International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

# Food Consumption Pattern and Dietary Adequacy Among *Bhils* of Udaipur (Rajasthan)

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**Abstract:** ***The Bhils commonly known as the desert dwellers are the largest tribal group in the Aravali belt of Rajasthan. This is the third largest tribal group of Indian sub-continent. The tribal populations are 'at risk' of under nutrition because of their dependence on primitive agricultural practices, and uncertainty of food supply. Total 100 families of Bhil tribe of Jhadol and Girwa panchayat samiti in Udaipur district of Rajasthan were interviewed through 24 hour recall method of diet survey to assess the food and nutrient intakes of all the individuals who had partaken the meals on that day combined with food frequency questionnaire. Gap between the mean intake and the recommended dietary allowances (RDA) value for nutrients like energy (1642 kcal/d in Jhadol and 1623/d kcal in Girwa), calcium (475 mg/d in Jhadol and 362.3mg/d in Girwa), iron (12.5mg/d in Jhadol and 12.9mg/d in Girwa), β-carotene (2782.4 mcg/d in Jhadol and 1612.4 mcg/d in Girwa), folate (6.29 mcg/d in Jhadol and 8.4 mcg/d in Girwa) and fat (17.2g/d in Jhadol), was high while their diets were found secured regarding intake of protein (58g/d in Jhadol and 59g/d in Girwa), fat (23.2g/d in Girwa), carbohydrate (317g/d in Jhadol and 280g/d in Girwa), ascorbic acid (66mg/d in Jhadol and 65.1mg/d in Girwa) and zinc (9.8mg/d in Jhadol and 10.4mg/d in Girwa). Diet of Bhils was found grossly inadequate in pulses, other vegetables, fats & oils and fruits, where as gap between the mean intake and the RDA value for nutrients was found high except protein, carbohydrate, ascorbic acid and zinc.***

**Keywords:** Bhil tribe, Food consumption pattern, Dietary adequacy, nutrient adequacy

## 1. Introduction

About half of the World's total populations of indigenous people, often referred as tribals, are living in India. A general feature of the tribal population of the country is their exclusive geographical habitat. The Bhils commonly known as the desert dwellers are the largest tribal group in the Aravali belt of Rajasthan. The National Nutrition Policy iterates, "*Nutrition effects development as much as development affects nutrition*'. 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. The tribal populations are 'at risk' of under nutrition because of their dependence on primitive agricultural practices, and uncertainty of food supply. Inadequate food habits along with traditional socio-cultural and biological activities may lead to a high proportion of under nutrition among children that also interferes with their body growth and development (Rao et al., 2006). Food consumption patterns can be defined as the recognizable ways of eating foods. Tribal people tend to adhere to their old eating patterns rather than venturing to seek new and more proper eating habits. In order to maintain healthful diets variety and balance of foods from all food groups and moderate consumption of all food items is very important (Jama, 2002). Many complex interacting systems affect man's food consumption patterns and his consequent state of health. Natural environment (climate, topography, and soil conditions) determines what food can be produced. Adequate food consumption pattern play an important role in development activities. Proper and adequate food consumption pattern is the instrument for achieving other developmental goals, most specially those connected to reduction in child mortality and improvements in maternal health, primary education enrollment and achievement, gender equity and the capacity to resist disease (ACC/SCN, 2000). The present study was carried out with the following objectives:

1. To assess the food consumption pattern of Bhil families.
2. To assess the dietary adequacy of Bhil tribes.

## 2. Methods

The study was conducted in Jhadol and Girwa panchayat samiti of Udaipur district. Ten villages each from Jhadol and Girwa panchayat samiti were selected randomly for the study. The villages were densely populated with Bhils. Ten families from each village of both panchayat samiti were selected making a total of 100 families. For accomplishing the present study, interview technique was used to gather information from the respondents. This section dealt with information related to the food consumption pattern of the people belonging to the Bhil tribe. 24 hour recall method of diet survey was carried out for one day, to assess the food and nutrient intakes of all the individuals who had partaken the meals on that day combined with food frequency questionnaire. Total quantity of each food item was noted in terms of household measures or numbers and consumption of food and nutrient was calculated by per adult consumption unit given by (ICMR, 1989).

The mean intake of different food stuffs consumed was then compared with the balanced diet (ICMR, 2010). Intake of 10 nutrients which includes protein, fat, carbohydrate, energy, calcium, iron, carotene, vitamin C, folate, and zinc were calculated. The nutrient intake was calculated using food composition tables (Gopalan et al., 1989). The intake of nutrient was compared with the RDA suggested by Indian Council of Medical Research (2010) for the adult sedentary male.

**Statistical Analysis**

The data was analyzed on the basis of per consumption unit. Information pertaining to consumption pattern of Jhadol and Girwa panchayat samiti was analyzed in Excel sheets and values were expressed as mean, standard deviation and standard error. t- test was applied to find out the significant difference between the mean values of food intake of families, food intake per adult consumption unit, percent adequacy of food intake, nutrient intake and percent adequacy of nutrient intake by Bhil families of Jhadol and Girwa panchayat samities.

## 3. Results and Discussion

**Household food intake**

Food consumed by Bhil families was calculated using 24 hour recall method for one day. Food intake of the families was affected by the seasonal variations like the consumption of maize and green vegetables was higher during the period of data collection i.e. November to February. Intake of all the food items was higher in Girwa panchayat samiti except the intake of milk and milk products and sugar which was higher in Jhadol panchayat samiti. Intake of food among Bhils was mainly influenced by their socio economic status which is very poor. It was very difficult for them to afford two square meals a day.

The mean intake of cereals in Jhadol panchayat samiti was 2035.4 g/d while in Girwa panchayat samiti the mean intake was 2113g/d as indicated in Table 1. Among cereals maize was consumed by majority of families due to its good production in these areas. Wheat was also cultivated but rice was not grown in both the panchayat samities. Pulses are not consumed daily due to their higher cost which is not affordable by Bhil families. Mean pulse intake by the families of Jhadol panchayat samiti was less i.e. 145.3g/day and in Girwa the mean intake was 217.9 g/d. The mean intake of milk and milk products was higher in families of Jhadol panchayat samiti i.e. 1490 ml/d as the consumption of buttermilk was higher in Jhadol than Girwa. While in Girwa the mean intake was 866ml/d. Due to high availability and low cost of green leafy vegetables during winter the mean intake of green leafy vegetables was higher in both the panchayat samities. Table 1 depicts that in Jhadol the mean intake of GLVs was 1085g/d and in Girwa the mean intake was 1198 g/day. The mean intake of root vegetables like potato and onion in Jhadol panchayat samiti was 329.4 g/d while in Girwa panchayat samiti it was 395.1g/d. Consumption of roots was higher as they are affordable by Bhil families and are also cheaper than other vegetables. The intake of other vegetables was low in both the panchayat samities especially in Jhadol due to low purchasing power. The mean intake of other vegetables was 402.1g/d in Jhadol panchayat samiti and 577.9g/d in Girwa panchayat samiti. The intake of fruits was very much low in both the panchayat samities .Very few families reported intake of fruits during study. Table 1 reveals that the mean intake of fruits in Jhadol panchayat samiti was 275g/d while in Girwa it was 529.1g/d. The mean intake of fats by the families of Jhadol panchayat samiti was 26.7g/d and in Girwa the mean intake was 35.2g/d higher than Jhadol main reason behind the low purchasing power of Bhil families especially in Jhadol. The mean intake of non vegetarian foods was 425g/d in Jhadol panchayat samiti due to low purchasing power while in Girwa it was 750g/d as revealed in Table 1. The frequency of consuming non vegetarian foods was less but the quantity consumed was found satisfactory. Intake of sugar was high in both the panchayat samities. In Jhadol the mean intake of sugar was 207.98g/d while it was low in Girwa i.e. 138.86g/d. There was siginificant difference in the intake of food stuffs among families of two panchayat samiti.

**Table 1:** Household food intake Jhadol and Girwa panchayat samiti

| Panchayat Samities | Details | Cereals | Pulses | M&MP | GLVS | Root Vegetables | Other vege-table | Fruits | Fats & oils | Non Veg | Sugar |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JHADOL | N | 50 | 16 | 50 | 20 | 28 | 29 | 3 | 27 | 7 | 50 |
| | Mean | 2035 | 145 | 1490 | 1085 | 329.4 | 402.1 | 275 | 26.7 | 425 | 208 |
| | SD | 661.1 | 41.1 | 641 | 244 | 56.1 | 104.5 | | 17.2 | 106 | 63 |
| | SE | 209.2 | 23.1 | 202 | 122 | 23.4 | 42.2 | | 7.6 | 75 | 20 |
| GIRWA | N | 50 | 27 | 50 | 28 | 24 | 36 | 8 | 35 | 11 | 50 |
| | Mean | 2113 | 217 | 866 | 1198 | 395.1 | 577.9 | 529 | 35.2 | 750 | 139 |
| | SD | 759.4 | 76.1 | 139 | 359 | 42.3 | 139.6 | 5.4 | 32.1 | 288 | 51.6 |
| | SE | 227.5 | 32.7 | 75.4 | 42.3 | 19.1 | 52.6 | 66 | 12.4 | 149 | 13 |
| t-value | | **1.07** | **7.09** | **13.3** | **2.42** | **9.25** | **11.14** | **7.49** | **4.4** | **5.47** | **11.1** |

**Food intake by adult consumption unit (g/CU/day)**

Food intake was calculated by dividing the mean intake of each food item by the family consumption unit. The family consumption unit was calculated as given by NIN (ICMR) 1989. The average consumption unit of Jhadol and Girwa was 5.5 and 5.9 respectively.

Persual of Table 2 indicates that the average intake of cereals per CU in Jhadol and Girwa was 365.4 g and 371g respectively which are almost equal to the recommended allowance for cereals. While the intake of pulses was very much lower than the recommended allowance due to their low purchasing power. Intake of pulses in Jhadol was 25.85g while in Girwa panchayat samiti the mean intake of pulses per CU was 33.28g. The intake of milk and milk products per CU was higher in Jhadol i.e. 267.6 ml than in Girwa where it was only 159.6 ml. The intake of milk and milk products was somewhat near to recommended values in Jhadol because majority of the families here include

buttermilk in their daily diet as it is available at cheaper rates than vegetables but in Girwa consumption of milk and milk products was only in the form of tea, they do not include buttermilk daily in their diet which leads to a wide gap between requirement and their intake. Mean intake of green leafy vegetable in Jhadol and Girwa panchayat samiti was 211.8g and 239.07g respectively. In Jhadol mean intake of root vegetable per CU was 64.14g while in Girwa the mean intake was 70.5g. The mean intake per CU for other vegetable in Jhadol and Girwa was 78.3g and 98g respectively. For fruits the mean intake per CU was 48.55g in Jhadol and 80.5 g in Girwa. Mean intake per CU for fats and oils in Jhadol panchayat samiti was very low i.e. 4.7g and in Girwa it was 6.02 g. In contrast with low consumption of non vegetarian foods as reported by Bhil families the intake per CU was found good i.e. 80.97g and in Girwa it was higher i.e. 152.32g per CU. In Jhadol and Girwa mean intake of sugar was 38.2g and 23.72g respectively. There was significant difference in the intake of all the food items in both the panchayat samities especially in the intake of milk and milk products and sugar the difference was highly significant.

**Table 2:** Food intake by adult consumption unit (g/CU/day)

| *Pancha-yat samities* | *Details* | *Cere-als* | *Pul-ses* | *M&MP* | *GLV* | *Root Vege-table* | *Other vege-table* | *Frui-ts* | *Fats & oils* | *Non Veg* | *Sugar* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JHADOL | N | 50 | 16 | 50 | 20 | 28 | 29 | 3 | 27 | 7 | 50 |
| | Mean | 365.4 | 25.85 | 267.6 | 211.8 | 64.14 | 78.3 | 48.55 | 4.7 | 80.9 | 38.2 |
| | SD | 86.3 | 4.47 | 86.89 | 61.67 | 13.8 | 34.62 | 10.52 | 4.17 | 39.8 | 12.3 |
| | SE | 27.3 | 2.52 | 30.55 | 30.53 | 9.4 | 13.8 | 7.44 | 2.01 | 28.1 | 3.9 |
| GIRWA | N | 50 | 27 | 50 | 28 | 24 | 36 | 8 | 35 | 11 | 50 |
| | Mean | 371.7 | 33.28 | 159.6 | 239 | 70.5 | 98 | 80.5 | 6.02 | 152 | 23.7 |
| | SD | 88.07 | 11.07 | 63.7 | 96.48 | 16.3 | 29.26 | 16.4 | 4.5 | 72.0 | 8.53 |
| | SE | 27.85 | 5.86 | 20.13 | 45.16 | 8.1 | 11.1 | 9.4 | 1.34 | 36.0 | 2.69 |
| t-value | | **2.70** | **5.20** | **14.04** | **2.20** | **2.99** | **4.92** | **6.27** | **2.9** | **4.62** | **13.5** |

**Percent adequacy of food intake by per adult consumption unit (per CU/day)**

Percent adequacy was calculated by dividing food intake per CU for each food item by recommended g/portion of balance diet of sedentary man (NIN/ICMR-2011).The value is then multiplied by 100 to get percent adequacy of food intake.

Data in Figure 1 reveals that the adequacy of cereals, GLVs and sugar was high in both the panchayat samities. The adequacy of milk and milk products was higher in Jhadol panchayat samiti due to higher intake of buttermilk and adequacy of non vegetarian food was higher in Girwa due to higher intake as compared in Jhadol. The adequacy of cereals in Jhadol and Girwa panchayat samities was adequate i.e. 97.4 percent and 99.12 percent respectively. Due to irregular intake of pulses by Bhil families which is influenced by their low purchasing power the adequacy was lower in both panchayat samities especially in Jhadol panchayat samiti i.e. 34.47 percent in Jhadol and 44.5 percent in Girwa. The adequacy of milk and milk products was 89.2 percent in Jhadol higher than Girwa which was only 53.1 percent. In Jhadol and Girwa panchayat samities the adequacy of green leafy vegetables was found to be 216.9 and 239 percent respectively much higher than the recommended value due to high availability of GLVs during winter season (period of data collection) and especially *bathua* which was available free of cost in abundance in wheat fields. Adequacy of root vegetables, other vegetables and fats and oils was low in both the panchayat samities; it was 32.02 and 35.2 percent for root vegetables, 40.88 and 49.02 percent for other vegetables, 19.1 and 24 percent for fats and oils in Jhadol and Girwa panchayat samiti respectively because Bhil families cannot afford intake of these items daily which effects their adequacy for these items. Due to rear consumption of fruits the adequacy for fruits was low in Jhadol than Girwa i.e. 38.8 percent and 76.3 percent respectively. In Jhadol the adequacy of non vegetarian foods was 80.9 percent while in Girwa the adequacy was much higher i.e.152 percent. Inspite of infrequent consumption of non vegetarian foods due to poverty the adequacy was found good in Jhadol while in Girwa it was much higher than RDI because whenever they consume nonveg food items, they consume it in good quantity. The consumption of sugar was much higher than recommended dietary intake in both panchayat samities i.e. 189 percent in Jhadol and 119 percent in Girwa.

There was significant difference in the adequacy of pulses, milk and milk products, root vegetables, other vegetables, fruits, fats and oils, non vegetarian foods, and sugar, while there was no significant difference in the adequacy of cereals and green leafy vegetables in both the panchayat samities.

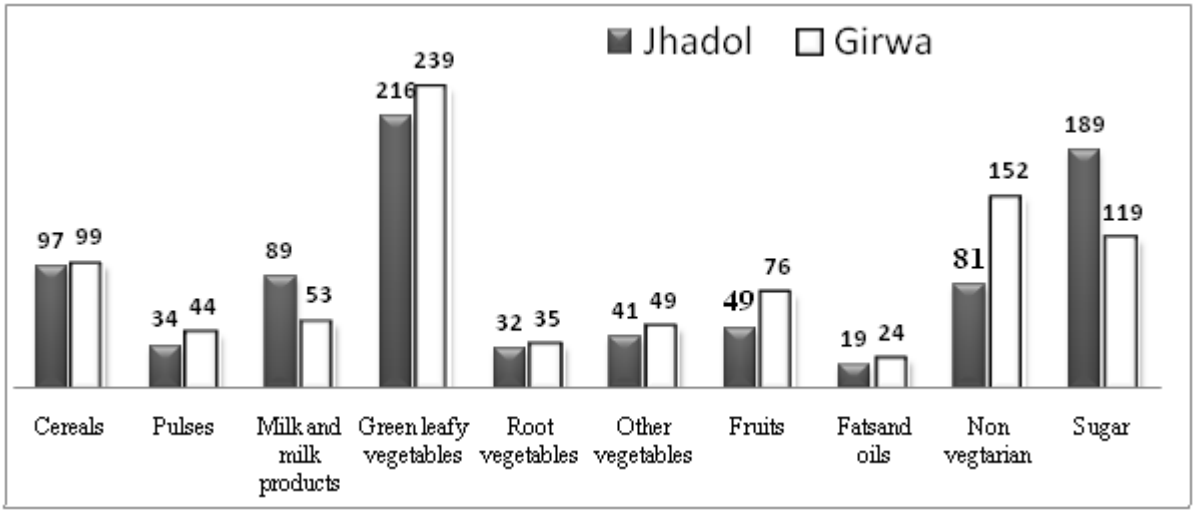


**Figure 1:** Percent adequacy (% RDI) of food intake by adult consumption unit (per CU/ day) in Jhadol and Girwa panchayat samiti

**Mean Nutrient Intake of the Family:** Mean nutrient intake of 100 families was calculated by using Food Composition Tables (ICMR 1989).Intake of 10 nutrients which includes protein, fat, carbohydrate, energy, calcium, iron, carotene, vitamin C, folate, and zinc were calculated.

***Protein*:** Data in Table 3 indicates that in Jhadol the mean protein intake was 58.02g and in Girwa it was 59.2g. In both the panchayat samities the intake was approximately equal to the RDA value. Intake of protein by Jenu kuruba and Yerava tribe was in line of respective RDA **(**Prabhakar and Gangadhar, 2011). Inspite of low intake of pulses their protein requirements is fulfilled by high intake of cereals especially maize, milk and milk products and during one day recall method the consumption of non vegetarian foods was found satisfactory which contrasts with the consumption pattern data. Non vegetarian foods are major source of protein in diets of Bhils (Bhattacharjee et al., 2009).There was no significant difference in the intake of protein in both the panchayat samities.

***Fat*:** As stated in consumption pattern of fats and oils most of the Bhil families do not include fats and oils daily the intake was found higher than the recommended values i.e. 17.2g in Jhadol and 23.2 g in Girwa as indicated in Table 3. Bhils are mainly maize eaters and the content of fat in maize is higher than wheat flour, they prefer goat milk which also contains slightly higher amount of fat than cow's milk and also the recommended dietary intake includes visible fat while the above values are combination of both visible and invisible fat. There was no significant difference in the intake of fat in both the panchayat samiti.

***Carbohydrate:*** The mean value of carbohydrate in the diets of surveyed households was 317.4g and 280g.There was no significant difference between the values of carbohydrate in both panchayat samities which is clearly depicted in Table 3.

***Energy***: The mean value of energy for Jhadol families was 1642.02 kcal and 1623.4 kcal for the families of Girwa which was less than the recommended value. The energy intake among Saharia tribe was below the recommended value (Rao et al., 2006). Table 3 depicts that there was no significant difference between the values of energy for both panchayat samities.

***Calcium****:* Among the five major food groups milk and milk products form a major source of calcium in diet and Bhil families mainly consume goat milk and buttermilk which contain very less amount of calcium as compared to calcium content of cow and buffalo milk. The mean value for calcium intake in Jhadol panchayat samiti was higher i.e. 475.02 mg due to higher intake of buttermilk while in Girwa it was 362.3mg. The intake of calcium was found lower than recommended value in both panchayat samities. There was significant difference in the values of calcium for both the panchayat samities.

***Iron***: Persual of Table 3 clearly depicts that the mean iron intake by families of Jhadol and Girwa panchayat samiti was almost same i.e. 12.5g and 12.9g respectively. The values are lower than the recommended allowances. Even due to good intake of green leafy vegetables and jaggery the values are lower because other food items consumed by Bhil families are not good sources of iron like maize flour contain half the amount of iron than wheat flour. There was no significant difference between the values of iron intake in both the panchayat samities.

***Carotene*:** The mean value of carotene intake in both the panchayat samities was much lower than the recommended value i.e. 2782.35mcg in Jhadol and 1612.4 mcg in Girwa. Only rich source of carotene included by Bhil families in their diets is maize. Other sources like goat milk has low amount of carotene. There was significant difference between the values of carotene intake in both the panchayat samities. The intake of vitamin A was much lower among the tribal population of Khammam District, Andhra Pradesh (Laxmaiah et al., 2007).

***Vitamin-C***: Mean value for intake of vitamin-C by families of Jhadol and Girwa panchayat samities was higher than the recommended value. Inclusion of *Bathua*, green chillies, coriander, tomato, cabbage, radish leaves, and ziziphus in

their diets contributes good amount of vitamin-C. Data in Table 3 indicates that in Jhadol panchayat samiti the mean intake was 66 mcg and 65.1mcg in Girwa panchayat samiti. There was no significant difference in the values of mean intake of vitamin-C in both panchayat samities.

***Folate*:** Mean intake of folate in diets of Bhils was much below the recommended values. In Jhadol the mean intake of folate was only 6.2 mcg while in Girwa it was 8.4 mcg as indicated in Table 3. This may be because of the diets taken by the Bhils are very poor sources of folate and among non vegetarian food, only chicken contain good amount of folate. There was significant difference in the intake of folate in both the panchayat samities.

***Zinc*:** In Jhadol the mean intake of zinc was 9.8mg and in Girwa it was 10.44mg. Maize, chillies, onion, potato, ziziphus, fresh dates are good sources of zinc which are included by Bhils in their diets. There was no significant difference in the values of zinc intake in both the panchayat samities which is clearly depicted in Table 3.

**Table 3:** Mean nutrient intake of the family

| Pancha-yat samities | Details | Protein (g) | Fat (g) | CHO (g) | Ene-rgy (kcal | Calc-ium (mg) | Iron (mg) | Carotene (µg) | Vit –C (mg) | Fola-te (µg) | Zinc (µg) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| JHADOL | Mean | 58.02 | 17.2 | 317.4 | 1642 | 475 | 12.5 | 2782 | 66 | 6.29 | 9.8 |
| | SD | 17.54 | 5.92 | 59.7 | 296.7 | 144.5 | 9.49 | 426.4 | 14.6 | 2.6 | 2.1 |
| | SE | 5.5 | 2.3 | 18.8 | 109.1 | 45.7 | 2.98 | 132.9 | 4.5 | 0.7 | 0.66 |
| GIRWA | Mean | 59.2 | 23.2 | 280 | 1623 | 362.3 | 12.9 | 1612 | 65.1 | 8.4 | 10.4 |
| | SD | 21.4 | 14.4 | 61.4 | 457.1 | 107.3 | 7.05 | 322.0 | 24.2 | 3 | 2.5 |
| | SE | 6.8 | 4.7 | 19.4 | 144.5 | 33.9 | 2.1 | 118.1 | 8.6 | 0.9 | 0.7 |
| t-value | | 0.46 | 0.58 | 0.85 | 0.05 | 1.47 | 0.07 | 5.09 | 0.05 | 0 | 0.33 |

***Percent Adequacy of Nutrient intake Per CU/Day*:** Percent adequacy was calculated by dividing mean nutrient intake value of families for each nutrient by the recommended dietary allowances for each nutrient and then multiplying the value by 100 to get the percent adequacy of nutrients in diets of Bhil families.

Figure 2 reveals that protein intake in both the panchayat samities was found adequate i.e. 96.6 percent in Jhadol and 98.6 percent in Girwa. Consumption of protein was adequate among Saharia tribe of Khammam district, Andhra Pradesh. Intake of fat was adequate in Girwa i.e. 83 per cent while in Jhadol it was 69 per cent. The adequacy of carbohydrate in the diets of Jhadol panchayat samiti and Girwa panchayat samiti was 91.1 and 80.4 percent respectively while the adequacy of energy was 70.7 percent for Jhadol families and 69.9 per cent for Girwa families. The adequacy of calcium intake for families of Jhadol panchayat samiti was 79.1 percent and for Girwa panchayat samiti it was 58.02 percent. The iron intake of Bhil families in Jhadol and Girwa panchayat samiti was 73.62 and 69.8 percent adequate respectively. The adequacy of carotene in the diets of Bhils was only 27.8 percent in Jhadol and 33.5 percent in Girwa while the adequacy of vitamin C intake in Jhadol and Girwa panchayat samiti was very high i.e.165.1 and 162.7 respectively. Among Korku tribe adequacy of ascorbic acid was higher in their diets (Das et al., 2010). The folate intake was very in adequate in both panchayat samities i.e. 3.1 percent and 4.2 percent in Girwa. The adequacy of zinc intake was 80.3 percent in Jhadol and 87.1 percent in Girwa. There was no significant difference in the adequacy of nutrients in both panchayat samiti except calcium and carotene.

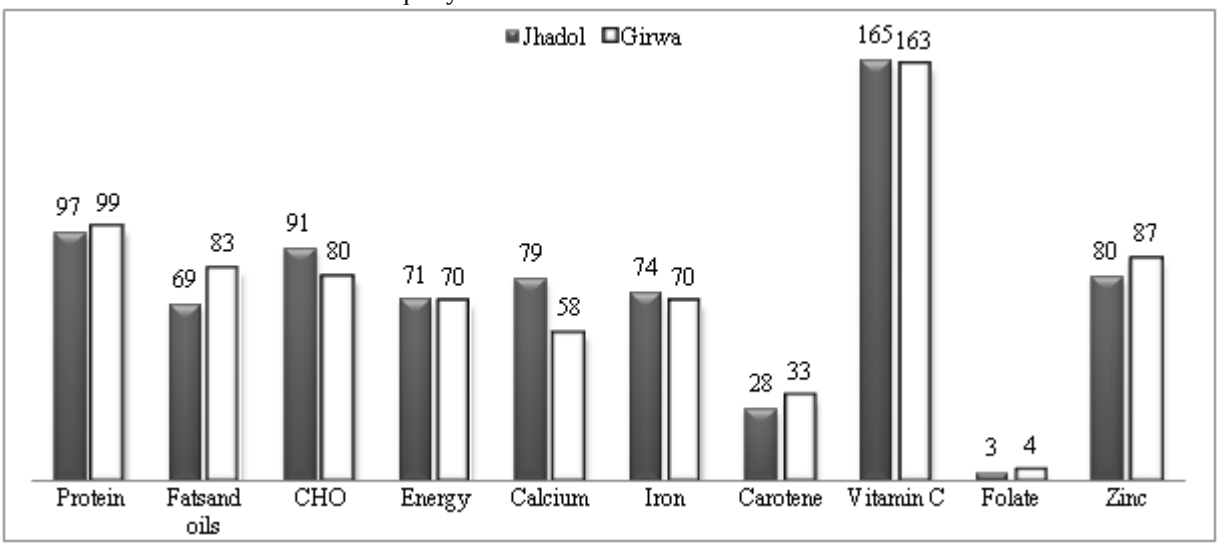


**Figure 2**: Percent adequacy (%RDA) of nutrient intake by adult consumption unit (per CU/day) in Jhadol and Girwa panchayat samiti

## 4. Conclusion

Consumption of food for Bhils is a means of satisfying hunger, the appetite of the stomach. Adequacy for cereals, GLVs and sugar was high in both the panchayat samities. Among cereals Bhils mostly consume maize and wheat. Rice is not cultivated in both areas thus consumed less. Among green leafy vegetables *bathua* was consumed by majority of the families in both panchayat samities as it is available free of cost in wheat fields. Bhils consume high amount of sugar in tea. The adequacy of milk and milk products was higher in Jhadol panchayat samiti due to higher intake of buttermilk .While the adequacy of pulses, root vegetables, other vegetables, fats and oils and fruits were low in both the panchayat samities. Due to low purchasing power Bhil families are unable to include these food stuffs daily in their diet specially pulses and fats and oils. Most of the families cook there by boiling method using buttermilk and this condition is high in Jhadol panchayat samiti. Buttermilk is cheaper than other food stuffs so it is used as substitute for vegetables, pulses. It is one of the reasons that consumption of buttermilk was higher in Jhadol because they are poorer than Bhils residing in Girwa panchayat samiti and thus cannot afford vegetables and pulses daily. Regarding nutrient intake diets of Bhils were found adequate in protein, fat, carbohydrate (CHO), vit- C, zinc. Inspite of low intake of pulses their protein requirements is fulfilled by high intake of cereals especially maize, milk and milk products and during one day recall method the consumption of non vegetarian foods was found satisfactory. Regarding fat Bhils are mainly maize eaters and the content of fat in maize is higher than wheat flour, they prefer goat milk which also contains slightly higher amount of fat than cow's milk and also the recommended dietary intake includes visible fat while the above values are combination of both visible and invisible fat. Inclusion of *Bathua*, green chillies, coriander, tomato, cabbage, radish leaves, and ziziphus in their diets contributes good amount of vitamin-C and maize, chillies, onion, potato, ziziphus, fresh dates are good sources of zinc which are included by Bhils in their diets. The diet of Bhils was found less adequate in energy, calcium, iron, carotene and folate. Inspite of adequate consumption of milk and milk products their adequacy for calcium is less because Bhil families mainly include goat milk and buttermilk which contain very less amount of calcium as compared to calcium content of cow and buffalo milk. Bhils are mainly maize eaters and the amount of iron in maize is approximately half the amount present in wheat and their diets did not contain any rich source of iron so their adequacy for iron is less. Due to very rear consumption of fruits the carotene content in their diet was less, the only source included by them is maize.

## 5. Acknowledgement

The authors acknowledge Department of Foods and Nutrition, College of Home Science, Maharana Pratap University of Agriculture and Technology and Tribal Research Institute, Udaipur, Rajasthan for their keen support during whole course of research work.

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