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Agriculture and Health of Tribal Women in A Rural, Forestry, Hilly Region with Extremely Low Resources

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1. Abstract

Background

Good nutrition affects individuals, communities, national development. It is imperative that right food is available, and is consumed. Dietary diversity must ensure adequacy of requirements for optimal physical, mental health. Not much is known about villagers having land, crops grown, women's health.

Objectives: Study was done to know about family land, crop grown, food consumed by rural tribal women, their health.

Material methods

Information about land, crops grown, storage, food consumed was collected from nonpregnant women of 25 to 49 years in 100 villages, randomly minimum 10 from each village. Height, weight, hemoglobin were measured.

Results

For 1200 women interviewed, 36.3% owned land, 67.05% of them grew crops, 27.83% Cotton, 22.3% Maize, 23.02% Jawar (Sorgum Tortillae), 26.8% Wheat. Most (41.25%) used Dholi (Mud covered Bamboo baskets), Drums (29.75%), Bori (Sacs) 29% for storage. Over all 961(80.1%) had kitchen gardens, 22.58% grew Tomatoes, 23.4% Brinjal, 27.36% Chillies, 26.6% Spinach with some overlap. Usual meal was Wheat Roti (sort of bread) (25.83%), Jawar roti (17.08%) with Dal (cooked pulses), 18.16% Rice Dal, 22.16% Roti Vegetables. Only 24.16% had fruits, milk occasionally 47.25% were vegetarian, 32% sometimes took nonveg 20.7%, eggs, meat more often, 34 % had vit A deficiency symptoms, 17.5 % seemed to have goiter. Seven percent had hemoglobin <5gm%, 13.91% ≥5 to <7gm%, 37.5% ≥7-<9gm%, 32.25% ≥9 to < 11gm% and 9.33% ≥ 11 gm%. 30.4% had low Body Mass Index, 33.6% normal, 36.1% high BMI.

Conclusion

Less than one third families owned land. 67.05% of them had crop, 80% had kitchen gardens but mostly Brinjal, and Chillies were grown. Very few consumed vegetables. More than 90% were anaemic 7% severely anaemic. 30% had low BMI, 34 % symptoms of vit A deficiency 17.5 % probably had goitre. Lot needs to change. Of 1200 women 270 (22.50%) had low BMI, 431 (35.92%) had normal, 499 (41.58%) had high BMI.

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3. Introduction

3.1. Background

Good nutrition with direct effects on health, is crucial fundamental driver of wide range of developmental goals of individuals, communities and nations. For positive impact of nutrition on health, it is essential that right food is available and people take right food. However, providing a growing global population with sustainable healthy diet is a challenge. Though global food production was in pace with population growth, more than 820 million people have insufficient food and many consume low-quality food which lead to various nutritional deficiencies [1]. Raphael [2] opined that unhealthy diets pose a great risk to morbidity and mortality because a lot of the world's population is inadequately nourished and many environmental systems and processes are pushed beyond safe boundaries. Shrinivas et al [3] reported that due to lack of right diet, 28% women of reproductive age had anaemia. Lotfi et al [4] reported that a large proportion of the population continues to consume essentially, a cereal based diet fortified with various chemicals with some sort of micronutrient sufficiency.

Women and children are the worst sufferers in most of the situations of diversities. Women of reproductive age are at higher risk. For rural women's health it is essential to know whether they own land, whether they grow crops, what they grow, how they store what they use and how is their general health.

3.2. Objective

Present study was done to know about land with rural families, crop grown, food consumed, especially by rural tribal women and their health with mission of trying feasible and effective interventions for positive change.

3.3. Material and Methods

Present study was done after approval of ethics committee of the institute in rural tribal communities of hilly, forestry Melghat of Amravati of Maharashtra in Central India. Information was collected from randomly selected women of 25 to 49 years, minimum 10 from each village in 100 villages by using predesigned pretested tool in local language with some questions needing yes or no answers and others open. Information was collected about land owned, used for growing crops, storage and other items like vegetables and fruits grown, consumed. Information about cereal, food, vegetables, fruits and milk, consumed was also collected.

3.4. Results

For the 1200 women interviewed 435(36.3%) owned land and of them 291 (67.05%) grew crops, 67 (23.02%) grew Jawar (Sorgum Tortillae), 78 (26.8%) Wheat, 65 (22.3%) Maize and 81 (27.83%) Cotton. For storage of grains, 495 (41.25%) used Dholi (Bamboo basket with layer of mud), 357 (29.75%) used metallic drums and 348 (29%) used Bori (Juit Sacs). Over all 961(80.1%) reported having kitchen gardens, 217 (22.58%) grew Tomatoes, 225 (23.4%) Brinjal, 263 (27.36%) Chillies and 256 (26.6%) Spinach, with some overlap. When asked about their everyday meals, 205 women (17.08%) said it was Jawar Roti (sort of bread) with Daal (Cooked Pulses), 310 (25.83%) said Wheat Roti with Dal, 201 (16.75%) Roti with Dal, and vegetables, and 218 (18.16%) Rice with Dal. Only 217 of 1200 (18.08%) women said they occasionally had fruits, and 324 (27%) had milk sometimes. Many, 567 (47.25%) women consumed only vegetarian diet, 248(20.7%) consumed eggs and meat often and 385(32%) used to have mainly vegetarian diet with occasional nonvegetarian meals.

Of the 1200 women 84 (7%) had <5gm% hemoglobin, 167 (13.91%) $\geq$ 5 to <7gm%, 450 (37.5%) $\geq$7-<9gm%, 387 (32.25%) $\geq$9 to < 11gm%, and only 112 (9.33%) were nonanaemic, Hb $\geq$11% gm. Overall more than 90% women of child bearing age were anaemic, and 408 (34%) had some symptoms of vit A deficiency and 210 (17.5 %) seemed to have goiter. Of the 1200 women 270 (22.50%) had low BMI, 431 (35.92%) had

normal and 499 (41.58%) had high BMI.

3. Discussion

The human welfare losses associated with women's nutrition are wide-ranging and severe, including reduced quality of life for themselves, impaired ability to bear, nurture children, and diminished capacity for domestic and income generating work. Waiting for seeing a change through narrowly targeted feeding programmes for pregnant and lactating women or waiting for economic development, means allowing many women to die. It is essential to understand the ground realities and advocate doable and sustainable dynamic modalities in the existing system, especially for those who have scarce resources, and are likely to depend on agriculture crop, cereals and vegetables, fruits available. It is essential to understand what is happening and work in such a way that there is continuity and sustainability. A study revealed that there was no shortage of food in Uganda, yet majority of its poorest households were reported to be "food insecure," with poor health and disease exacerbated by malnutrition. Ugandan farmers, mostly women, were eager to improve upon their existing methods of farming and welcomed new, inventive ideas [5]. So, issues are global. What best can be done with available resources to improve maternal nutrition, tackling undernutrition and micronutrient deficiencies, obesity and related issues, is the need of the hour. They need right food with right food habits and practices. In a study in India, the mean consumption of almost all the food items was below the recommended and prescribed by Indian Council of Medical Research. The Tribal health repeat survey was carried out during 1998-1999 in 9 States of India [6] which revealed that the consumption of almost all the foodstuffs was lower than that of the previous two surveys. Severe undernutrition though has reduced still chronic energy deficiency (CED) among males was 49.3%, and among females, 55.3% [7]. The consumption of protective foods like green leafy vegetables, fruits, milk was grossly inadequate, consequently vitamin & mineral intake were very low. Only 16.75% consumed vegetables, 18.08% women said they occasionally had fruits, 27% had milk occasionally. Bitot spots, the objective sign of Vitamin 'A' deficiency was in 0.8% [8]. During 2005-06, survey the consumption of all the foods, except for cereals, roots & tubers was found to be below the recommended dietary intake (RDI), in all the age/sex/physiological groups in all the states [9]. ICMR [10] reported a marginal decline in the intake of almost all the foods and nutrients over 3 decades. Number of underweight decreased from 23% in 1998-1999 to 20% in 2008-2009 (only 3% decrease) and to 18% in 2016, much slower. WHO [11], reported increased number of undernourished people from an estimated 804 million in 2016 to almost 821 million in 2017 and 54.4% (53-7 to 55.2) women of 15 to 49 years ago were anaemic. Social and economic factors were not independently associated with fruit or vegetable intake. Greater fruits and vegetables intake were predicted by healthier dietary attitudes which in turn were related to social and community connections, rather than economic factors. Micronutrient deficiency study revealed widespread problem of deficiencies among vulnerable segments worse among tribals than their rural counterparts [11]. The United Nation-Food and Agriculture Organization [11] panel have reported that poor quality diet with lack of dietary diversity is greater threat to health than infectious diseases. Eating nutrient-rich foods would result in savings of resources of industrial food fortification. Fruits and vegetables (FV) being rich sources of antioxidants, fiber and other micronutrients should make a generous portion of an individual's diet. Majority of people consume far lesser than daily recommended FV and milk in India and the same was found in the present study also. Only 217 of 1200 (18.08%) had fruits and 201 (16.75%) took vegetables that too occasionally. Many women had kitchen gardens though not 100%, but mostly Chillis and Brinjals were grown, no Papaya or Banana, Guava, Custard apple, which are nutritional and not very

difficult to grow. Women mostly had wheat Roti or Jawar Roti with Dal.

Targeted agricultural guidance to rural communities has been reported to help in quality nutrition [12] Bose [13] reported that anaemia accounted for at least 20% of maternal mortality. In the present study more than 90% tribal nonpregnant women of child bearing age were anaemic, 20% had severe anaemia and 7% had very severe anaemia. Information about everyday food did reveal the obvious reasons. A study was carried out in Abbottabad and the results showed that the most common type of anemia was iron deficiency anemia that affected 68% people and was more common in women [14]. Present findings revealed that most women would not have become anaemic if they had enough iron intake. Good sources of iron, fruits, vegetables, whole grains, milk meat, fish, dry beans, egg, nuts have become too expensive for rural women. In the multivariate analysis, vitamin A insufficiency, socioeconomic status, and age were significantly associated with anemia [15]. Agricultural programs complement global efforts to stimulate productivity and thus increase income generation too which is very essential in the era of high food prices. In addition, they help families in quality nutrition [16]. However, some researchers have reported that evidence of effects on nutrition outcomes, in relation to home-based food production programme was inconclusive, with the exception of effects of vitamin A [12]. Evidence suggested that targeted agricultural programme were more successful when they incorporated strong behaviour change, communication strategies and a gender-equity focus [17, 18]. It is essential that in agriculture related matters, feasible and sustainable advocacy is done with support where needed, as was found necessary in the present study. Weaknesses in programme designs and implementation have contributed to the limited evidence of nutritional outcomes so far [12,18]. The National Nutrition Monitoring Bureau survey in India revealed that over 40 years, the proportion of landless people in rural areas grew from 30% to 40%, and the proportion of people who were owners and cultivators decreased by almost half. Food inflation increased at a faster rate than overall inflation (10% versus 6.7%). So, most rural people were neither growing food, nor buying it in adequate quantities. Though India reduced malnutrition, but it was still 13 times worse than Brazil, nine times worse than China and three times worse than even South Africa [19]. In the present study only, 435 of 1200 (36.25%) had land and only 291 of 435 (67%) grew crop. Only 291 of 1200 (24.25%) rural women had some crop of their own but not for their own needs. Not everything was edible. Even in kitchen gardens, no one grew Papaya, Banana or Guava, Custard apple or even Potatoes. To achieve Sustainable Development Goal (SDG) it is essential to meet diverse, yet specific, targets the nutritional needs specially of vulnerable groups [20].

Nutrition interventions for mother's health will have synergistic effects on the health of family. Solutions need to involve deep understanding of the ground realities. They may target gaps in knowledge or gaps in use. Advocacy needs to be adaptable and scalable across a range with local contexts, regions and geographies as per need, with sustainability in mind. Not much is known about many issues about agriculture, what villagers grow, what and how much they use, and how they store. It is essential to know about food available and consumed underweight and overweight, deficiencies, anaemia and so on. Kerala was not a high per capita income state, yet the nutritional indicators for children, were far superior to other States. 47.25% women consumed only vegetarian diet, 20.7%, consumed eggs and meat more often and 32% consumed mainly vegetarian, diet and occasionally nonvegetarian food. The survey only confirmed what was known for long that nutritional outcomes are a function of household wealth and income. Malnutrition continues to be the leading risk factor for disease burden in India. The trends up to 2017 indicated that substantially higher rates of

improvement will be needed for malnutrition indicators in most states to achieve the Indian 2022 and the global 2030 targets [21].

Malnutrition is indeed a global emergency, and courageous and timely actions are needed from governments, media outlets, non-governmental organisations, and civil society [22]. Nevertheless, Abbas [23] reported that a reduction in malnutrition is only possible if there is political will, economic stability, and a prioritisation of malnutrition as public policy and a developmental issue by governments, especially in developing countries.

An alternative and better vision could be active support to farmers to grow millets, fruits and vegetables through long standing agricultural reforms. A complete overhaul in approach, beginning with the universalisation of the Public Distribution System, making items such as fruits, eggs and vegetables affordable for all on a regular basis and ensuring that people have the purchasing power to sustain themselves and their families, is the need of the hour. All this would require higher investments, but more than that an alternative vision that looks to support all peoples to feed themselves well and enough.

Table I: Anaemia in rural tribal women of reproductive age.

Variables Age	Total	Hemoglobin									
		>5 gm	%	≥5-<7 gm	%	≥7-<9 gm	%	≥9-< 11 gm	%	≥11 gm	%
25-29	256	38	14.85	47	18.35	127	49.6	88	34.37	21	8.2
30-34	249	13	5.22	24	9.63	76	33.52	69	27.71	47	18.87
34-39	201	11	5.47	32	15.92	45	22.38	71	35.32	22	10.94
39-44	264	13	4.92	54	20.45	101	38.25	59	22.34	12	4.54
45-49	230	9	3.91	10	4.34	101	43.91	100	43.47	10	4.34
Total	1200	84	7	167	13.91	450	37.5	387	32.25	112	9.33
Education											
Illiterate	435	13	2.98	65	15.17	232	53.33	113	25.97	12	2.75
Primary	386	28	7.25	36	9.32	98	25.38	182	47.15	42	10.88
Secondary	230	15	6.52	36	15.65	90	39.13	46	20	43	18.69
Higher Secondary	95	12	12.63	24	25.26	10	10.52	36	37.89	9	9.47
Graduate	54	12	22.22	6	11.11	20	37.03	10	18.51	6	11.11
Total	1200	84	7	162	13.91	450	37.5	387	32.25	112	9.33
Economic Class											
Upper	61	10	61	8	13.11	26	42.62	11	18.03	6	9.83
Upper Middle	56	9	10.71	5	8.92	22	39.28	12	21.42	8	14.28
Middle	256	25	9.76	65	25.39	78	30.46	49	19.14	39	15.23
Upper Lower	388	19	4.89	24	6.18	125	32.21	209	53.86	11	2.83
Lower	439	21	4.78	65	14.8	199	45.33	106	24.14	48	10.9
Total	1200	84	7	167	13.91	450	37.5	387	32.25	112	9.33
Profession											
Housewife	375	28	7.46	45	12	162	43.2	75	20	65	17.33
Laborer	532	27	5.07	63	11.81	163	30.63	254	47.74	25	4.69
Own Farm Owner	293	29	9.89	59	20.13	125	42.66	58	19.79	22	7.5
Total	1200	84	7	167	13.91	450	37.5	387	32.25	112	9.34
Parity											
P2	170	30	17.64	42	24.7	32	18.82	38	22.35	28	16.47

P3	265	12	4.528	37	13.96	101	38.11	85	32.1	30	11.3
P4	325	21	6.462	46	14.15	159	48.92	78	24	21	6.46
P5 Above	440	21	4.773	42	9.545	158	35.91	186	42.3	33	7.5
Total	1200	84	7	167	13.92	450	37.5	387	32.3	112	9.33

Table II: Body mass index in reproductive age women.

Variables Age	**Total**		**BMI**					
			Low		**Nar**		**High**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**
25-29	256	21.33	31	12.11	105	41.02	120	46.88
30-34	249	20.5	35	14.06	99	39.76	115	46.18
34-39	201	16.75	87	43.28	59	29.35	55	27.36
39-44	264	22	32	12.12	109	41.29	123	46.59
45-49	230	19.16	85	36.96	59	25.65	86	37.39
Total	1200	100	270	22.5	431	35.92	499	41.58
Education								
Illiterate	435	36.25	88	20.23	136	31.26	211	48.51
Primary	386	32.16	89	23.06	166	43.01	131	33.94
Secondary	230	19.16	50	21.74	82	35.65	98	42.61
Higher Secondary	95	7.91	19	20	35	36.84	41	43.16
Graduate	54	4.5	24	44.44	12	22.22	18	33.33
Total	1200	100	270	22.5	431	35.92	499	41.58
Economic Class								
Upper	61	5.08	11	18.03	24	39.34	26	42.62
Upper Middle	56	4.66	19	33.93	11	19.64	26	46.43
Middle	256	21.33	71	27.73	86	33.59	99	38.67
Upper Lower	388	32.33	71	18.3	149	38.4	168	43.3
Lower	439	36.58	98	22.32	161	36.67	180	41
Total	1200	100	270	22.5	431	35.92	499	41.58
Profession								
Housewife	375	31.25	77	20.53	105	28	193	51.47
Laborer	532	44.32	141	26.5	207	38.91	184	34.59
Own Farm Owner	293	24.41	52	17.75	119	40.61	122	41.61
Total	1200	100	270	22.5	431	35.92	499	41.58
Parity								
P2	170	14.15	67	39.41	49	28.82	54	31.76
P3	265	22.08	74	27.92	65	24.53	126	47.55
P4	325	27.08	89	27.93	102	31.38	134	41.23
P5 Above	440	36.66	40	9.09	215	48.86	185	42.05
Total	1200	100	270	22.5	431	35.92	499	41.58

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