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Impact of Nutrition Education on Nutrition Knowledge of Tribal Women and Nutrient Intake of their Children (6 - 9 Year) from Gondia District

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Abstract: ***Education can change the personality and behavior of people. Food consumption of a family can reveal the quantity and quality of the family's nutrient intake and family's nutritional status. This study was conducted to show the impact of nutrition education on the nutrition knowledge of tribal women (120) and the nutrient intake of tribal children (60 boys and girls, 6 - 9 years) of Gondia District using a 72 - hour dietary recall. Dietary patterns and habits were studied and their nutrient intake was compared with RDA. A random sampling method was used. Data were analyzed by MS - Excel Package 2010 and SPSS software version - 16; paired t - tests were used for children's mean nutrient intake and nutrition knowledge of tribal women. A study showed a significant increase in the nutrient intake of tribal children after nutrition education. There was increase in the mean nutrient intake of boys of viz protein, Ca, Fe, vitamin C, K, and fiber; it was 2.61gm, 27.03mg, 7.06mg, 8.04mg, and 2.94gm respectively. A significant difference was also seen in the mean nutrient intake of girls of viz protein, Ca, Fe, vitamin C, K, and fiber; it was 1gm, 5.29mg, 4.62mg, 16.97mg, and 39gm respectively. A significant increase in the nutrition knowledge of tribal mothers of boys and girls, which was 9.13 (before NE M= 24.32 and after NE M= 33.45) and 9.93 (before NE M= 24.30 and after NE M= 34.23) respectively. Nutrient intake of children was deficient when compared with Recommended Dietary Allowances (RDA), before and after imparting nutrition education to tribal children's mothers. A positive impact of nutrition education was seen in the nutrition knowledge of tribal women after completing nutrition education.***

Keywords: Tribal, Nutrient Intake, Dietary Pattern, Nutrition Education

1. Introduction

Education is a lifelong, continuous process that never ends. Education has a very positive impact on our understanding, behavior, and qualities.

In today's period, proper nutrition is vital for a beneficial lifestyle and plays a role in maintaining good health. An individual's nutritional status generally depends on two factors, external factors such as food security, eating habits, cultural, social, and economic factors, and internal factors, including age, gender, nutrition, behaviour, and physical activity (14) (6). The food consumption pattern of a family can indicate the quantity and quality of the nutrient intake of the family and thus can determine the nutritional status of the family (15).

Nutrition education plays an important role in improving an individual's or communities nutritional status concerning food, health, and nutrition and in convincing them to adopt desirable food habits (8). Nutrition education - related programs are important as they target enhancing subjects and dietary - nutrient intake by promoting behavioral change like food choice and cooking ability - methods, motivation, and stilt the intention for change (7). According to the Census of 2011, the ST population in India was 104.5 million, accounting for 8.63 per cent of the total population of the country. Nutritional knowledge plays an important role in the selection of a healthy and nutritious diet. Inadequate nutritional knowledge leads to different nutritional problems and adverse dietary practices (12).

Nutrient intake should be balanced in individuals' diets, excess or deficiency of nutrients is not suitable for our health. Health and food have very important associations. Our body works according to what we eat. It is necessary to give proper nutrition to children and each individual for good health. Chapattis are made out of wheat flour only or many times with rice flour by tribals. Consumption of rice is more with sabzi (curry of any vegetable) Dal is used occasionally or many times there is no use of any type of dal. Tribal people hunt various kinds of wild animals like ghenga (snail), bagula (heron bird), gilhari (squirrel) and eat them by roasting or frying them. Most of the tribal people eat "pej" which is made of rice flour or wheat flour.

This study was done to examineimpact of nutrition education on nutrition knowledge of tribal women and nutrient intake of their children (6 - 9 year) from Gondia District. The objectives of this study were as follows -

Objectives:

- To study the socio - economic status of selected tribal children family.

- To study the dietary pattern and habits of tribal children.
- To study the nutrient intake of tribal children.
- To study the effect of nutrition education on nutritional knowledge of tribal mother and nutrient intake of tribal children.

2. Methodology

Source of data: In this study, the data was collected from tribal school - going children and their mothers in selected areas of the Gondia District.

Location of the study: The study was conducted in selected villages of Gondia District.

Study Population: The population includes school - going (6 - 9 years) tribal boys and girls.

Sample Size: Total 120 tribal children (60 tribal boys, 60 tribal girls) and their mothers were selected by purposive random sampling technique.

Method of data collection: An interview cum questionnaire schedule was used to collect data about the nutritional knowledge of tribal women and 24 - hour recall methods were used to collect data on the nutrient intake of tribal children from the subjects and their mothers. Nutrition education material was also prepared to provide nutrition education to tribal women. One hundred twenty tribal women and tribal children were selected before imparting nutrition education and the same women and children were selected after imparting nutrition education.72 - hours dietary recall questionnaire were used to know the nutrient intake of tribal children before and after imparting nutrition education to their mothers and compared nutrient intake with Recommended Dietary Allowances (RDA) 2020. A pre and post - Knowledge Attitude & Practice (KAP) questionnaire was made by the researcher to understand the knowledge of tribal children's mothers. A pre - KAP test was done before imparting the nutrition education program. The post - KAP test was administered after the intervention program. Nutrition education was implemented on various aspects of food and nutrition and considering the qualification of the women. More audio and visual aids and PPTs were used to deliver lectures. At the end of the programs, women were encouraged to ask any questions regarding the topics. The tribal women were given the post - KAP test 2–3 days after the completion of the program.

Data Analysis: Data were analyzed by MS - Excel Package 2010 and SPSS software version - 16; paired t - tests were used for children's mean nutrient intake and nutrition knowledge of tribal women.

Table 1: Socio - economic profile of mothers

Information related socioeconomic status of mothers is displayed in table no.1

Variables	Boys		Girls	
	Number	Percent (%)	Number	Percent (%)
Type of family				
Nuclear	51	85	47	78.33
Joint	9	15	13	21.66
No. of family members				
1 - 3	15	25	10	16.66
4 - 5	39	65	45	75
6 - 9	6	8.33	5	8.3
Monthly Family Income (SES level)				
≤3907 (VII)	-	-	4	6.66
3908 - 11707 (VI)	11	18.33	9	15
11708 - 19515 (V)	09	13.33	26	43.33
19516 - 29199 (IV)	24	60	11	18.33
29200 - 39032 (III)	16	26.66	10	16.66
39033 - 78062 (II)	-	-	-	-
≥78063 (I)	-	-	-	-
Type of House				
Kaccca house	32	53.33	38	63.33
Pakka house	28	46.66	22	36.66
Cooking fuel				
LPG	8	13.33	8	13.33
Bio gas	2	3.33	-	
Firewood	34	56.66	39	65
LPG and Firewood both	16	26.66	13	21.66

Table 1 revealed that the majority (85%) of boys' and (78.33%) of girls tribe children lived in nuclear families. Patale, C. et al. (2016) and Das et al. (2020) also observed maximum family lived in a nuclear family (68% and 65.33% respectively). The result showed that most of the tribal girls (75%) and boys (65%) had a family size of 4 - 6 members. The percentage of tribal children with family size 1 to 3 members was 17% whereas 8% children belong to family size with 6 to 9 members. Maximum tribal boys (60%) children's family belongs to SES level –IV, followed by SES level III (16.66%) and SES level VI (18.33%). Thirteen per cent of the boys family belongs to SES level V, Whereas Maximum tribal girls (43.33%) children's family belongs to SES level –V, followed by SES level IV (18%) and SES level III (16%). It was clear that 53.33% of tribal boys and 63% of tribal girls had kaccha house followed by 46 % of boy and 37% girls had pakka house respectively. Maximum tribal families were used firewood for cooking purposes (i. e.60 %) followed by 22.66% of tribal children's families used LPG and firewood both for cooking; Thirteen per cent of tribal families used LPG for cooking.

Table 2: Literacy status of mothers of tribal children

Education	Boys		Girls	
	N	%	N	%
Illiterate	2	3.33	5	8.33
Primary school	10	16.66	20	33.33
Middle school	20	33.33	21	35
SSC	19	31.66	9	15
HSC	7	11.66	4	6.66
Graduate	2	3.33	1	1.66

Table 2 revealed that most of the tribal mothers of boys and girls were literate. The findings of this study showed that 16% tribal mothers of boys acquired education up to the primary school level. Tribal mothers completing education up to middle school, SSC and HSC, graduate were 33.33%, 31.66%, 11.66% and 3.33 respectively. Illiterategond mothers of boys was 3.33 %. They were unable to understand some language such as Marathi, English It was found that tribal mothers of girls acquiring education up to the primary school level were 33.33%. Tribal mothers who completed education up to middle school, SSC and HSC, graduate were 35%, 15%, 6.66% and 1.66% respectively. Illiterate gond mothers of girls was only 8.33 %. Same trend was found by Omondi & Kirabira, Kumar, et al., and Sinha et al.

Table 3: Occupation of parents of tribal boys

Occupation	Boys				Girls			
	Mother		Father		Mother		Father	
	N	%	N	%	N	%	N	%
Farm wager	22	36.66	19	31.66	23	38.33	25	41.66
Gathering of forest products	6	10	5	8.33	10	16.66	4	6.66
Labors	18	30	28	46.66	16	26.66	22	36.66
Animal husbandry	7	11.66	6	10	7	11.66	2	3.33
Self - employed	3	5	2	5	-	-	7	11.66
House wife	4	6.66	-	-	5	8.33	-	-

Table 3 indicates the occupation of parents of boys. The result revealed that the maximum number of mothers were farm wagers and laborers (36.66 % & 30%). Twelve per cent of tribal mothers do animal husbandry. Tribal mothers (10%) gathered forest products, whereas 6.66 % of mothers were housewives. Only 5% of mothers were self - employed. The table shows that the maximum number of fathers was laborers (46%), followed by farm wagers 31.66 %.10% of fathers do animal husbandry. Only 8.33% and 5% of fathers of boys gathered forest products and they were self - employed. In terms of occupation of girls parents maximum were farm wager (40%), followed by labors (32%).16.66%, 11.66% and 8.33% of mothers of girl child were gathered forest products, do animal husbandry and house wife respectively.

Table 4: Distribution of children on the basis of Food Consumption pattern and habits

Food habits	Boys		Girls	
	Number	%	Number	%
Vegetarian	19	31.66	23	38.33
Non vegetarian	41	68.33	37	61.66
Meal Timing				
Regular	26	43.33	39	65
Irregular	34	56.66	21	35
Meal pattern				
LD	2	16.66	8	13.33
BLD	14	16.66	12	20
BLSD	40	66.66	33	55
LSD	4	6.66	7	11.66
Consumption of milk/day				
1 cup	15	25	8	13.33
2 - 3 cup	5	8.33	6	10
1 glass	12	20	2	3.33

No consumption	28	46.66	44	73.33
Consumed breakfast				
Roti+Tea	34	56.66	32	53.33
Murmura+Tea	16	26.66	11	18.33
Biscuit+ Tea	4	6.66	2	3.33
Upma/Poha	-	-		-
Consumption of salad/day/weekly 3 - 4 times				
Yes	12	20	9	15
No	48	80	51	85

Table no 4 shows the eating habits of tribal school - going boys and girls. The table indicates that the majority of respondents were non - vegetarian (60%). The meal timing of boys was irregular (56.66%) while maximum girls had regular meal timing (65%). The table shows that a maximum 66.66% of boys and 55% girls had four meal patterns i. e. BLSD.14% tribal children used to take only 2 meal pattern (LD) were 14%. Consumption of milk was not seen in maximum girls (74%) as compared to boys.20% tribal boys consumed 1glass/day of milk.1cup/day and 2 - 3 cup/day were 25% and 8.33% respectively. Girls consumption was very low i. e.3 %, 10% and 12.33% consumed milk 1glass/day, 1cup milk/day and 2 - 3 cup/day respectively. A maximum of 50% of boys and girls were consumed roti+ tea for breakfast followed by 22.66% who consumed murmura+tea.4.2 % of boys and girls consumed biscuits with tea. Salad were not consumed by maximum tribal children only 13% child they consumed salad weekly.

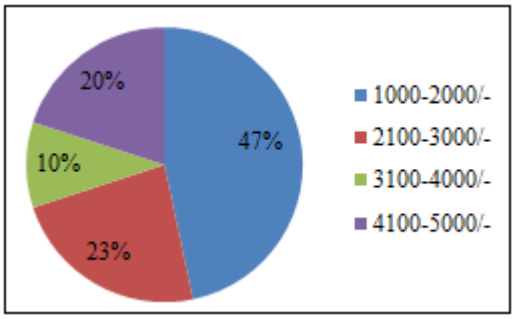

Figure 1: Monthly income spent on food by tribal Boys family

From figure no.1 it was found that 47% of tribal families of school - going boys spent 1000 - 2000/ - per month on food. Followed by 23.33% of tribal boys families spent 2100 - 3000/ - rs monthly on food. Twenty per cent of tribal families of boys spent 4100 - 5000/ - per month on food.

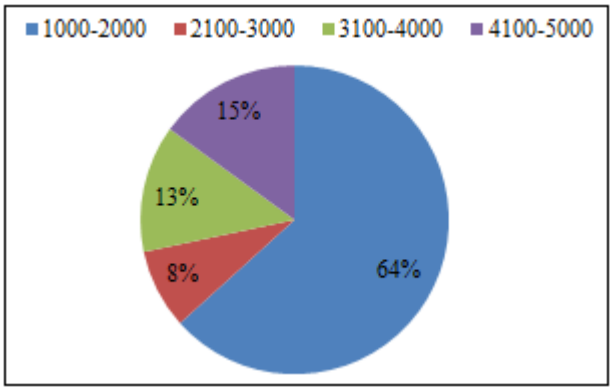

Figure 2: Monthly income spent on food by tribal Girls family

From figure no.2 it was found that 64% of tribal families of school - going girl spent Rs 1000 - 2000/ - per month on food, followed by 13% of tribal girls families who used to spent 3100 - 4000/ - Rs monthly on food.15% of tribal families of spent Rs 4100 - 5000/ - per month on food.

Dietary Assessment

Table 5: Comparison of mean nutrient intake of tribal boysbefore and after imparting nutrition education

Nutrient Intake			Boys Mean ± SD	Girl Mean ± SD
Pair 1	Energy (Kcal)	Before	1879.99 ±126.05	1793.86 ±252.38
		After	1822.16 ±125.56	1788.57 ±290.45
Pair 2	Carbohydrate (gm)	Before	159.91 ±15	159.21 ±11.73
		After	155.82 ±13.23	154.59 ±9.69
Pair 3	Fat (gm)	Before	25.09 ±2.90	21.89 ±2.24
		After	24.11 ±2.14	23.30 ±1.759
Pair 4	Protein (gm)	Before	18.55 ±4.37	15.63 ±3.54
		After	21.16 ±1.49	16.52 ±3.41
Pair 5	Fiber (gm)	Before	15.08 ±2.06	14.27 ±2.30
		After	18.02 ±2.04	15.08 ±2.47
Pair 6	Calcium (mg)	Before	502.97 ±173.23	324.69 ±102.97
		After	530 ±166.08	390.38 ±97.10
Pair 7	Iron (mg)	Before	11.76 ±2.68	9.66 ±2.07
		After	14.70 ±1.22	10.16 ±1.875
Pair 8	Sodium (mg)	Before	1659.20 ±171.14	1634.02 ±181.31
		After	1431.07 ±133.89	1493.20 ±145.17
Pair 9	Potassium (mg)	Before	1497.70 ±183.31	1600.08 ±265.79
		After	1594.23 ±170.90	1639.45 ±130.16
Pair 10	Vitamin –C (mg)	Before	34.62 ±10.95	35.28 ±15.41
		After	42.66 ±9.79	52.25 ±15.985

Pair 11	Vitamin A Carotene (mg)	Before	370.36 ±131.62	325.68 ±176.22
		After	449.73 ±75.20	348.46 ±162.38
Pair 12	Magnesium (mg)	Before	137.42 ±25.90	133.41 ±33.45
		After	154.97 ±25.23	154.82 ±33.58
Pair 13	Vitamin - B1 (mg)	Before	0.61 ±0.32	.58 ±.33
		After	0.62 ±0.39	.63 ±.38
Pair 14	Vitamin - B2 (mg)	Before	0.72 ±0.29	.52 ±.36
		After	0.57 ±0.37	.59 ±.41
Pair 15	Vitamin - B3 (mg)	Before	6.89 ±1.92	5.97 ±2.97
		After	7.49 ±1.73	6.74 ±2.00
Pair 16	Vitamin - B6 (mg)	Before	0.68 ±0.37	.61 ±.33
		After	0.66 ±.298	.69 ±.33
Pair 17	Vitamin B - 12 (mg)	Before	0.60 ±0.53	.28 ±.52
		After	0.93 ±0.60	.556 ±2.30

Table 6: Paired Sample test result of nutrients (Boy)

	Paired Differences						't ' value	df	Sig. (2 - tailed)
		Mean Difference	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre - Energy - Po - Energy	57.83	192.71	24.88	8.05	107.61	2.32	59.00	0.02
Pair 2	Pre - Carb - Po - Carb	4.10	18.63	2.40	- 0.71	8.91	1.70	59.00	0.09
Pair 3	Pre - Fat - Po - Fat	0.98	3.27	0.42	0.13	1.82	2.32	59.00	0.02
Pair 4	Pre - Protein - Po - Protein	- 2.61	4.38	0.57	- 3.74	- 1.48	- 4.61	59.00	0.00
Pair 5	Pre - Fiber - Po - Fiber	- 2.95	2.87	0.37	- 3.69	- 2.21	- 7.97	59.00	0.00
Pair 6	Pre - Ca - Po - Ca	- 27.02	65.24	8.42	- 43.88	- 10.17	- 3.21	59.00	0.00
Pair 7	Pre - Fe - Po - Fe	- 2.94	2.66	0.34	- 3.63	- 2.25	- 8.55	59.00	0.00
Pair 8	Pre - Na - Po - Na	228.13	215.46	27.82	172.47	283.79	8.20	59.00	0.00
Pair 9	Pre - K - Po - K	- 96.53	251.83	32.51	- 161.58	- 31.47	- 2.97	59.00	0.00
Pair 10	Pre - Vit - C - P - Vit - C	- 8.04	13.38	1.73	- 11.50	- 4.58	- 4.65	59.00	0.00
Pair 11	Pre - Vit - A - Po - Vit - A	- 79.37	150.78	19.47	- 118.32	- 40.42	- 4.08	59.00	0.00
Pair 12	Pre - Mg - Po - Mg	- 17.55	33.81	4.37	- 26.28	- 8.81	- 4.02	59.00	0.00
Pair 13	Pre - Vit - B1 - Po - Vit - B1	- 0.02	0.46	0.06	- 0.14	0.10	- 0.29	59.00	0.78
Pair 14	Pre - Vit - B2 - Po - Vit - B2	0.15	0.45	0.06	0.03	0.26	2.51	59.00	0.02
Pair 15	Pre - Vit - B3 - Po - Vit - B3	- 0.60	2.59	0.33	- 1.27	0.07	- 1.80	59.00	0.08
Pair 16	Pre - Vit - B6 - Po - Vit - B6	0.03	0.49	0.06	- 0.10	0.15	0.43	59.00	0.67
Pair 17	Pre - B12 - Po - B12	- 0.33	0.64	0.08	- 0.50	- 0.16	- 3.98	59.00	0.00

Table 7: Paired Sample test result of nutrients (Girl)

	Paired Differences						't ' value	df	Sig. (2 - tailed)
		Mean	SD	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre - Energy - Po - Energy	- 4.71	162.93	21.03	- 46.80	37.37	- .224	59	.824
Pair 2	Pre - Carb - Po - Carb	4.61	14.20	1.83	.94	8.28	2.517	59	.015
Pair 3	Pre - FAT - Po - FAT	- 1.40	1.83	.23	- 1.87	- .93	- 5.94	59	.000
Pair 4	Pre - Protein - Po - Protein	- .88	1.40	.18	- 1.25	- .525	- 4.89	59	.000
Pair 5	Pre - Fiber - Po - Fiber	- .81	2.18	.28	- 1.37	- .25	- 2.88	59	.005
Pair 6	Pre - Ca - Po - Ca	- 65.69	72.55	9.36	- 84.44	- 46.95	- 7.01	59	.000
Pair 7	Pre - Fe - Po - Fe	- .49	.92	.11	- .73	- .25	- 4.17	59	.000
Pair 8	Pre - Na - Po - Na	140.81	194.59	25.12	90.54	191.08	5.60	59	.000
Pair 9	Pre - K - Po - K	- 39.37	305.42	39.43	- 118.27	39.52	- .99	59	.322
Pair 10	Pre Vitamin 'C' - Po - Vitamin 'C'	- 16.97	16.09	2.07	- 21.13	- 12.81	- 8.17	59	.000
Pair 11	Pre - Vitamin A - Po Vitamin - A	- 22.77	48.79	6.29	- 35.38	- 10.17	- 3.61	59	.001
Pair 12	Pre - Mg - Po - Mg	- 21.40	34.17	4.41	- 30.23	- 12.58	- 4.85	59	.000
Pair 13	Pre - B1 - Po - B1	- .05	.21	.028	- .10	.003	- 1.86	59	.068
Pair 14	Pre - B2 - Po - B2	- .06	.42	.054	- .17	.045	- 1.16	59	.248
Pair 15	Pre - B3 - Po - B3	- .77	2.08	.26	- 1.31	- .234	- 2.87	59	.006
Pair 16	Pre - B6 - Po - B6	- .08	.25	.032	- .15	- .02	- 2.68	59	.009
Pair 17	Pre - B12 - Po - B12	- .27	.46	.06	- .39	- .15	- 4.57	59	.000

Tables no.5, 6 and 7 showed a significant increase in the mean nutrient intake of the tribal children (girls and boys) after imparting nutrition education. There was an increase in protein intake of boys, which was2.61g (before M=18.55 gm and after nutrition education M=21.16gm). Same result was found by Jyoshna, E. (2017). In terms of energy and carbohydrate intake was decreased after nutrition education, which was higher than RDA (Before M=1879.99 Kcal and after nutrition education M= 1822.16 Kcal). The Significant increase in mean fiber intake of boys and girls was also

increased, which was 2.94gm and 0.81gm ($p \leq 0.05$). A significant different was found in the mean nutrient intake of minerals of boys and girls after nutrition education, which was e. g. Ca=27.03mg; Fe=7.06 mg; Mg=17.97 mg; K=96.53 mg and Ca=5.29 mg; Fe=4.62; K=39 respectively. In terms of vitamins, there was an increase in vitamin - C intake of boys and girls, which was 8.04 mg (before M=34.62 mg and after M=42.66 mg) and 17.05 mg (before M=35.2 mg and after M=52.25mg) respectively. An insignificant difference was seen in the mean nutrient intake of the vitamin B complex ($p \geq 0.05$). Results revealed that the nutrient intake of tribal boys and girls was deficient as compared to RDA. Energy and carbohydrate intake were high as compared to RDA. Same result was found in the study of M. Sharma et al. (2020), Chakma et. al. (2014). Higher consumption of energy, carbohydrate and sodium was seen in both boys and girls; this same result was found by Bhanushali, et al. (2019), D. S. Natekar et al. (2015) and Radhamani K. V. et al. (2017)

Table 8: Comparative analysis of knowledge of tribal women in terms of nutrition before and after imparting nutrition education using paired t –test

		Mothers of Boys	Mothers of Girls
		Mean ± SD	Mean ± SD
Pair - 1	Pre total score of nutrition knowledge of tribal women	24.32 ±2.15	24.30 ±1.93
	Post total score of nutrition knowledge of tribal women	33.45 ±1.90	34.23 ±1.88

Table no.8 shows that the mean of pre - total score of nutrition knowledge of tribal mothers of boys was 24.32 ± 1.93 which increased to 33.45 ± 1.88 (i. e. mean of post - total score of nutrition knowledge of tribal women). A significant gain in nutritional knowledge of tribal mother of girls, was 9.93 (Before nutrition education mean was 24.30and after nutrition education mean was 34.23). Similar type of result was also observed by others, who Pavithra, G., Kumar S. G. & Roy G. (2020), Rezaei, O. M. and Miri, M. R. (2017) B. (2016) and Sangwan (2015) Sinha, R. & Sharma, B. (2013).

3. Conclusion

There was a significant increase in the mean nutrient intake of the tribal children (Boys and Girls) after nutrition education to their mothers (the significant level was $p<0.05$). It was also found that nutrition education among tribal women had a positive effect on their nutrition knowledge. Pre - scores of nutrition knowledge revealed that maximum tribal women had inadequate knowledge about various aspects of nutrition. A significant gain in knowledge scores (34.23 ± 1.88) of tribal women was found after the implementation of nutrition education in terms of various aspects of nutrition. In this way, nutrition education can be an encouraging step towards enhancing the children's nutritional status and the public's nutritional status.

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