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Dietary intake and nutrient adequacy among tribal women in Udaipur district

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Abstract

The present study was conducted to assess the dietary intake and nutrient adequacy of the tribal women in Udaipur district, Rajasthan. A total of 200 tribal women were selected using simple random sampling from four tribal villages of the district. Dietary intake was assessed using the 24-hour dietary recall method, and nutrient intake was calculated using the Indian Food Composition Tables (IFCT, 2017). The mean intake was compared with the Recommended Dietary Intake (RDI) and Recommended Dietary Allowance (RDA) using the Z-test. The findings revealed that the dietary adequacy of cereals was highest (98.63%), whereas the intake of pulses, green leafy vegetables, other vegetables, fruits, roots, nuts, milk and milk products and edible oils was significantly below the recommended levels ($p < 0.001$). The mean intake of energy, protein, folate, retinol, calcium, and iron was significantly lower than the RDA, while fat, carbohydrate and dietary fibre intake exceeded the recommended levels. The study highlights poor dietary diversity and inadequate intake of several essential nutrients among tribal women, indicating the need for nutrition education, dietary diversification, and community-based nutrition interventions to improve their nutritional status.

Keywords: Tribal women, dietary intake, nutrient adequacy, dietary diversity, nutritional status

Introduction

According to the World Health Organization (WHO), "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 1948) [9]. Good health is essential for leading a productive life and improving the overall quality of life. Adequate nutrition is essential for maintaining health, work productivity and overall well-being. Women of reproductive age have higher nutritional requirements because of physiological demands associated with growth, menstruation, pregnancy, and lactation. Singh and Wadhawan (2019) [6] found that healthy dietary habits and adequate nutrient intake are associated with better menstrual health, while poor dietary habits may increase the risk of menstrual problems. Inadequate intake of energy, protein and essential micronutrients may adversely affect their nutritional status and increase the risk of poor health outcomes. Tribal women constitute one of the most nutritionally vulnerable population groups in India. Geographical isolation, poverty, food insecurity, low educational status and limited access to health and nutrition services contribute to inadequate dietary intake among these communities (Kapoor *et al.*, 2022) [2]. Rajasthan has a large tribal population, especially in districts such as Udaipur, where the Bhil tribe is predominant (Ministry of Tribal Affairs, 2022). Assessment of dietary intake is an important

step in understanding the nutritional status of a population. The 24-hour dietary recall method is widely used to estimate the amount of food consumed and to calculate daily nutrient intake. It helps identify whether the intake of energy, protein, fat, iron, calcium, vitamins and other nutrients is adequate (Thompson and Subar, 2017) [8].

Methodology

Participants were selected using a simple random sampling technique. A total of 200 tribal women from four selected tribal villages of Udaipur district, Rajasthan, were included in the study. Dietary intake was assessed using the 24-hour dietary recall method, wherein each respondent was asked to recall all foods and beverages consumed during the previous 24 hours. Standardized household utensils such as cups, bowls, spoons and glasses were used to estimate portion sizes, which were subsequently converted into raw food weights. The nutrient content of the foods consumed was calculated using the Indian Food Composition Tables (IFCT, 2017). Mean daily intake of energy, protein, fat, carbohydrates, calcium, iron and other nutrients was computed and compared with the ICMR–NIN Recommended Dietary Allowances (RDA, 2024) to assess nutrient adequacy and the Z-test was used to compare the mean daily intake of food groups and nutrients with the Recommended Dietary Intake (RDI)/Recommended Dietary Allowance (RDA).

Results and Discussion

The food intake and nutrient intake of tribal women were assessed using the 24-hour dietary recall method. The findings related to dietary intake and nutrient adequacy are

shown below.

1. Food intake of the tribal women

Table 1: Dietary Intake and Dietary Adequacy of Food Groups among Tribal Women

Food groups	RDI	Per day dietary intake	Adequacy	Z value	p value
Cereals	250g	246.56±90.31	98.63	-0.54	0.59
Legumes and pulses	45g	12.04±20.78	26.77	-22.42	< 0.0001
Green leafy vegetable	100g	44.80±88.30	44.81	-8.84	< 0.0001
Other vegetable	200g	70.09±65.23	35.05	-28.16	< 0.0001
Fruits	100g	7.28±39.33	7.29	-33.33	< 0.0001
Roots	100g	46.72±56.04	46.73	-13.44	< 0.0001
Nuts	30g	0.35±2.69	1.19	-155.66	< 0.0001
Milk and milk products	300	240.75±124.92	80.25	-6.71	< 0.0001
Edible oil seeds	25g	19.60±15.40	78.41	-4.96	< 0.0001

Significant at 0.01 level

The mean daily intake of different food groups was compared with the Recommended Dietary Intake (RDI) and dietary adequacy was calculated Table 1.

The mean daily intake of cereals was 246.56 ± 90.31 g, with a dietary adequacy of 98.63%, indicating that cereal consumption was almost comparable to the recommended intake of 250 g/day. The difference between the observed and recommended intake was statistically non-significant ($Z = -0.54$, $p = 0.59$).

The mean daily intake of legumes and pulses was 12.04 ± 20.78 g, with a dietary adequacy of 26.77 per cent, which was significantly lower than the recommended intake of 45 g/day ($Z = -22.42$, $p < 0.0001$). Similarly, the mean intake of green leafy vegetables was 44.80 ± 88.30 g, providing a dietary adequacy of 44.81 per cent and was significantly below the recommended intake of 100 g/day ($Z = -8.84$, $p < 0.0001$). Similarly, the mean intake of green leafy vegetables was 44.80 ± 88.30 g/day, meeting only 44.81 per cent of the recommended intake ($Z = -8.84$, $p < 0.0001$). The intake of other vegetables was 70.09 ± 65.23 g/day, corresponding to 35.05 per cent of the recommended 200 g/day, and was also significantly lower than the recommendation ($Z = -28.16$, $p < 0.0001$).

Fruit consumption was extremely low, with a mean intake of only 7.28 ± 39.33 g/day, fulfilling merely 7.29 per cent of the recommended 100 g/day ($Z = -33.33$, $p < 0.0001$). The intake of roots and tubers averaged 46.72 ± 56.04 g/day, which met

46.73 per cent of the recommended intake and was significantly lower than the RDI ($Z = -13.44$, $p < 0.0001$). Nuts were consumed in negligible amounts, with a mean intake of 0.35 ± 2.69 g and a dietary adequacy of only 1.19 per cent, which was significantly below the recommended intake of 30 g/day ($Z = -155.66$, $p < 0.0001$).

The mean daily intake of milk and milk products was 240.75 ± 124.92 ml, with a dietary adequacy of 80.25 per cent, which was significantly lower than the recommended intake of 300 ml/day ($Z = -6.71$, $p < 0.0001$) and the mean intake of edible oil and oilseeds was 19.60 ± 15.40 g/day, fulfilling 78.41 per cent of the recommended 25 g/day, and the difference was statistically significant ($Z = -4.96$, $p < 0.0001$).

The findings of the present study are consistent with those of Nayak and Sreegiri (2017) [3], who found significantly lower dietary adequacy of nutrient-rich food groups among tribal women, resulting in poor nutrient intake. Ghosh-Jerath *et al.* (2020) [1] also reported that Indian tribal women generally have low dietary diversity and inadequate consumption of protective foods, leading to poor dietary adequacy. Similar findings were reported by Ninama (2017) [5], who found that the dietary intake of pulses, vegetables, fruits, and milk among tribal women in southern Rajasthan was below the recommended dietary intake.

2. Nutrient intake of the tribal women

Table 2: Nutrient Intake and Nutrient Adequacy among Tribal Women

Nutrient	RDA Value	Actual Intake (Mean ± SD)	Percent Adequacy (per cent)	z-value	p-value
Energy (kcal)	2130	1313.27 ± 333.56	61.66	-34.63	<0.001**
Protein (g)	45.7	40.58 ± 11.18	88.80	-6.48	<0.001**
Total Fat (g)	25	35.14 ± 16.53	140.56	8.67	<0.001**
Carbohydrate (g)	130	202.40 ± 60.15	155.69	17.00	<0.001**
Total Dietary Fibre (g)	30	34.98 ± 11.60	116.60	6.07	<0.001**
Total Folate B9 (µg)	220	173.36 ± 79.01	78.80	-8.35	<0.001**
Total Ascorbic Acid (mg)	65	58.68 ± 57.28	90.28	-1.56	0.121
Retinol (µg)	840	124.65 ± 46.56	14.84	-217.19	<0.001**
Calcium (mg)	1000	472.82 ± 254.22	47.28	-29.31	<0.001**
Iron (mg)	29	13.62 ± 5.59	46.96	-38.85	<0.001**

** Significant at 0.01 level

Table 2 represents the dietary intake and per cent adequacy of selected nutrients among tribal women based on the 24-hour dietary recall method. The mean nutrient intake of the

respondents was compared with the respective Recommended Dietary Allowance (RDA) using a z test.

Energy: The mean daily energy intake of the respondents was 1313.27 ± 333.56 kcal, with a nutrient adequacy of 61.66% of the RDA. The intake was significantly lower than the recommended level ($Z = -34.63, p < 0.001$).

Protein: The mean protein intake was 40.58 ± 11.18 g, achieving 88.80% nutrient adequacy. The intake was significantly lower than the RDA ($Z = -6.48, p < 0.001$).

Total Fat: The mean total fat intake was 35.14 ± 16.53 g, with a nutrient adequacy of 140.56%. The intake was significantly higher than the RDA ($Z = 8.67, p < 0.001$).

Carbohydrate: The mean carbohydrate intake was 202.40 ± 60.15 g, providing 155.69% nutrient adequacy. The intake was significantly higher than the RDA ($Z = 17.00, p < 0.001$).

Total Dietary Fibre: The respondents consumed 34.98 ± 11.60 g of dietary fibre per day, with a nutrient adequacy of 116.60%. The intake was significantly higher than the RDA ($Z = 6.07, p < 0.001$).

Total Folates (Vitamin B9): The mean folate intake was 173.36 ± 79.01 µg, with a nutrient adequacy of 78.80%. The intake was significantly lower than the RDA ($Z = -8.35, p < 0.001$).

Total Ascorbic Acid (Vitamin C): The mean ascorbic acid intake was 58.68 ± 57.28 mg, with a nutrient adequacy of 90.28%. The difference from the RDA was statistically non-significant ($Z = -1.56, p = 0.121$).

Retinol (Vitamin A): The mean retinol intake was 124.65 ± 46.56 µg, corresponding to a nutrient adequacy of 14.84%. The intake was significantly lower than the RDA ($Z = -217.19, p < 0.001$).

Calcium: The mean calcium intake was 472.82 ± 254.22 mg, with a nutrient adequacy of 47.28%. The intake was significantly lower than the RDA ($Z = -29.31, p < 0.001$).

Iron: The mean iron intake was 13.62 ± 5.59 mg, providing 46.96% nutrient adequacy. The intake was significantly lower than the RDA ($Z = -38.85, p < 0.001$).

Similar findings were reported by Sharma and Meena (2018) [7], who reported poor nutrient intake and inadequate consumption of calcium- and iron-rich foods among tribal women in Rajasthan. Similar findings were reported by Negi *et al.* (2024) [4], who found inadequate intake of energy, protein, iron, calcium, vitamin A, folic acid, and vitamin C among Mawasi tribal women in Madhya Pradesh.

Conclusion

The present study demonstrated that the dietary intake of tribal women in Udaipur district was inadequate for most food groups and essential nutrients. While cereal intake was nearly adequate, the consumption of pulses, green leafy vegetables, other vegetables, fruits, nuts, milk and milk products was considerably below the recommended levels. The intake of energy, protein, folate, vitamin A, calcium, and iron was also insufficient, indicating poor dietary quality and

inadequate nutrient adequacy among the respondents. These findings emphasize the need for focused nutrition education, promotion of dietary diversification, and improved access to nutrient-rich foods through community-based nutrition programmes to enhance the nutritional status of tribal women

References

1. Ghosh-Jerath S, Kapoor R, Singh A, Downs S, Fanzo J, Margetts B. Diet quality, nutritional adequacy and anthropometric status among indigenous women of reproductive age group (15–49 years) in India: a narrative review. *Journal of Xenobiotics*. 2020;10(2):1-18.
2. Kapoor R, Sabharwal M, Ghosh-Jerath S. Diet quality, nutritional adequacy and anthropometric status among indigenous women of reproductive age group (15–49 years) in India: a narrative review. *Dietetics*. 2022;2(1):1-22.
3. Nayak MSDP, Srengiri S. A study on dietary habits and nutrient intake of tribal women in ITDA Paderu Division of Visakhapatnam District, Andhra Pradesh. *Journal of Community Health Management*. 2017;4(3):100-105.
4. Negi S, Jagre A, Negi RS. A study on the health and nutritional status of Mawasi tribal women in villages of Chitrakoot region in Madhya Pradesh, India. *Advances in Research*. 2024;25(2):81-92.
5. Ninama R. A study of nutrient intake of tribal women in Banswara district of Southern Rajasthan. *The Journal of Public Health*. 2017;119:263-268.
6. Singh M, Wadhawan N. Effect of dietary habits on menstrual problems in young girls. *International Journal of Current Microbiology and Applied Sciences*. 2019;8(7):279-286.
7. Sharma S, Meena MS. Nutritional status of tribal women (Saharia and Meena), Baran district of Rajasthan, India. *Nutrition & Food Science*. 2018;48(6):922-939.
8. Thompson FE, Subar AF. Dietary assessment methodology. In: *Nutrition in the Prevention and Treatment of Disease*. 4th ed. 2017.
9. World Health Organization. Constitution of the World Health Organization. 1948. <https://www.who.int/about/governance/constitution>