



# Calorie-Protein Consumption and its association with Socio-economic variables among Gond Tribe, Bilaspur, Chhattisgarh, India

K. Bharathi<sup>1,\*</sup> and Roshni Pottam<sup>2</sup>

<sup>1</sup> Assistant Professor, Department of Sociology and Social Anthropology, College of Social Sciences and Humanities, Arba Minch University, Ethiopia, North Africa.

<sup>2</sup> Department of Anthropology and Tribal Development, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh, India.

## ARTICLE INFO

### Article history:

Received: 26 April 2017;

Received in revised form:  
12 May 2017;

Accepted: 22 May 2017;

### Keywords

Calorie,  
Protein,  
Socio-economic,  
Gond,  
Consumption Unit.

## ABSTRACT

An attempt is made to study the family dietary patterns and its association with socio-economic variables among Gond community of Melnadih village, Karra Gram Panchayat, Bilaspur district, Chhattisgarh, India. A homogenous population with varied occupational categories was selected by using 24-hour recall method of in-depth interview to obtain information from participants on their intake of foods on the previous day. A sample of 42 household(s) was selected randomly to assess the dietary intake. It is reported that agriculture practicing households have a mean calorie (1645.02 Kcal.) and mean protein (45.40 gms) consumption which is low when compared with wage labor category with a mean calorie of 2286.43 Kcal. and mean protein value of 57.50 gms. and with other services. A consumption unit of 2.9 indicates that ideal family size can avail the minimum requirements of balanced diet and can meet the daily average energy and protein requirements for the Indian population.

© 2017 Elixir All rights reserved.

## Introduction

Nutrient contents of the diet provide all the nutrients to meet the human requirements in proper proportions for the different physiological activities. The amount of each nutrient needed for an individual depends upon his/her age, body weight and physiological status. The level of energy intake from food will balance energy expenditure when the individual has a body size and composition and protein requirement will balance the losses of nitrogen from the body in persons maintaining energy balance at modest levels of physical activity (FAO, 1973; 2001). The presence of nutrients in food consumption differs from one population to another population and from one geographical area to another depending on the availability of food, types of crops grown, and the cooking patterns. However, food consumption is variably affected by a whole range of factors including food availability, food accessibility and food choices, which in turn may be influenced by geography, demography, disposable income, socio-economic status, urbanization, globalization, religion, culture, marketing, and consumer attitude (Kearney, 2010). People's knowledge, attitudes and perceptions, traditions, culture, and social organization are the significant factors influencing food consumption patterns (Jenny and Egal, 2002; FAO, 2005). However, nutritional intake of people is determined by four major factors - the availability, type, quality of food as well as the income level of consumers. In most developing countries food is not sufficiently accessible to a very large segment of the population; the types of food consumed are often nutritionally inadvisable and the quality of food is poor (Peng, 1981). Further, the food consumption patterns were dominated largely by caloric foods and low in protein consumption as they rely on the availability of vegetables and fruits in the market and household income (Abdalla and Leonhauser, 2013). This inconsistency may be due to changes between rural and urban areas (NIN and WB, 1991); different study methods and sample size (Tuyen et al., 2002), different incomes, food availability, transportation, and eating habits of various populations (Glewwe et al., 2002). The place of residence, family income, and household size, education of the head of household, ethnicity, and ecological region is significantly associated with energy (calorie) intake (Dien et al., 2004). However, assessing dietary intake allows public health agencies and organizations to determine whether the population or subgroups within the population have inadequate intake or excess intake of specific nutrients (NHANES, 1999-2000).

The present study focuses on the calorie and protein consumption and its association with socio-economic variables of Gond tribe of Bilaspur district, Chhattisgarh state, India. This study helped to assess the standard dietary intake values when compared with the daily average energy and protein intake safe values as suggested by Food and Agricultural Organization of the United Nations (FAO). Since 1948, FAO has convened numerous expert groups in the field of nutrition to collate, evaluate and interpret current scientific knowledge in order to derive estimates of human energy requirements and use these estimates to provide recommendations to people and policy makers. However, human energy requirements are essential for assessing whether food supplies are adequate to meet a population's nutritional needs.

### Material and Methods

A dietary survey was conducted among Gond tribe of Melnadih village, Karra Gram Panchayat, Kota Tehsil, Bilaspur district, Chhattisgarh, from the housewives by employing 24-hour recall method and direct weighing method.

Out of 42 tribes in Chhattisgarh, Gond is the most populous tribe with a population of 3,659,384 constituting 55.3 percent of the total ST population (Census of India, 2001). Out of the total population of Chhattisgarh State, around 76.76 percent live in the villages of rural areas. The total ST population of Bilaspur is 498,469, out of which 248,172 are males and 250,297 are females and the total ST population of Kota tehsil is 83,691 of which 41,884 are males and 41,807 are females (Census of India, 2011). Bilaspur district is famous for its rice quality, kosa silk and cultural background. Gond people are Dravidian people in Central India, spread over the states of Madhya Pradesh, Eastern Maharashtra, Chhattisgarh, Uttar Pradesh, Northern Andhra Pradesh, and Western Odisha. They are designated as scheduled tribe in Andhra Pradesh, Uttar Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Odisha and West Bengal. About half of Gond populations speak *Gondi* language while the rest speak Indo-Aryan languages including Hindi. The primary occupation of Gond tribe is agriculture, where rice is grown predominantly as rain fed crop.

The data was collected from a sample of 42 households<sup>1</sup> selected through a simple random method for choosing informants from Melnadih village during the year 2014-2015. 24-hour recall method of diet survey was adopted which helped to assess the calorie and protein intake of the family members by using oral questions mostly suited to the local conditions. The housewife, a key informant for the study was enquired about the type of preparations made for the families as a whole and the ingredients that are used in each preparation. The raw quantity used in the preparation was considered for measurement. Measuring cups as used by the mothers suitable to local conditions considered in measuring raw rice, pulses, and other cereals is done to assess the cooked intake of the family directly in terms of raw amounts of rice. The standard values (calorie and protein) of the food items were noted from Nutritive Value of Indian Foods (NIN, 2009). The average energy requirement was calculated by considering the type of physical activity performed by the selected group whose primary occupation is agriculture followed by wage labor activities. The mean height of both the sexes is  $\geq 168$  cms. and mean weight of 65 kgs. The median body mass index (BMI) of Gond tribe is 23.2 kg/m<sup>2</sup>. The consumption unit of the individuals was calculated based on the occupational category. The consumption unit of each member of the family was computed to know the total consumption unit. The mean age group of the respondents is 30 years of age.

The family intake in terms of raw amount is calculated as follows:

Raw amount of food intake = Standard value of the food item X Total amount used in each preparation

Total Calorie intake = Total caloric value of each preparation

-----  
Consumption Unit

Total Protein intake = Total protein value of each preparation

-----  
Consumption Unit

**Table 1. Co-efficient for computing calorie requirement of different groups**

Group	Type	Consumption Unit (CU) <sup>2</sup>
Adult Male	Sedentary worker	1.0
Adult Male	Moderate worker	1.2
Adult Male	Heavy worker	1.6
Adult Female	Sedentary worker	0.8
Adult Female	Moderate worker	0.9
Adult Female	Heavy worker	1.2
Adolescents	12 to 21 years	1.0
Children	9 to 12 years	0.8
Children	7 to 9 years	0.7
Children	5 to 7 years	0.6
Children	3 to 5 years	0.5
Children	1 to 3 years	0.4

(Source: NIN, Hyderabad ).

### Results and Discussion

The main source of energy in most of the Indian diets is carbohydrates derived largely from cereals present in them. These cereals constitute 80% of our diet and provide 50-80% of daily energy intake. However energy contribution from diets varies very widely (NIN, RDA- 2010). The average daily intake of each type of food is calculated from the total weigh of raw food actually cooked for the family.

<sup>1</sup> Consisting of working males and non-pregnant non-lactating working and non-working women.

<sup>2</sup> Consumption unit of the study population calculated based on the type of work chosen by the family member.

**Table 2. Sex Distribution among Gond Population.**

Tribe	Male	Percentage (%)	Female	Percentage (%)	Total	Percentage (%)	Sex ratio=F/M * 100
Gond	124	47.33	138	52.67	262	100	111.3

Sex structure is an easily identifiable characteristic of any population group. Table 2 shows the percentage of males and females in the population. It is reported that the percentage of females (52.87%) is more than the number of males (47.12%) in the proportion of Gond population in the study area. Further, the sex ratio, a frequently used measure may either be expressed as the number of males per 1000 females or as the number of females per 100 males. According to 2001 Census, the overall sex ratio of the Gond population in Chhattisgarh is 101.8 females per 100 males show more preponderance of females. This is significantly higher than the sex ratio of national average of 978 females for the total ST population. However, the sex ratio among the present study population shows 111.3 females per 100 males indicating slight preponderance of females.

**Table3. Age-Sex Distribution among Gond Population.**

Age group	Male	Percentage (%)	Female	Percentage (%)	Total	Percentage(%)
0-11	2	40	3	60	5	1.91
1-5	9	52.94	8	47.05	5	6.49
6-10	9	52.94	8	47.05	17	6.49
11-15	11	44	14	56	25	9.54
16-20	13	40.62	19	59.37	32	12.21
21-25	24	52.17	22	47.82	46	17.56
26-30	14	58.33	10	41.66	24	9.16
31-35	6	33.33	12	66.66	18	6.87
36-40	9	50	9	50	18	6.87
41-45	9	60	6	40	15	5.73
46-50	5	35.71	9	64.28	14	5.34
51-55	6	60	4	40	10	3.82
56-60	1	33.33	2	66.66	3	1.14
60+	6	33.33	12	66.66	18	6.87
<b>Total</b>	<b>124</b>	<b>47.32</b>	<b>138</b>	<b>52.67</b>	<b>262</b>	<b>100.00</b>

Sex and age are the basic characteristics or the biological attributes of any demographic group and affect not only its demographic but also its social, economic and political structure, for they influence birth and death rate, internal migration, marital status composition, manpower, gross national product, planning regarding educational, medical services and housing. The age structure of any population is studied with the help of simple mathematical measure like per cent distribution. Population data are invariably classified by sex and age category. Sex and age are visible, indisputable, and convenient indicators of social status.

Sex and age are the basic characteristics or the biological attributes of any demographic group and affect not only its demographic but also its social, economic and political structure, for they influence birth and death rate, internal migration, marital status composition, manpower, gross national product, planning regarding educational, medical services and housing. The age structure of any population is studied with the help of simple mathematical measure like per cent distribution. Population data are invariably classified by sex and age category. Sex and age are visible, indisputable, and convenient indicators of social status. The age-sex distribution of Gond population is presented in Table 3 which was conventionally divided into 5 year age group intervals from 1 to 60+ years age group. The infants were represented from 0+ months to 11 months. The above data shows that there is maximum number of people in the age group 21-25 years (17.56%) followed by 16-20 years (12.21%). All the age groups shows almost similar population distribution except among 0-11 months (1.91%) infants and 56-60 years (1.14%) age group elders.

**Table 4. Marital Status among Gond Population.**

Category	Male	Percentage (%)	Female	Percentage (%)	Total	Percentage (%)
Married	57	43.84	73	56.15	130	<b>49.61</b>
Unmarried	66	56.89	50	43.10	116	<b>44.27</b>
Widow	-	-	15	100	15	<b>5.72</b>
Widower	1	100	-	-	1	<b>0.38</b>
<b>Total</b>	<b>124</b>	<b>47.32</b>	<b>138</b>	<b>52.67</b>	<b>262</b>	<b>99.98</b>

The study of the characteristics of a population includes the study of the distribution of persons according to their marital status. Marriage involves the first step in the formation of a biological family. The pattern of marital status distribution of any society is determined by the combined effect of various biological, social, economic, religious and legal factors affecting marriage. The unique pattern of marriage among this group is practicing early marriages among females. This pattern is however, found among the study population which is presented in the Table 4.

The frequency of unmarried males (56.89%) outnumbered the frequency of married males (43.84%) while a reverse trend is observed among married females (56.15%) outnumbering unmarried females (43.10%) indicating that the marriageable age for girls is earlier than male members in the society. However, the study population shows higher frequency (49.61%) of married males and females put together. The proportion of widows (5.72%) is more than widowers (0.38%).

One of the important indicators of social development is the level of literacy and educational attainment, a high level of which is considered to be an important variable affecting the process of modernization. Educational attainment is generally measured by the percentage distribution of various levels of educational completion. Educational attainment of the present study population is presented in Table 5 shows that a sizeable percentage of population with a higher frequency of females (79.03%) falls under Non-

literate. Most of the males (80.95%) have completed undergraduate level of education when compared with overall educational level of the study population.

**Table 5. Educational Status among Gond Population.**

Literacy	Male	Percentage(%)	Female	Percentage(%)	Total	Percentage(%)
Non-literate	13	20.97	49	79.03	62	<b>25.31</b>
Primary	23	52.27	21	47.72	44	<b>17.96</b>
Secondary	27	55.10	22	44.89	49	<b>20.0</b>
High Secondary	34	50.75	33	49.25	67	<b>27.34</b>
Under Graduate	17	80.95	4	19.04	21	<b>8.57</b>
Post Graduate	2	100	-	-	2	<b>0.82</b>
<b>Total</b>	<b>116</b>	<b>47.35</b>	<b>129</b>	<b>52.65</b>	<b>245<sup>3</sup></b>	<b>100.00</b>

Only 0.82 percent males had completed post-graduation studies. Both males and females (27.34%) have completed higher secondary education. This shows that there is awareness and importance of education more among males rather than females among the study population.

**Table 6. Occupational Status among Gond Population.**

Occupation	Type	Male	Percentage (%)	Female	Percentage (%)	Total	Percentage (%)
Primary	Agriculture	23	74.19	8	25.80	31	<b>32.97</b>
	Wage Labor	7	77.77	2	22.22	9	<b>9.57</b>
	Non-Agriculture	8	57.14	6	42.85	14	<b>14.89</b>
	Service	4	100	-	-	4	<b>4.25</b>
Secondary <sup>4</sup>	Agriculture	1	100	-	-	1	<b>1.06</b>
	Wage Labor	8	66.66	4	33.33	12	<b>12.76</b>
	Non-Agriculture	1	100	-	-	1	<b>1.06</b>
	Service	19	86.36	3	13.63	22	<b>23.40</b>
<b>Total</b>		<b>71</b>	<b>75.53</b>	<b>23</b>	<b>24.47</b>	<b>94<sup>5</sup></b>	<b>100.00</b>

Occupational status among Gond population is presented in the Table 6 is categorized into primary and secondary types.

The types of occupation that were considered under primary and secondary occupation include agriculture, wage labor, non-agriculture and service. The primary occupation of the present study population is maximum (32.97%) in agriculture with more male participation (74.19%) when compared with female population (25.80%). According to Census of India, 2001, it is reported that the overall work participation of Gond tribe in Chhattisgarh district is 30.5 percent among agricultural labor category. Among the types of occupation, male work participation is more (77.77%) in wage labor of the primary category. Among secondary occupation type, the overall occupation status is more (23.40%) in service category. However, the male participation in work is also higher (86.36%) among service category when compared with all types of all types of occupation.

**Table 7. Distribution of Households according to Dietary Habits.**

Category	Number of Households	Percentage (%)
Vegetarian	4	9.52
Non-Vegetarian <sup>6</sup>	38	90.48
Both	42	100.00

The distribution of household according to dietary habits is discussed under the Table 7. It is reported that most of the Gond population are non-vegetarians consuming fish, egg, chicken etc as part of their diet. Only 9.52 percent of the study population is vegetarian and thus availing the nutrition supplements from vegetables.

The unit consumption of a reference man and woman is the average intake of food per day. The distribution of calorie and protein among Gond population is recorded in the Table 8.

It shows that the mean calorie consumption is 1890.73 Kcal. among the sample population indicates that there is low prevalence of 759.27 Kilo Calories when compared with the daily average energy requirement of 2650 Kilo Calories. Further, it is found that the mean protein consumption is 50.25gms. which is slightly lower than the daily average protein value as suggested by FAO (60gms.). However, a difference in prevalence of 9.8 low intake of protein is noted.

Table 9 shows occupation-wise consumption of calorie and protein values among the sample study. As the members of the study population practice agriculture, wage labor and other services, the overall consumption of calorie and protein values were calculated. The total number of households falling under the category of agriculture is 20 with a mean calorie consumption of 1645.02 Kcal. and mean protein value of 45.40gms. The number of households (12) belonging to wage labor category shows a mean calorie consumption of 2286.43Kcal. with a mean protein value of 57.50gms. It is observed that the mean calorie and mean protein intake of wage labor group is more than the members who opted to agriculture and other services as occupation. The mean

<sup>3</sup> 10 children who are below the age of 5 years and 7 children who have not enrolled in school are not considered to show the educational status.

<sup>4</sup> Persons who practiced primary occupation has also practiced secondary occupation during lean periods.

<sup>5</sup> The total includes only working respondents out of the total population investigated which includes dependents, i.e. children and old age persons of different age groups.

<sup>6</sup> Non-vegetarians include those who consume cooked meat and fish and, the amount consumed is counted in the form of number and quantity.

calorie consumption is 1502.49 Kcal. with a mean protein value of 41.83gms. among those who opt to other services to maintain their livelihood.

However, the mean calorie consumption is lower (2286.43Kcal.) among wage labors when compared with the daily average energy requirement (2650) Kilo Calories. It is noted that the mean protein consumption among wage labor is slightly lower (57.50gms) when compared with FAO standards (60gms.).

**Table 8. Per Day for Unit Consumption of Calorie and Protein among Gond.**

Number of Household	Mean Calorie Consumption (Cal.)	Mean Protein Consumption	FAO Daily Average values		% of Deficiency	
			Calorie	Protein	Calorie	Protein
38	1890.73	50.25	2650 K Cal.	60gm	(759.27)760 K Cal <sup>7</sup> (21%)	9.8

**Table 9. Occupation-wise Consumption of Calorie and Protein among Gond<sup>8</sup>.**

Occupational Category <sup>9</sup>	Number of Households <sup>10</sup>	Mean Calorie	Mean Protein	FAO Daily Average values <sup>11</sup>		Difference in prevalence of low intake	
				Calorie (Kcal.)	Protein (gms.)	Calorie (Kcal.)	Protein (gms.)
Agriculture	20	1645.02	45.40	2650	60	1004.98	14.6
Wage Labor	12	2286.43	57.50			363.57	2.5
Service	10	1502.49	41.83			1147.51	18.17

**Table 10. Mean Intake of Food Stuffs among Gond Population.**

Food Stuffs <sup>12</sup>	Number of Households	Mean Consumption
Cereals	38	446.94
Vegetables	36	254.83
Pulses	8	94.47
Fats & Oil	37	1.95
Sugar	19	5.40
Ata	12	108.09
Non-Vegetarian	7	151.02
Fruit (Papaya) papita	1	125

The structure of the food system is heavily influenced by the nature of its staples or locally available foods. Such foods are those that are eaten frequently and that generally supply a large portion of a people's caloric and protein intake.

Various food stuffs consumed can be analyzed in terms of their frequency or mean intake. The mean intake of various food stuffs among Gond community is represented in Table 10.

It is observed that cereals account to high mean intake of 446.94 indicating that all the sample households consume cereals as staple food. It is found that the mean intake of vegetables (254.83) by households is higher than the mean intake by non-vegetarian (151.02). However, the persons with non-vegetarian food choice also consumed vegetables and fruits locally available at weekly market.

**Table 11. Per Day Per Unit Consumption of Nutrients according to Family Size among Non-Vegetarians (without inclusion of dietary fibre).**

Family Size	Number of Households	Calorie	Protein	FAO Daily Average values <sup>13</sup>		Difference in prevalence of low intake	
				Calorie (Kcal.)	Protein (gms)	Calorie (Kcal.)	Protein (gms)
2	2	2232.81	54.05	2650	60	417.19	5.95
3	1	5496.77	164.63			+2846.77 <sup>14</sup>	+104.63 <sup>15</sup>
4	7	2310.62	54.51			339.38	5.49
5	6	1466.20	43.7			1183.8	16.3
6	7	1851.78	54.21			798.22	5.79
7	4	1500.86	36.1			1149.14	23.9
8	5	1807.18	48.16			842.82	11.84
9	4	1660.72	40.85			989.28	19.15
11	1	1372.78	41.95			1277.22	18.05
12	1	896.53	22.91			1753.47	37.09
67	38 <sup>16</sup>	2059.62	56.11			590.38	3.89

<sup>7</sup> Figure rounded up to 760 Kcal

<sup>8</sup> without considering the calculation of dietary fibre in the diet

<sup>9</sup> Three occupational types are considered and Non-agricultural is not used for computation of calorie and protein intake due to technical difficulties and inconsistency of the data.

<sup>10</sup> Individuals of house hold with vegetarian and non-vegetarian food choice. Figure rounded up to 760 Kcal.

<sup>11</sup> Daily average energy and protein intake for persons possessing mean height of  $\leq 170$  cms, mean weight of 65 kgs and a mean BMI  $\leq 24.9$  kg/m<sup>2</sup>.

<sup>12</sup> Persons who consumed cereals, pulses, vegetables and fruits, and others also consumed non-vegetarians, altogether accounting to 38 households.

<sup>13</sup> Daily average energy and protein requirement as defined by FAO/ WHO/ UNU

<sup>14</sup> More calorie intake reported in a family consisting of 3 members

<sup>15</sup> More protein intake reported in a family consisting of 3 members.

<sup>16</sup> The data is computed to show the calorie and protein intake among non-vegetarians only.

The mean intake of wheat flour<sup>17</sup> consumption is 108.09; mean intake of fruit (papaya) 125.0 indicating the local availability of fruit type in the study area, mean intake of pulses (94.47), mean intake of sugar (5.40), and mean intake of fats and oils is 1.95.

**Table 12. Calorie and Protein Consumption based on Consumption Unit.**

Household <sup>19</sup>	Consumption Unit <sup>20</sup>	Calorie consumption (Kilo Calories)	Protein consumption (Grams)
1	6.9	1451.06	34.18
2	9.3	1372.78	41.95
3	8	2269.04	45.29
4	6.8	2539.25	55.31
5	3.3	1928.90	42.10
6	3.9	2120.8	47.21
7	4	1804.06	39.43
8	3.6	2798.95	72.70
9	7.7	2087.52	90.47
10	2	2387.50	64.5
11	7.9	1958.99	64.5
12	4	2528.91	64.86
13	2.9	5496.77	164.63
14	8.8	1425.35	28.94
15	4.1	1064.93	25.17
16	7.7	1701.62	39.21
17	3.3	1782.19	36.73
18	4	1041.25	30.12
19	5.2	1116.58	27.92
20	4.9	1964.07	41.58
21	4.5	1813.61	43.49
22	4.5	2054.72	41.27
23	6.4	908.32	23.44
24	6.4	2527.48	58.86
25	6	2118.85	99.45
26	5.4	2117.39	50.88
27	4.9	1878.05	50.16
28	4.4	1012.53	34.48
29	4.8	1251.17	32.75
30	4.4	1493.43	67.48
31	4	1839.31	54.38
32	6.9	1164.13	22.38
33	10.2	896.53	22.91
34	4.4	1918.75	85.10
35	8.1	719.29	14.65
36	3.2	3492.02	71.42
37	4.6	1723.77	36.08
38 <sup>21</sup>	2	2078.12	43.61

The above table shows the distribution of families as per day per unit consumption of nutrients i.e. carbohydrates and proteins. It is reported that a single household consisting of 3 members in family<sup>18</sup> has high levels of consumption of calorie and protein than among families with more number of family members. Conversely, as the number of family size increased the intake levels of calorie and protein decreased (Refer table 11).

The calorie and protein consumption among the sample households is presented in the Table 12. It clearly depicts that the intake of calorie (5496.77 Kcal.) and protein consumption (164.33gms.) is found to be more in a family with the consumption unit 2.9 indicating that the total number of household members is small and availing the minimum requirements of balanced diet and meeting the standard values as suggested by FAO.

<sup>17</sup> Locally called as 'ata' prepared in the form of 'roti' and counted the number of pieces consumed by each member of the family.

<sup>18</sup> Minimum family size

<sup>19</sup> Household based on random sampling.

<sup>20</sup> Consumption unit calculated based on the type of occupation of the working individuals in each family and the number of dependents according to the age group.

<sup>21</sup> Calorie and Protein Consumption levels were calculated for the 38 households who belong to non-vegetarian food choice.

There are also families that are acquiring average calorie and protein intake and are maintaining the basic metabolism of the body requirements. A low calorie intake (896.53 Kcal.) and protein consumption of 22.91gms. is noted in a family with a consumption unit of 6.4. With a high consumption unit (8.8) in a family also had low calorie intake and protein consumption and not meeting the standards as recommended by FAO standards.

This indicates that there are many families in the village who are below the average daily intake and are not availing the recommended calories and proteins intake. This condition if persists for long duration, it results in undernutrition among the Gond community of Melnadih village.

### Conclusion

Recalled information from a sample household is interpreted after the insights developed from participant observation. Observation of ongoing food-related behavior is essential for understanding food preparation rules and the recipe patterns among Gond population. Ethnographic method helped to understand the community's food choice and the description of different occasions helped to know the meal pattern they followed, local availability of food varieties willingly consumed, and the intensive observations enabled the researcher(s) to apprehend family roles on food choices and type of preparation.

It is reported that most of the Gond population are non-vegetarians (90.48%) consuming fish, egg, and chicken as part of their diet. It shows that the mean calorie consumption is 1890.73 Kcal. among the sample population indicates that there is low prevalence of 759.27 Kilo Calories when compared with the daily average energy and protein intake by F.A.O.

The total number of households falling under the category of agriculture is 20 with a mean calorie consumption of 1645.02 Kcal. and mean protein value of 45.40 gms. The number of households (12) belonging to wage labor category shows a mean calorie consumption of 2286.43Kcal. with a mean protein value of 57.50 gms. It is observed that the mean calorie intake of wage labor group is more than the members who opted to agriculture and other services.

It is observed that cereals account to high mean intake of 446.94 indicating that all the sample households consume cereals as staple food.

It clearly depicts that the intake of calorie (5496.77 Kcal.) and protein consumption (164.33 gms.) is found to be more in a family with the consumption unit of 2.9 indicating that an ideal family size can avail the minimum requirements of balanced diet and can meet successfully the daily average intake.

It is found that the individuals cling to their native dishes or does not go away from the extent of food availability. Carbohydrate is one of our prime sources of energy, which can bring dividends to the diet and from health, economic standpoint; it should not be minimized as it is responsible for protein formation and basic metabolic rate.

Cooking in water or steaming increases the digestibility of some proteins by enhancing the nutritive value, the importance of this function is illustrated by the fact that proteins accessible from vegetables especially from soybeans and wheat (*ata*) have a higher biological value when cooked. It is also found that milk is diluted by mothers during supplementary feeding to children which is out of their reach and expensive too. Solely administering protein rich foods cannot resolve protein-calorie malnutrition due to the associated socio-economic problems.

Eating too little, skipping meals, eating at irregular hours are some of the shortcomings observed among the study population. However, food intake should be evaluated regularly and there is an urgent need for making it, a strong case for the importance of nutrition that would require discussion and sharing of concerns, issues and possible rationales for placing nutrition in the main stream of development.

The present study results recommend that the government should formulate strategies to allocate surplus land for cultivation, encourage horticulture, increase the level of agricultural production, and food supplies required for the study population.

### Acknowledgements

The authors express gratitude to the Gond tribe, Melnadih village, Kota block, Bilaspur district, Chhattisgarh who voluntarily participated in giving information on dietary practices.

### Conflict of Interests

The authors declare there is no conflict of interests in publishing this research work.

### References

- Abdalla S, Leonhauser I.U. Dietary food consumption patterns in Sudan. *Basic Research Journal of Agricultural Science and Review*, 2013, 2(9): 180-185.
- Census of India. Statistical Profile of Scheduled Tribes. Directorate of Census Operations in Chhattisgarh, Census of India. 2001.
- Census of India, 2011. Population Statistics. Directorate of Census Operations in Chhattisgarh, Census of India. 2011.
- Dien, Le Ngoc, Thang, NM, Bentley, ME. Food Consumption Patterns in the economic transition in Vietnam, *Asia Pacific J Clin Nutr*. 2004; 13(1): 40-47.
- F.A.O. EC/FAO Food Security Programme-Phase II 'Food Security Information for Action' Programme Work plan for the Republic of the Sudan. December, 2005.
- F.A.O. Nutrition Meetings Report Series, No. 52; WHO Technical Report (Energy and protein requirements: report of a Joint FAO/WHO Ad Hoc Expert Committee). 1973; Series, No. 522.
- F.A.O. Food and Nutrition Technical Report Series. Human energy requirements. Report of a Joint FAO/ WHO/ UNU Expert Consultation, Rome. 2001.
- Glewwe P, Koch S, Nguyen BL. Child Nutrition, Economic Growth and the Provision of Health Care Services in Vietnam in the 1990s. February 2002. Retrieved from online. [www.econ.worldbank.org/files/11787\\_wps2776.pdf](http://www.econ.worldbank.org/files/11787_wps2776.pdf)
- Gopalan C, Ramasastry B.V, Balsubramanian S.C. Nutritive value of Indian Foods. First Edition 1971. Revised and updated by Narasinga Rao B.S, Deosthale Y.G, Pant K.C, National Institute of Nutrition, Hyderabad. 2004.
- Indian Council of Medical Research. Nutrient requirements and Recommended Dietary Allowances for Indians. A Report of the Expert Group of Indian Council of Medical Research. 1990.

- Jenny A.L, Egal F. Household food security and nutrition in mountain areas- an often forgotten story. Nutrition Program Service, FAO-ESNP. October 2002.
- Kearney, J. Food consumption trends and drivers. *Phil. Trans. R. Soc.* 2010; 365: 2793–2807.
- National Institute of Nutrition. Diet Surveys. National Nutrition Monitoring Bureau (NNMB), National Institute of Nutrition, Hyderabad, 1979.
- National Institute of Nutrition and World Bank. Report on Re analyzing Data Collected by General Nutrition Survey 1987–1989. Hanoi, 1991.
- National Institute of Nutrition. Recommended Dietary Allowance 2010. Nutrient Requirements and Recommended Dietary Allowances for Indians, A Report of the Expert Group of the Indian Council of Medical Research, NIN. 2009.
- NHANES. Intake of Calories and Selected Nutrients for the United States Population, 1999-2000. Department of Health and Human Services, National Centre for Health Statistics, U.S. 1999-2000.
- Peng K.K. “Consumer Action: A Third World Approach” *Ceres. FAO Review on Agriculture and Development*, 1981, 81(14): 31-34.
- Tuyen LD, Bricas N, Mai LB, Maire B, Dop MC, Chung ND, et.al. Trends in Food Consumption and in the Nutritional Status in Urban Vietnam. 2002. <http://www.fao.org/ag/ags/agm/sada/asia/DOCS/DOC/Ledanh1.doc> (Retrieved from online)