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Study of the therapeutic properties of daily meals of women's in rural areas

Jyoti Singh[1], Shikha Khare[2]
[1] Department of Home Science, Nehru Gram Bharati, Deemed to be University, Prayagraj, Uttar Pradesh, India
[2] Head, Department of Home Science, Nehru Gram Bharati, Deemed to be University, Prayagraj, Uttar Pradesh, India

Abstract
Our sample of overweight or obesity women in rural India is concerning, as it is in line with evidence from numerous other LMIC settings. The lack of dietary diversity (especially fruits and vegetables) and high intakes (total fat and sodium) are also concerning, as we know that unhealthy eating behaviors are associated with the onset of nutrition related chronic disease (NCD). The prevalence of obesity and overweight among women, combined with poor dietary intakes, poses a challenge to women's health in India and to the overall public health response. While this study is small and not intended to be representative, it has provided important knowledge on NCD risk factors in rural women and further work needs to be conducted to explore the potential drivers of obesity and overweight, as well as unhealthy dietary intakes, among rural women in India. There are many complex factors that need to be addressed in order to successfully implement targeted approaches to reduce NCD rates across India.
According to the results of the study, the intake of leaf green vegetables was 5.9%, fruits were 24.8%, roots, tuber and other vegetables were 21.9%, pulses were 72.5%, cereals were 61.9% and milk products were 62.3% compared to the suggested dietry guidelines according to ICMR. The intake of fats & oils was found to be higher than the recommended diet due to improper feeding practices.

Keywords: Therapeutic properties, daily meals, women, rural areas

Introduction
Women's health status has a direct bearing on the health and well-being of the whole family. Maternal morbidity and mortality affect not just the mother but the entire family. Most often, women not only shoulder the responsibility of home management and child care, but are also actively involved in economically gainful employment outside the household or even contribute significantly in the family business, be it agriculture or industry. The rural women play crucial role in agriculture farming as agricultural labors and extensively extend their support to their husbands in farming operations as partners. Not only in farming have they always engaged in other agricultural allied activities of dairying, poultry, and aquaculture.

Needs and Importance of Study
All people need a variety of foods to meet requirements for essential nutrients, and the value of a diverse diet has long been recognized. Dietary diversity is a qualitative measure of food consumption which indicates household access to a variety of foods; it also serves as a proxy for nutrient adequacy of an individual's diet. Among poor populations in the developing world, lack of food diversity is a severe problem, as diets are monotonous and based predominantly on starchy staples which lack essential micronutrients and contribute to the burden of malnutrition and micronutrient deficiencies. More specifically women in the reproductive age group and children are most vulnerable to malnutrition due to low dietary intakes, inequitable distribution of food within the household, improper food storage and preparation, dietary taboos, infectious diseases, and care. Poor health has indirect outcomes not only on women but also on their families. Women having poor health are more probable to give birth to low weight infants. Many researches have been done in releated topic but some aspect were untouched like nutritional and therapeutic practices in rural areas specially in the present scenario as all we know that rural area's women are very sensitive because they come from environment of rural civilization. Under such condition nutritional education concerning the basic health practices must to be told all concern. Furthermore, a woman's health affects the economic well-being of the household, as a woman in poor health will be less productive in the labor force. 6 Chronic diseases are no longer labeled as 'diseases of affluence', as these occur both in resource-poor countries as well as in the poor people in richer countries, with this transition occurring at a faster pace in developing countries.

Related literature
(Drewnowski A. *et al.* 2004) The nutritional status differs from one region to other and wider gaps exist between rural and urban women. Gradually, Indian economic growth was being increased but still the complete food security was not attained and the women and children were noticed as the vulnerable groups for the access of better food and qualitative diets. Women in majority focus on the well-being of the family members including the food intakes by neglecting their own dietary needs which lead to deprived food and nutrient intakes among Indian women.
(Griffiths P & Bentley M *et al.* 2005) With increased agricultural tasks Rural women could be more in control of food and farming resources, which could help to promote the wellbeing of the woman and her family which would make them less susceptible to developing NCDs or obesity. However, the relationship between increased contribution to farming and women's empowerment is not necessarily a positive one. For many women in rural villages, the addition of farm work decreases their available time and detracts from opportunity for personal growth and empowerment.

(Radhakrishna R. *et al*. 2004) A lack of autonomy was clear during the interviews with the women of this study. At times women were unable to answer basic questions about household income and expenditure. Marriage is vital to a women's survival in India where heterosexual partnerships are the norm. All the women interviewed for this study were married and almost all had at least two children, some had three or four.

Objectives

To assess the therapeutic properties of daily Meals of women's in rural area.

Hypothesis

There is significant effect of therapeutic properties found in daily meals of women's of rural areas.

Sampling

Total number of 600 rural women in different aged groups *Viz*., 35-40 (n=150); 40-45 years (n=160); 45-50 years (n=150) and 50-55 years (n=140) were studied. In the present study was conducted in five rural Gramsabha *viz*., Balipur, Pandey Tara, Gopalpur, Chaghaipur and Daherkala for the research. From each Gramsabha, three villages i.e., a total of fifteen villages served as the major area of the study. The women from the villages constituted the rural sample.

Study Tools and Technique

Self made research tool applied in this research by researcher.

Analysis

Dietary assessment

Food habit

The following table 1 shows the food habits of the respondents. Most of the respondents from gramsabha (villages) were non vegetarian. 70 percent from Balipur, 65 percent from Daherkala, only 72 percent from Gopalpur, 75 percent from Chaghaipur and 68 percent from Paney Tara were non vegetarian. The percentage of respondents who consume fleshy food is very low. Respondents can only consume fleshy foods once or twice a month and in very small quantities.

Table 1: Food Habit

Food Habit	Balipur (n=120)	Pandey Tara (n=115)	Gopalpur (n=130)	Chaghaipur (n=120)	Daherkala (n=115)
Vegetarian	36 (30%)	37 (32%)	36 (28%)	30 (25%)	40 (35%)
Non-vegetarian	84 (70%)	78 (68%)	94 (72%)	90 (75%)	75 (65%)
Figures in parenthesis indicate percent					

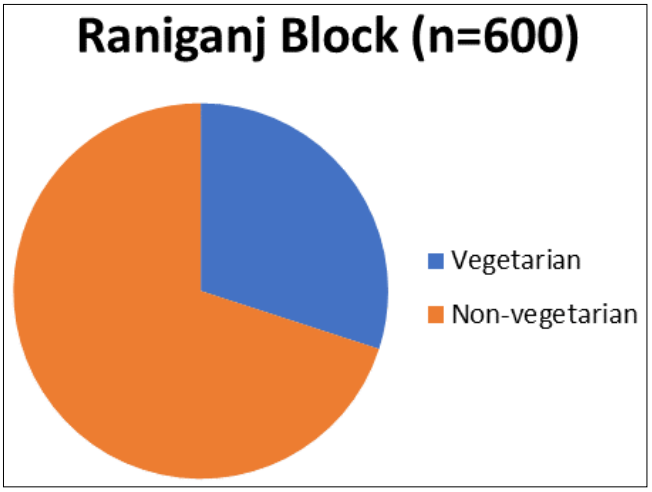

Fig 1

General meal pattern of the respondents

To understand their dietary habits, we asked them about their eating habits and meal patterns. The general eating pattern of the respondents from both the villages was very similar. They had three meals a day, breakfast, lunch, and dinner. They did not take any snacks in the morning or in the middle of the day. They cook food twice a day, once in the morning and once in the evening. The food that is cooked in the morning is taken twice, once for breakfast and once for lunch. In the morning, they cook chapatti with potato based vegetable curry and once for rice, dal, and again for potato based curry or vice versa. They consume negligible amounts of milk, which is only taken as tea or otherwise black tea. They rarely consume fruits, and if they do consume them, it is only seasonal fruits. They consume green leafy vegetables very rarely and rarely. They consume potatoes which are grown in the fields where they work. Carbohydrate foods in the form of cereals and potato form their staple diet.

Food intake of the respondents:-

A diet survey was conducted to determine the nutritional status of the participants. For this, a 24-hour recall method was used in which the participants were asked to recall the food they consumed the previous day. The information provided by the participants was recorded. The quantity of food consumed by each participant was calculated per food ingredient and then the mean was calculated on the basis of the data of the whole respondent's village wise, as shown in Figure 1.

Figure 1 represents the food intake of the participants as per food adequacy. The food adequacy was calculated according to the RDA that the participants met. As the values of the food intake may not provide an accurate picture about the adequacy of food.

Balipur & Pandey Tara Gramsabha

The overall analysis of the data shows that the respondents' main diet consists of cereals, roots and tubers. The adequacy

of cereals is 121.56% and the adequacy of roots and tubers is 112.0%. It is clear that potatoes are the main source of the respondents' diet. The adequacy of pulses is 56.74% which is much lower than the RDA, as the consumption of meat is very low and less pulse could not satisfy the respondents' protein needs. Vegetables and fruits are much less than the adequacy of the RDA, with the adequacy of GLVs at 18.0% and other vegetables at 34.65%. The respondents do not place much importance on fruits, as shown by the above data. They consume cheap seasonal fruits when they are available, but the adequacy of fruit is very low at 14.68%.
40% of the body weight in fleshy foods is met. Meat and meat products are consumed very rarely. This is due to the high cost of such products and the respondents' low monthly income. 8.75% of the total body weight in milk and dairy products is met. This quantity is mainly consumed through tea and sometimes deserts. 26% of the total RDA is met by sugar. This is mostly consumed through tea or desserts. Sugar consumption is not daily. 40.8% of the total Body weight in fat is met by visible oil. This quantity is marginal. Vegetable curries usually contain visible oil.

Gopalpur, Chaghaipur & Daherkala Gramsabha

An overall perusal of the figure highlights that cereals form the main diet of the respondents. Adequacy of cereals (117.33%) is more than the RDA. It highlights the fact that cereals form the main source of diet of the people. They consume more cereals than required to satisfy hunger. Adequacy of pulses met is 71.2 per cent which is marginally deficient than the RDA. As it has been found out that the consumption of meat and meat products is also very low, hence, less consumption of pulses could not meet the protein requirements of the respondents. Intake of vegetables and fruits is far less than the RDA. Adequacy of roots and tubers is 75.3 per cent which is also marginally deficient than the RDA. Adequacy of GLVs is 20.5 per cent while that of other vegetables is 50.15 per cent. The respondents add green vegetables to potato which is more in quantity than green vegetables. Hence, intake of vegetables is only half of the RDA. The respondents do not give much importance to consumption of fruits as is evident from the above Fig. 1 of. They eat cheap seasonal fruits as and when available. Sugar intake is 40 per cent RDA, which is only one-fifth of the total RDA. Sugar consumption is mostly in the form of tea or dessert. Sugar consumption is not daily. Fat intake is 45 per cent RDA and is marginal in terms of quantity. Fat intake is mainly in the form of visible oil in vegetables. Comparing the food intake of the respondents of the Gramsabha, it can be observed that the adequacy of food intake (for all the food groups except roots and tubers) of the respondents of Balipur and Pandey Tara is slightly better than the respondents of Gopalpur, Chaghaipur and Daherkala. This may be correlated with the higher monthly income of the respondents of Daherkala as compared with that of other gramsabha.

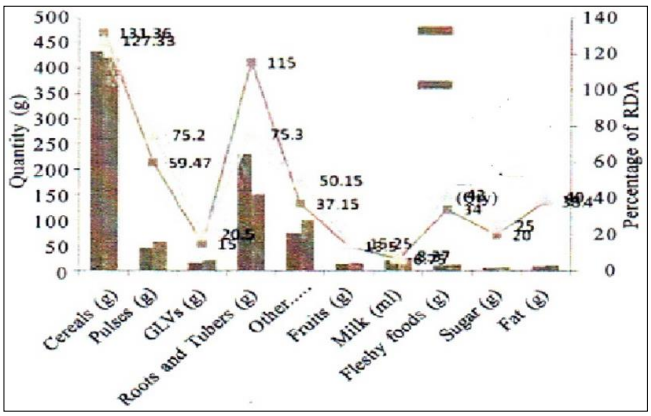

Fig 2: Mean food intake of respondent on 24 hour recall method

Mean nutrient intake of respondents

The nutrient adequacy ratio was calculated to determine the adequacy of a diet based on 17 out of 18 micronutrient micronutrients evaluated. That is Calcium, Iron, vitamin A, vitamin C, vitamin D, vitamin E, thiamin, riboflavin, niacin, thiamin, pyridoxine, zinc, magnesium, copper, folate, phosphorous, and selenium but not for sodium. Although sodium is an important micronutrient, there is no scientific evidence for a causal relationship between sodium intake and an adequacy indicator, and there is no evidence for an intake-response relationship to determine an estimated average requirement (EAR) for sodium.
The respondents' nutrient intake was expressed as Nutrient Sufficient. Nutrient Sufficient was calculated to assess the adequacy of the respondents' intakes of various nutrients. From the data of Fig. 2, it can be seen that the respondents from the villages of Balipur (78.7%), Pandey Tara (76.4%), Gopalpur (80.6%), Chaghaipur (82.3%) and Daherkala (84.9%) had marginal inadequacy in terms of energy intake.

Diet Diversity Score (DDS) According to Socio-demographic Variables

Table 1 shows the Diet Diversity Score (DDS) according to the socio-demographic variables and nutritional status of ELANS. The mean DDS for the whole sample was 3.73 ± 1.04 out of 12 possible point maximal score. This mean value was lower ($t(600) = -7.219$, $p < 0.0001$) than the recommended cut-off criterion (five or more food groups consumed) for a diverse diet. Out of the total sample, 64.5% of the participants could be classified as having a diverse diet based on the cut-off criterion (Table 1).
However, none of the respondents consumed foods from all groups examined (Table 2). There was a main effect of 5 Gramsabha in Raniganj ($F(600) = 29.127$, $p<0.0001$, $\eta 2 = 0.064$), in which only Balipur and Gopalpur Gramsabha had average scores above five points.
Also, the DDS varied between SES ($F(600) = 15.694$, $p<0.0001$, $\eta 2 = 0.019$), with people of low SES having significantly lower scores than those in the high SES (LSD,

p<0.05), which did not differ from the medium SES. No main effects for the nutritional status and age were observed. However, an interaction between Gramsabha, SES, and nutritional status (F (600) = 2.632, p<0.032, η2 = 0.016) revealed that the DDS was higher in underweighted and normal-weight women from the high SES in Chaghaipur and Balipur.

When analyzing the socio-demographic variables in this subsample, the main effects of Sample area (F (600) = 11.872, p<0.0001, η2 = 0.06) and SES were retained (F (600) = 4.016, p < 0.028, η2 = 0.004, Table 4.3.2) When looking at the percentage of rural women participants from the diverse subgroup and the subgroup that did not have a diverse diet, there was a significant difference in the percentage that consumed each food group.

Table 2: Food groups included in the minimum Dietary Diversity Score

Food Group	Specific Foods
Starchy staples (Grains, White Roots, Tuber and Plantains)	Rice, Bread, Tortillas, Breakfast Cereals, Maize, Pasta, Cassava, Potatoes, Plantains Rip, and Green
Meat Poultry and Fish	Beef, Pork, Lamb, Veal, Chicken, Turkey, Liver, Other Organs, Canned Sardines and Tuna, Fresh Fish and Seafood
Dark Green Leafy Vegetables	Broccoli, Mustard Greens, Turnip Greens, Collards, Spinach
Other Vitamin A	Rich Fruits and Vegetables Carrots, Sweet Potatoes, Winter Squash, Pumpkin, Cantaloupe, Mango, Papaya, and Apricot
Other Vegetables	Lettuce, Cauliflower, Radish, Okra, Green Peas, Green Pepper, Shallots, Leeks, String Beans and Others
Other Fruits	Oranges, Grapefruits, Banana, Apples, Pears, Strawberries, Watermelon, Kiwi, Berries, Melons, Avocado, Lemon, Lime, Tangerine, Pineapple, Tamarind and Others
Pulses (Beans, Peas, and Lentils)	Lentils, Beans (Black, Kidney, Pinto, and Others), Chickpeas and Soybeans
Dairy	Milk, Yogurt, and Cheese
Eggs	Eggs
Nuts and Seeds	Pecans, Cashews, Peanuts, Almonds, Walnuts, Sunflower Seeds and other Seeds

Table 3: Sample characteristics, Diet Diversity Score (DDS) & proportion of participants reaching the minimal DDS in ELANS

	Dietary Diversity Score (DDS)					Participants Reaching the Minimum DDS			
	N	Mean	SD	P	η2(%)	n	%	P	η2(%)
Overall Age Range	600	3.73	1.04			476	57.7		
35-40 years	150	3.15	1.01	0.071	0.1	124	38.5	0.394	0.1
40-45 years	160	4.42	1.30	0.081	0.1	128	47.6	0.465	0.1
45-50 years	150	3.52	1.03			122	49.3		
50-55 years	140	4.16	1.20			102	40.6		
Socioeconomic Status	600	4.83	1.34			476	57.7		
High	180	4.96	1.35	0.001	0.9	146	60.4	0.028	0.3
Middle	300	4.78	1.32	0.002	0.9	220	71.6	0.030	0.4
Low	120	4.59	1.23			110	67.6		
Area (Raniganj)	600	4.63	2.26			440	57.7		
Balipur	120	3.56	2.02			90	40.5		
Pandey Tara	115	3.28	1.98			80	58.6		
Gopalpur	130	4.01	2.16			110	60.52		
Chaghaipur	120	3.98	1.85			90	42.65		
Daherkala	115	4.06	1.65			70	49.25		
Nutritional Status									
Underweight	130	3.81	1.38			90	58.60		
Normal Weight	170	4.18	1.42			140	59.75		
Overweight	200	4.56	1.54	0.252	0.1	170	61.19	0.756	0.1
Obesity	100	3.66	1.32			80	56.65		
SD:- Standard deviation. η2: Eta squared coefficients for estimating the effect size									
DDS:- consumption of at least five out of 10 Food Groups									

The food groups that were consumed the most by the diverse subgroup were dark green leafy vegetables, which had the largest percentage difference between the two subgroups. The percentage of participants were observed in the following order: dark green leafy vegetables (Δ = 78%; $\chi^2_{(120)} = 154.65$, $p < 0.0001$); nuts (Δ = 71%; $\chi^2_{(115)} = 78$, $p < 0.0001$); eggs (Δ = 52%; $\chi^2_{(120)} = 160.68$, $p < 0.0001$); pulses (Δ = 46%; $\chi^2_{(130)} = 254.12$, $p < 0.0001$); other vegetables (Δ = 43%; $\chi^2_{(115)} = 293.12$, $p < 0.0001$); meat, poultry, and fish group (Δ = 36%; $\chi^2_{(115)} = 198.58$, $p < 0.0001$); dairy (Δ = 34%; $\chi^2_{(120)} = 208.45$, $p < 0.0001$); fruits (Δ = 20%; $\chi^2_{(127)} = 289.36$, $p < 0.0001$); starchy staples (Δ = 16%; $\chi^2_{(120)} = 93.31$, $p < 0.0001$); and vitamin A-rich fruits and vegetables (Δ = 14%; $\chi^2_{(115)} = 377.73$, $p < 0.0001$). Trans fatty acids, cholesterol, and monounsaturated fats were also significantly different between groups, but with rather negligible size effects (<1%). Out of the eighteen micronutrients evaluated, thirteen were significantly different between groups, with vitamin A (3%), magnesium (3%), pyridoxine (2%), vitamin D (2%), and

phosphorous (2%) as the micronutrients with higher intake by a highly diverse diet.

Conclusion

Results of this study showed that consuming dietary supplements in daily meals can help the patients to meet their nutritional needs and improve their malnutrition. The result shows that 25% of rural women are hungry at least once a month; a third of women did not consume milk more than once a week; around 25% of female did not consume fruit per week; and only 25% of women eat 4+ meals a day. This population group has the highest rate of physical growth and is the most undernourished. However, the feeding practices were found to be inadequate. Poor nutritional intake in rural women might affect their educational status, impede physical growth, raise the risk of low obstetric outcomes, endanger the health of future children and harm future productivity and revenue generation potential. The government and other relevant bodies should emphasize a design evidence based nutrition intervention for rural women to prevent the lifelong effects of malnutrition. Growing older is a recognised risk factor for rural women's malnutrition. Given that oldest-old did not independently correlate with malnutrition, there was likely a healthy survival effect in this study. To detect malnutrition and increase yield, primary care practitioners may concentrate screening efforts on evaluating older patients (35 to 55 years of age). In certain research, there was no correlation between gender and undernourishment. In this study, variables that may be linked to malnutrition, such as unemployment, low socioeconomic status, low literacy, low family income, low education, and low occupational status, were not shown to be significant.

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