. According to NFHS-3, the national average prevalence of anaemia in reproductive-age women is 55%.^[12] In the current study 52% of adolescent girls and young women were anemic which was mainly due to poor diet, lack of knowledge and inefficient utilization of services rendered by the Government in preventing anemia. The prevalence of anaemia in the study conducted in this region was found to be 60.9%.^[3] Study conducted by Amarnath, M *et al.*, 2013 reported that about 88.9% of adolescent girls are anemic in them 17.8% are severely anemic.^[13] In another study, prevalence of anemia was found to be 96.5%^[14]

Every culture irrespective of its simplicity and complexity has its own set of beliefs and practices for treating different ailments. In this study area it was observed that different parts of the plants were used either in the form of powder, decoction and paste in treating various diseases. Leaves of *Bauhinia vahli* (addaku) were used for treating blood dysentery, leaves of *Aegle marmelos* (Maredu) were used in treating cold whereas stem bark powder of *Aegle marmelos* (Maredu) were used for treating jaundice & piles respectively, Similar usages were found previous studies.^[15,16]

CONCLUSION

The studied tribal community is found to be portraying adversity in diversity with respect to dietary habits and food consumption patterns. The dietary habits of tribal community were found to be erratic. Frequency of consumption of all the foods was found to be very low. Consumption of milk and its products was almost negligible. Consumption of non vegetarian foods was limited to frequency of hunting. Only during festivals, they were consuming more variety of foods. The majority of people were consuming only two square meals a day.

Public health programmes should be properly implemented to improve the health conditions and nutritional status among tribes. Development of resources certainly solve the problem of malnutrition and increase work capacity in tribal population which in turn can raise the quality of life. The high-rate illiteracy necessitates a more robust adult literacy programme. Nutrition education is mostly helpful for changing the health and nutritional status of tribal population. Nutrition education need to be reinforced to promote better infant feeding and child rearing practises, personal hygiene, and environmental sanitation. Ethnic medicinal plants should be explored to test their efficacy in treating diseases.

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