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Study on the Diet and Health Status of the Working Population of the Birhor, PVTG of Purulia

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Abstract

A tribe is an independent political division of a population with a common culture. Tribal people are primitive residents of our country. Tribal communities are isolated from the general population and are socially and economically disadvantaged. In view of their habitat and dietaryU habits, they often distinguish themselves from other population groups. Their food consumption pattern is influenced by varieties of nature and varies from extreme deprivation in the lean season to high levels of intake of several foods during the post-harvest period. Geographical isolation, primitive agricultural practices socio-cultural taboos, lack of formal education, poor infrastructure facilities, improper health-seeking behavior, poverty etc. leads to the development of various morbidities and undernutrition. For this study, 100 individuals from the Birhor community have been selected among which 50 are male and the rest are female. Some anthropometric measurements are taken for understanding the health status and to understand the nutritional status of daily food intake has been taken in a methodological procedure. The analysis of the study reveals that few age groups of this particular population remain undernourished, though the majority of them still belong to the normal nourished and healthy population group.

Keywords: Nutritional Status; Diet and Health

Introduction

We are still in the nascent stage of understanding how our diet scripts the physical status of an individual. Our knowledge is furthermore limited regarding the above in context t of the ethnic communities who are constantly under threat due to habitat destruction leading to the reduction in their abilities as hunter-gatherers and also a collection of forest produce. An individual's physical status depends on a number of factors including age, gender, diet, genetic composition, and geographic location of an individual. Changes in dietary habit, lifestyle can alter the health status of an individual. Reshuffling the diet can have an eloquent consequence on the body composition as it is more vigorously interconnected with food choices rather than the traditional nutrient depiction typically used in nutrition research [1]. Thus, recognizing the role of diet at the onset of assessing nutritional status is pivotal for discerning the health status of an individual.

Among the 41 different tribal groups in West Bengal we have focused our study on Birhor community, the food forager tribal group to provide an insight into the dietary pattern. Birhor tribal group, the cynosure of this study, is the seventh-largest tribal group in West Bengal mostly living in the districts of Purulia. Birhors are treated as a marginalized primitive community living in forests as foragers. They do also drudgery as the purveyor of games and the forest

produced by the neighbouring Hindus. The hindunization process and degradation of their ancient lifestyle pattern can easily be trailed in their present subsistence strategy and livelihood form.

Birhor people, being a traditionally foraging tribe, were heavily dependent on the forests for their livelihood and diet. From our field study, these people are still fond of consuming forest produces like roots, tubers, wild fruits, vegetables and wild animals. They also use to domesticate cows, buffaloes large in number comparing to these days and consume their milk and other dairy products too. But at present, due to less availability of pastoral area and high price of those animals, domestication is reduced. And nowadays, their access to forest has been restricted either due to the wide-scale deforestation or strict implementation of anti-deforestation measures though the latest Dwellers (Recognition of Forest Rights) Act, 2006 was promulgated to protect the rights of forest dwellers on forest to live and for their livelihood. Small fishes are available in the rivers and canals in lesser quantity. Finding no other alternative their diet is also changing as they have become habituated with usual staple Bengali foods like rice, pulses, vegetables etc. Available from the ration system and/or in the local markets. All these changes have caused a schism between their traditional livelihood and compulsion of taking up uncertain means of livelihood in the form of wage earning causing a yawning gap between their required and available nutritional needs causing under nutrition and occasional starvation deaths.

Food

- **Rice**

Breakfast: They usually use to take rice in their breakfast; they called it "Marbhat" in the breakfast they take it off at a minimum of 250 g.
Lunch: In lunch also they take the same "Marbhat", which they have earlier make for their Breakfast but in lunch the amount of rice is about 300 g.
Dinner: Only in both breakfast and lunch they use to take Marbhat but, at night dinner, they use to take normal rice at night, i.e."Damari" which is off about 100 g.

- **Chapati (Roti)**

Breakfast: In the Bhupatipally village, among the Birhor tribe, they used to take the roti, in their breakfast which is off about 2-3 pieces only.
Tiffin: They also take 1-2 pieces of roti with the tea in the evening time with their leisure time they use to take it and gossip with each other.

- **Hazari (Puffed rice)**

Tiffin: Some of the families used to take it with milk and tea in their tiffin time, in gossiping or in their leisure time.

- **Tea (chaye)**

Breakfast: They usually take the tea, whenever they need, or when they want feel relax they take it, but in morning breakfast it is one of the most important thing for them, as it was there morning starting part, they usually use to take 1-2 cups in the morning.

- **Tiffin:** After returning from the work, they need a tea break, which makes them refresh, as they are gatherers, they get much tired after working, in this break they usually take the tea with roti, which remove their hungriness.

- **Biscuits (Baitua)**

Breakfast: when they take the tea in the first morning, they take the baitua with it; they take maximum 5-6 Baitua with it, which they believe that it gives them lots of energy.
Tiffin: In the early morning they take lots of baitua with the tea, so for Tiffin only they take very few amount of, which is near about 2-3 biscuits. They take it just for their mood swings only

- **Milk (Toya)**

They have this drink whenever they need actually; they take 2-3 times in a day of a week. They don't have the specific time for this, they take it according their wishes, basically they provide the milk of their child only at in the infant stage, as they believe that it gives them energy and nutrition at that stage, but due to lack of economic problem, after few months they provide the home made food for the infant one, that's why most of the child suffers from Mal nutrition.

- **Fish (Echili)**

Lunch: They takes both the small and big fish with their homemade rice, named as Marbhat, they take the Echili with the marbhat, which is near about 250 g. They take 2-3 pieces of fish with the marbhat.

- **Meat**

Breakfast: Due to their busy schedule they are unable to take the fleshy item in the break fast as they are wood gatherer they go for gathering very early in the morning.
Lunch: They mostly eat the fleshy type of food in every situation or of any of their rituals one they mainly used their domestic animals for their fleshy in them there is one thing they decided them as the richest one only by having a lots of hence in their houses in their language is called sim de also prefer, The flesh of duck named gare. And goat named Maraash. But the amount of meat which they usually take in their lunch is mostly of two pieces which is of about 250 grams as they are not economically strong enough so they don't buy the flash from the market but by using the domestic one day failed the emotional but for survive the life they usually do it in lunch the usually take twice or thrice in a week.
Dinner: after the lunch the rest of the things which gets left

day keep it for the dinner time or sometimes if they don't have taken the fish you one at the lunch time de take it at their dinner as they takes eat during the night they usually used to take two pieces only which is of about 200 grams whereas the percentage of milk is about 200 grams and percentage of female is about 50 grams but at the time of rituals the most of the rituals are celebrated at night but that time day take fresh as there according in off mood swings.

- **Egg (Anda)**

Breakfast: They try to take the eggs daily but it is not possible due to lack of money day, so they suffer from Mal nutrition but for the children today, they get the eggs from the school as the school give them the facility to have it they have it from there, it is provided them by the government normally they take the eggs off the only one is taking by them sometimes they also not take it to, so that they can get the chicks from it and further that use the chicks for their domestic purposes. They take 2-4 eggs in a week. Mostly females take less than male, male take 2 eggs whereas females take 1egg as it is the only way to get protein for them.

Lunch: They used to take lots of vegetables but due to short period of time in their lifestyle they cultivate many vegetables but them unable to take it for their houses as they sell this vegetable to the market from which they get economically strong base. Every vegetables have local terms in their languages they usually buy the vegetables from the market and some are also from their cultivated land they used to take vegetable like potatoes beans onions Gourd cabbage cauliflower the local name of the gourd is letoya, brinjal-Benguya, Reddish-Muluaya. They usually used to take this with the Marbharat which is their regular dishes but when some vegetables are get variations otherwise there regular dishes are the same they take some leafy things also those are palongshaak, laushaak tomato, papaya, neem are the all substances they usually take.

Dinner: At the dinner time by taking all the vegetables is usually make the sabji at night they usually use the sabji which is mainly made in their lunch time actually that amount of taking about male and females are two different they used to take two different ways mail used to take 250 grams and female used to take 150 grams at night they don't take lots of food as they consume it little bit of it as they wake up very early in the morning they are very concerned about the digestions as they don't get much food to eat so they maintain their health during their dinner time.

- **Fruits**

Due to their lack of economic condition they usually not get any fruits to eat but sometimes they have the fruits plant in their own houses from where they can get the fruits and sometime they usually buy it from the market for the any ritual purposes celebrating by them they usually used to take those fruits only they used to take apples bananas jackfruit custard apple and others. They usually have their food in their leisure time only and the male take those fruits in the forest so that they can have it during their working hours.

Addiction

Addiction is a complex condition, a brain disease that is manifested by compulsive substance use despite harmful consequence. People with addiction (severe substance use disorder) have an intense focus on using a certain substance(s), such as alcohol or drugs, to the point that it takes over their life. They keep using alcohol or a drug even when they know it will cause problems. Yet a number of effective treatments are available and people can recover from addiction and lead normal, productive lives. It is a compulsive, chronic, physiological or psychological need for a habit-forming substance, behavior, or activity having harmful physical, psychological, or social effects and typically causing well-defined symptoms (such as anxiety, irritability, tremors, or nausea) upon withdrawal or abstinence : the state of being addicted.

Nausea and abdominal pain, which can also lead to changes in appetite and weight loss. Increased strain on the liver, which puts the person at risk of significant liver damage or liver failure. Seizures, stroke, mental confusion and brain damage, Lung disease. Among the Birhor tribe, in the Bhupatipally village, they are mostly addicted to alcohol all day long. The alcohol which they usually use to take called "Mohua", and"Hariya", and the other substance they usually use to take it for 2-3 times per day. This addiction is not found only in the family members but also the children feed this addiction. They consume alcohol all day long at any time. They always in a drunken mode.

While working among the Birhor tribe, I noticed that, they take food which is full of carbohydrates, but while consuming a lot of it, they feel consumed fat and protein which is very much necessary for them, as it is the only reason for suffering over the disease malnutrition. They take all day long, which is not for their pleasure, they usually used to take it from younger age to older age just to distract their mind from the hungriness. As they don't consume much food daily, which they actually need for their body to grow up.

Materials and Methods

This study was conducted from 7th December, 2019 to 11th December, 2019 on the previously studied Birhor family from Bhupatipally village of Purulia disrict, West Bengal, India. For this study, 50 Birhor male and 50 Birhor female from working population was chosen based on their dependency on traditional hunting and foraging. Necessary permissions and informed consents were obtained from

the community leaders before the commencement of the study. Dietary intake has been assessed by subjective report and objective observation [2]. Open ended surveys such as dietary recalls and close ended surveys, basically structured interview was conducted to capture detailed information about all foods and beverages including food frequency and food quantity consumed by the respondent in a span of 24 hours following the standard and most common method [3]. The same process was continuously repeated for 5 long days to get an average assessment. To be maximally accurate the weights of all raw food items, all cooked food items and each food item consumed by one individual was taken into account following the study of National Diet and Nutrition Surveys [4].

The structured interview guide is given below

Meal type	Food Items	Quantity	Ingredients	Quantity	Male Intake	Female Intake
Breakfast						
Mid-morning						
Lunch						
Evening Snacks						
Dinner						

For the purpose of the study, all meals per day were taken into consideration including meal types, food items, raw food ingredients and their quantity (in grams), cooked food amount (in grams) for each item and each food item quantity consumed by each individual (in grams). All food item quantity was measured using Generic electronic kitchen digital weighing scale machine (Manufacture Series no. ISCALE-1). Collected data were analyzed following the dietary guideline as prescribed by National Institute of Nutrition [5]. Conversion Factor (CF) for an ingredient has been calculated using the standard formula.

$$CF=\frac{\text{Weight of the raw food used (in grams)}}{\text{Total cooked quantity of that preparation } (\text{in ml.})}$$

The CF value was then multiplied with the value of cooked food consumed (in ml.)By an individual to calculate the amount of given ingredient consumed by that particular individual following the standard guideline [5]. Comparison with reference values of each ingredient consumed by an individual was then done by using the Nutritive value of Indian foods as per the guideline of National Institute of Nutrition [5-7]. An average of per day consumption was measured from the 5 day dietary assessment table. The tabulation was done for calculating the intake of macro and micro nutrients, vitamins and minerals by an individual to assess the health and nutrition status of that individual and to assess the difference between recommended dietary allowance for Indian population of different ages given by ICMR and present food intake of the participants.

Anthropometric measurements like height, skinfold, and weight were measured. Three commonly used undernutrition indicators i.e. stunting underweight n wasting were used to evaluate the nutritional status of d subjects. BMI was calculated for all subjects individually. Biceps and triceps skinfold measurements are calculated to assess the subcutaneous fat deposition. Statistical analysis is done with standard deviation to note the measures of dispersion. Male and female subjects are measured individually and separately to note down sexual dimorphism. The instruments used were Martin's anthropometry, weighing machine, skinfold caliper, and steel tape.

Results

The dietary estimations in context to food were studied according to the methods mentioned in the materials and methods and it is found that the tribal people of Birhor it has been observed that the protein intake by the age group of male between 15-35 years found 92-94 g and the age group of 35-55 years found 76-88 g. Carbohydrate intake 15-35 years found 464-436 g and 35-55 years age group found 412-453 g.

Fat intake lowest percentage found in the range between 15-35 years around 16.7-18.2 g. The highest percentage almost 16-19 g found in the group of 35-55 years. Minerals and crude fiber intake highest percentage found in 15-35 years and the lowest percentage mineral intake found in the age group of 35-55 years. However, crude fiber intake almost same percentage in all range of group. In case of females the percentage of protein , carbohydrates, minerals and crude fiber intake lesser than male birhor, only the percentage of fat intake which is higher than male birhor, however, the less fat intake found in the range of 45-55 years (Tables 1-3A).

Birhor Male (avg)	Protein (gm)	Carbohydrates (gm)	Fat (gm)	Minerals (gm)	Crude Fiber (gm)
15-25 Years	92.146±63.886	432.880±20.450	16.724±12.323	11.596±1.345	6.559±2.135
25-35 Years	94.138±68.924	464.928±21.606	18.234±12.367	11.327±1.368	6.559±2.135
35-45 Years	88.158±65.994	453.990±22.608	19.354±14.351	11.695±1.741	6.559±2.135
45-55 Years	76.246±62.560	412.678±20.510	16.626±11.346	10.569±1.347	6.559±2.135

Birhor Female (avg)	Protein (gm)	Carbohydrates (gm)	Fat (gm)	Minerals (gm)	Crude Fiber (gm)
15-25 Years	88.268±61.218	412.567±27.675	19.474±13.456	12.578±1.671	7.714±2.243
25-35 Years	86.246±59.908	410.878±26.516	18.356±14.388	10.412±1.790	6.824±2.435
35-45 Years	73.439±54.228	376.413±24.142	16.747±12.202	6.908±1.258	5.938±2.295
45-55 Years	69.257±50.498	372.368±20.786	14.641±10.512	5.716±1.113	5.769±2.183

Table 1: Both male and female are suffering from mal-nutrition.

Age Group (Yr)	Male	Percentage	Female	Percentage	Total
0 - 4	16	7.84	14	6.86	30
05-Sep	13	6.37	18	8.82	31
Oct-14	12	5.88	15	7.35	27
15 - 19	6	2.94	7	3.43	13
20 - 24	3	1.47	6	2.94	9
25 - 29	8	3.92	12	5.88	20
30 - 34	7	3.43	6	2.94	13
35 - 39	11	5.39	7	3.43	18
40 - 44	5	2.45	6	2.94	11
45 - 49	3	1.47	3	1.47	6
50 - 54	4	1.96	3	1.47	7
55 - 59	5	2.45	3	1.47	8
60 - 64	2	0.98	2	0.98	4
65 - 69	1	0.49	2	0.98	3
70 - 74	0	0	0	0	0
75 - 79	1	0.49	2	0.98	3
80 - 84	0	0	1	0.49	1
Total	97	47.53	107	51.94	204

Table 2: Distribution of Birhor Population According to Gender and Age.

Anthropometric Measurements on 100 Birhor Adults

Age Group	Sample Size	Height (cm)	Weight (Kg)	BMI	Analysis
15 - 25 years	7	164.8	53	19.5	Normal
25 - 35 years	12	167.2	62	22.2	Normal
35 - 45 years	18	166.4	59	21.3	Normal
45 - 55 years	13	167.4	52	18.5	Under Nourished

Table 3A: Height / Weight Measurements of Male Birhor.

Age Group	Sample Size	Height (cm)	Weight (Kg)	BMI	Analysis
15 - 25 years	9	159	59	23.41	Normal
25 - 35 years	16	146	50	23.8	Normal
35 - 45 years	14	147.5	38.1	17.5	Under Nourished
45 - 55 years	11	146.8	39.6	18.4	Under Nourished

Table 3B: Height / Weight Measurements of Female Birhor.

Age Group	Sample Size	Biceps (cm)	Triceps (cm)	Supraliac (cm)	Sub-scapular (cm)
15 - 25 years	7	1.48	0.65	1.41	2
25 - 35 years	12	1.3	2.07	2.12	1.14
35 - 45 years	18	1.67	1.3	1.24	0.68
45 - 55 years	13	1.07	0.58	1.15	0.65

Table 3C: Skinfold Measurements of Male Birhor.

Age Group	Sample Size	Biceps (mm)	Triceps (mm)	Supraliac (mm)	Sub-scapular (mm)
15 - 25 years	9	0.47	0.59	1.1	1.46
25 - 35 years	16	0.45	0.85	1.28	1.35
35 - 45 years	14	0.41	0.77	1.3	1.2
45 - 55 years	11	0.45	0.86	1.39	1.25

Table 3D: Skinfold Measurements of Female Birhor.

Age Group	Sample Size	Height (cm)	Mean	Std. Deviation	Std. Error
15 - 25 years	7	164.8	23.1	20.04	2.83
25 - 35 years	12	167.2	40.1	17.97	2.54
35 - 45 years	18	166.4	59.9	15.06	2.13
45 - 55 years	13	167.4	43.5	17.52	2.48

Age Group	Sample Size	Weight (Kg)	Mean	Std. Deviation	Std. Error
15 - 25 years	7	53	7.42	6.44	0.91
25 - 35 years	12	62	14.88	6.66	0.94
35 - 45 years	18	59	21.24	5.34	0.76
45 - 55 years	13	52	13.52	5.44	0.77

Table 4: Statistical Analysis of Birhor Male.

Age Group	Sample Size	Weight (Kg)	Mean	Std. Deviation	Std. Error
15 - 25 years	9	59	10.62	6.84	0.97
25 - 35 years	16	50	16	4.8	0.68
35 - 45 years	14	38.1	10.67	3.87	0.55
45 - 55 years	11	39.6	8.71	4.36	0.62

Age Group	Sample Size	Height (cm)	Mean	Std. Deviation	Std. Error
15 - 25 years	9	159	28.62	18.43	2.61
25 - 35 years	16	146	46.72	14.04	1.99
35 - 45 years	14	147.5	41.3	15.02	2.12
45 - 55 years	11	146.8	32.3	16.19	2.29

Table 5: Statistical Analysis of Birhor Female.

Analysis

By analyzing the total number of distribution of Birhor population is 204 members. According to gender age wise lowest number of people found in the senior group between ages of 60-84 old found 11 persons (female-63.6 % and male- 36.3 %). However, none were age range between 70-74 old. Next group middle aged people between 40-59 old found 32 persons (female-46.8% and male- 53.1%). Next group of young people between the ages of 20-39 old found 60 persons (female- 51.6 % and male- 48.3 %). Therefore, the highest number of people found in the teenager and child group between ages of 4-19 old found 101 persons (female - 53.4% and male- 46.5%).

The BMI percentage taken by anthropometric measurements on height and weight of male Birhor out of 100 Birhor adults the age group of 15-45 old found normal nourished (BMI percentage around 21.3%-19.5%). However the age group of years found under nourished (the percentage of BMI=18.5%). In case of female Birhor age group of 15-35 old found Normal nourished (BMI rate is=23.8%-23.4%), and the age group of 35-55 old found under nourished (BMI=17.5%-18.4%).

The highest subcutaneous fat distribution in the biceps and triceps region in male Birhor age group which is found in 35-45 years and the lowest percentage of subcutaneous fat found in 45-55 years. Statistical analysis is done on skin fold measurements to assess the variation and level of dispersion.

Conclusion

With this group of the study population, there is a hope to reveal the diversity of the foods consumed and their association with the health status. In addition to that, traditional dietary pattern study would help us to reveal whether or not any malnutrition element is associated with the diet and associated health status.

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