



FOOD CONSUMPTION PATTERNS, DIETARY DIVERSITY AND THEIR INFLUENCE ON HEALTH AMONG RURAL COMMUNITIES: A COMMUNITY-BASED STUDY.

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Abstract

Food consumption patterns are important determinants of nutritional status, health, productivity, and quality of life. Rural communities often depend on locally available cereals, pulses, vegetables, milk, animal foods, and seasonal foods, while socioeconomic conditions, agricultural practices, food prices, cultural traditions, education, and changing lifestyles influence dietary choices. The present study was designed to assess food consumption patterns and their influence on health among rural households. A community-based cross-sectional survey may be conducted using a structured questionnaire, 24-hour dietary recall, food-frequency questionnaire, dietary-diversity assessment, and selected anthropometric or self-reported health indicators. The study focuses on meal frequency, consumption of cereals, pulses, vegetables, fruits, milk and animal-source foods, snacks, processed foods, sugar and salt, as well as dietary diversity. Evidence indicates that greater dietary diversity and consumption of minimally processed foods are generally associated with better nutritional adequacy, whereas diets high in energy-dense processed foods, free sugars, sodium, and unhealthy fats can increase the risk of malnutrition and non-communicable diseases. Rural India is also experiencing a nutrition transition in which traditional dietary patterns coexist with increasing consumption of processed and convenience foods.

Keywords: Food consumption, Dietary diversity, Rural nutrition, Health, Malnutrition, Dietary patterns.

Introduction:

Food is one of the fundamental requirements for human survival, growth, development, reproduction, and maintenance of health. The quantity, quality, diversity, frequency, and safety of food consumed by individuals collectively constitute their food consumption pattern. Food consumption patterns are influenced by household income, food availability, agricultural production, geographical conditions, culture, religion, education, food prices, family size, gender roles, cooking practices, and access to markets and health services. Consequently, food consumption patterns differ considerably between communities and socioeconomic groups.

A healthy diet is characterized by adequacy, balance, moderation, and diversity. Current WHO guidance emphasizes the importance of a varied diet based largely on minimally processed or unprocessed foods, including vegetables, fruits, pulses, whole grains, nuts, and appropriate sources of protein, while limiting foods high in unhealthy fats, free sugars, and sodium. Such dietary patterns help prevent nutrient deficiencies and reduce the risk of diet-related non-communicable diseases.

In rural communities, food consumption is strongly connected with local agricultural and economic conditions. Households involved in farming may produce cereals, pulses, vegetables, milk, eggs, or other foods for household consumption. However, production of food does not necessarily guarantee a diverse diet. Research from rural India has shown that household production diversity and market access can both influence dietary diversity.

Indian dietary patterns have traditionally been dominated by cereals, particularly rice and

wheat, supplemented by pulses, vegetables, milk, spices, oils, and regionally available foods. Traditional diets can provide substantial nutritional value when they are sufficiently diverse. However, socioeconomic development, urbanization, changing lifestyles, greater market penetration, and availability of packaged foods have contributed to a nutrition transition. This transition involves the coexistence of undernutrition, micronutrient deficiencies, overweight, obesity, and diet-related chronic diseases.

Dietary diversity is particularly important because no single food normally provides all nutrients required by the human body. Consumption of several food groups improves the likelihood of obtaining adequate amounts of vitamins, minerals, protein, essential fatty acids, and other nutrients. FAO's Household Dietary Diversity Score (HDDS) provides a simple measure based on the number of food groups consumed by a household during the preceding 24 hours. It is designed as a household-level indicator rather than an individual nutrient-intake measure.

Rural populations may experience several barriers to healthy diets, including low income, seasonal food availability, limited access to diverse markets, food insecurity, inadequate nutrition knowledge, gender-related inequalities in food allocation, and dependence on staple cereals. A study of rural Indian women found that dietary diversity is an important area of concern and demonstrated differences in food-group consumption within households. Another study among women of reproductive age in rural Odisha examined dietary diversity using the FAO Minimum Dietary Diversity for Women indicator and its association with anaemia.

The relationship between diet and health is multidimensional. Insufficient dietary diversity may contribute to protein-energy malnutrition and micronutrient deficiencies, including iron, vitamin A, folate, vitamin B12, and other nutrient deficiencies. Conversely, excessive consumption of energy-dense foods, refined carbohydrates, salt, sugar, and unhealthy fats may contribute to overweight, obesity, hypertension, diabetes, and cardiovascular disease. Thus, both undernutrition and overnutrition can occur within the same community or household.

The present research topic is therefore important for Home Economics and Community Nutrition because it connects food selection, household resource management, nutrition education, health, and community development. Understanding actual food consumption patterns can help identify nutritional problems and guide appropriate interventions such as nutrition education, kitchen gardens, dietary diversification, improved food access, and community-based health programmes.

Review of Literature:

Food Consumption and Health

Diet is a major determinant of health across the life course. WHO states that healthy diets protect against all forms of malnutrition and reduce the risk of several non-communicable diseases. A healthy diet should provide sufficient energy and nutrients while avoiding excessive intake of components that may adversely affect health.

The WHO and FAO joint statement emphasizes four basic principles of healthy diets: adequacy, balance, moderation, and diversity. It also recognizes that the exact composition of a healthy diet varies according to cultural practices, food availability, individual needs, and local circumstances.

Food consumption is therefore not simply a matter of calorie intake. The quality and variety of foods are equally important. Diets containing a variety of vegetables, fruits, pulses, whole grains, nuts, and suitable protein sources are more likely to provide a broad range of nutrients.

Dietary Diversity

Dietary diversity is commonly used as a proxy for the variety of foods available and consumed. FAO's HDDS is based on the number of food groups consumed during the previous 24 hours and provides a rapid assessment of household access to food variety.

In India, dietary diversity is affected by income, food prices, agricultural production, market access, education, and household characteristics. Gupta et al. examined 3,600 households in rural India and reported that both production diversity and market integration can influence dietary diversity.

Dietary diversity is especially important among women because women of reproductive age have high nutritional requirements and may be vulnerable to iron and other micronutrient

deficiencies. Jin et al. investigated dietary diversity among 980 non-pregnant women aged 15–49 years in rural Odisha and examined its association with anaemia.

Rural Food Consumption Patterns in India:

Rural Indian diets have historically depended heavily on locally available staple foods. Cereals often provide a substantial proportion of energy, while pulses, vegetables, milk, animal-source foods, oils, and fruits contribute additional nutrients.

However, the Indian food system is changing. Shetty described a nutrition transition in India associated with demographic changes, urbanization, dietary changes, and increasing chronic disease burdens.

FAO's discussion of dietary diversification in India also identifies the coexistence of undernutrition, overnutrition, micronutrient deficiencies, cereal-dominated diets, and increased consumption of unhealthy foods. It recommends strategies such as dietary diversification, kitchen gardens, biofortification, women's empowerment, nutrition education, and improved WASH practices.

Cereals and Pulses:

Cereals such as rice, wheat, maize, sorghum, and millets are important sources of dietary energy. Pulses such as lentils, chickpeas, pigeon pea, and other legumes provide plant protein, fibre, minerals, and other nutrients.

Combining cereals and pulses can improve the overall protein quality of predominantly plant-based diets. Traditional Indian meals frequently use combinations such as rice and dal, roti and pulses, or cereal-based foods with legumes and vegetables.

The 2024 ICMR-NIN Dietary Guidelines for Indians emphasize dietary diversity and appropriate combinations of foods as part of healthy eating.

Fruits and Vegetables:

Vegetables and fruits provide dietary fibre, vitamins, minerals, and bioactive compounds. WHO recommends that people over 10 years of age aim for at least 400 g of fruits and vegetables per day, while recognizing that dietary recommendations need to consider age and individual circumstances.

Low consumption of vegetables and fruits can reduce dietary diversity and micronutrient adequacy. Rural areas may have good seasonal access to locally grown vegetables but may

experience limited availability of certain foods throughout the year.

Kitchen gardens can potentially improve access to vegetables and contribute to household dietary diversity. FAO's India-focused nutrition work identifies kitchen gardens as one potential strategy for dietary diversification.

Milk and Animal-Source Foods:

Milk, eggs, fish, meat, and other animal-source foods can contribute high-quality protein and several micronutrients. Their consumption varies according to income, cultural preferences, availability, religion, livestock ownership, and local food practices.

Households that keep dairy animals may have greater access to milk, but production for the market does not necessarily mean that all household members consume sufficient quantities.

Processed Foods and Nutrition Transition:

Changing lifestyles have increased access to packaged snacks, sugar-sweetened beverages, instant foods, refined bakery products, and other highly processed foods. WHO reports that dietary transitions in many populations have increased consumption of foods high in energy, unhealthy fats, free sugars, and sodium, while fruit, vegetable, and fibre intake may remain inadequate.

The increasing availability of processed foods can create a double burden of malnutrition, where deficiencies and diet-related overweight or chronic diseases occur simultaneously.

Food Consumption and Non-Communicable Diseases:

Dietary patterns have important implications for hypertension, cardiovascular disease, diabetes, obesity, and certain cancers. High intake of sodium, unhealthy fats, free sugars, and highly processed foods may contribute to adverse health outcomes, whereas diets rich in fibre, whole grains, vegetables, fruits, legumes, and nuts are associated with better health outcomes. The relationship is particularly relevant in rural communities undergoing socioeconomic and dietary transitions.

Socioeconomic Influences:

Food choices are strongly influenced by household income and food prices. Healthy foods may be less accessible to economically vulnerable households, particularly where markets are distant or seasonal.

Research in rural India indicates that market integration and production diversity both influence dietary diversity.

Education also plays an important role because nutrition knowledge can influence food selection, cooking practices, meal planning, and food allocation.

Women and Intra-household Food Distribution:

Women may have important responsibilities for food procurement, preparation, and distribution, yet their own dietary diversity may be inadequate. Research involving rural Indian households has examined whether women consume less diverse diets than other household members and highlighted the importance of considering intra-household dietary differences. This makes women an important target group for community nutrition education and household food-management interventions.

Methods for Assessing Food Consumption:

Food consumption can be studied through:

- 24-hour dietary recall
- Food-frequency questionnaire
- Food records
- Household food inventories
- Dietary diversity scores
- Anthropometric assessment
- Biochemical indicators
- Health and disease history

WHO, FAO, and UNICEF's guidance on monitoring healthy diets emphasizes standardized approaches to dietary assessment and monitoring.

The 24-hour recall is useful for documenting foods consumed on a particular day, while an FFQ provides information on usual consumption frequency over a longer period. Combining methods can provide a more comprehensive assessment.

Objectives:

General Objective:

To study food consumption patterns and their influence on health among rural communities.

Specific Objectives:

1. To assess the frequency and pattern of food consumption among selected rural households.
2. To determine the dietary diversity of the study population.
3. To assess the consumption of cereals, pulses, vegetables, fruits, milk, animal-source foods, and processed foods.

4. To examine the relationship between food consumption patterns and selected health indicators.
5. To identify socioeconomic and demographic factors associated with dietary diversity.
6. To suggest appropriate community-level strategies for improving healthy food consumption.

Materials and Methodology:

Research Design

A community-based cross-sectional descriptive study is recommended. The study can assess dietary practices and selected health indicators at one point in time.

Study Area

The research may be conducted in selected rural villages of a chosen district. The investigator should specify:

- District
- Taluka/block
- Villages
- Population
- Major occupations
- Agricultural characteristics
- Health facilities
- Food-market availability

Study Population

The study population may consist of adult members of selected rural households, preferably individuals responsible for or knowledgeable about household food preparation and consumption.

For a student-level study, a sample of 100–200 households/participants may be practical, depending on available time and resources.

Sampling

A multistage or systematic/random sampling method is preferable.

For example:

District → Taluka → Villages → Households → Eligible participant

Inclusion and exclusion criteria should be defined before data collection.

Data Collection Tools

A structured questionnaire can contain five sections:

Section A: Socio-demographic information

- Age
- Sex
- Education
- Occupation
- Family size
- Household income

- Land ownership
- Livestock ownership

Section B: Food consumption

Questions should cover:

- Cereals
- Pulses
- Green leafy vegetables
- Other vegetables
- Fruits
- Milk
- Eggs
- Meat/fish
- Nuts and seeds
- Oils/fats
- Packaged snacks
- Sugar-sweetened beverages

Section C: 24-hour dietary recall

Participants report all foods and beverages consumed during the previous 24 hours.

Section D: Food-frequency assessment

Frequency may be categorized as:

- Daily
- 4–6 times/week
- 2–3 times/week
- Once/week
- Occasionally
- Never

Section E: Health indicators

Depending on resources and ethical approval:

- Height
- Weight
- BMI
- Self-reported chronic disease
- Blood pressure, if appropriately measured
- Recent illness
- Perceived health status

Dietary Diversity:

Household dietary diversity can be assessed using FAO's HDDS approach. The score is

Table 1. Socio-demographic Characteristics of Illustrative Sample (n = 100)

Variable	Category	n	%
Sex	Male	43	43
	Female	57	57
Age	18–30 years	24	24
	31–45 years	39	39
	46–60 years	27	27
	>60 years	10	10
Education	No formal education	16	16
	Primary/secondary	52	52
	Higher secondary+	32	32

based on the number of food groups consumed during the preceding 24 hours. Importantly, HDDS is a household-level indicator and should not be interpreted as an individual nutrient adequacy score.

Data Analysis:

Data may be entered into Microsoft Excel, SPSS, R, or another validated statistical package.

Descriptive statistics:

- Frequency
- Percentage
- Mean
- Standard deviation

Inferential statistics may include:

- Chi-square test for categorical associations
- t-test for comparison of means
- ANOVA for comparison among multiple groups
- Correlation analysis
- Logistic or linear regression where appropriate

Statistical significance may be set at $p < 0.05$, provided assumptions of the selected test are met.

Ethical Considerations:

The study should obtain appropriate institutional approval where required. Participants should receive information about the study and provide informed consent. Personal information should be kept confidential, participation should be voluntary, and participants should be free to withdraw.

Results:

Important: The following numerical results are illustrative as actual findings obtained from field survey.

Table 2. Illustrative Food Consumption Frequency

Food group	Daily (%)	2–6 times/week (%)	Occasionally (%)
Cereals	100	0	0
Pulses	74	22	4
Vegetables	61	34	5
Fruits	19	47	34
Milk/dairy	55	29	16
Eggs	17	39	44
Meat/fish	6	31	63
Packaged snacks	18	43	39
Sugar-sweetened beverages	9	27	64

Illustrative interpretation: Cereals were consumed daily by all households, whereas fruit, eggs, meat/fish, and packaged foods showed greater variation.

Table 3. Illustrative Dietary Diversity Categories

Dietary diversity category	n	%
Low	27	27
Moderate	48	48
High	25	25
Total	100	100

The illustrative dataset suggests that **48%** of households had moderate dietary diversity, while 27% had low diversity.

Table 4. Illustrative Health Indicators

Health indicator	n	%
Self-reported good health	63	63
Self-reported moderate health	29	29
Self-reported poor health	8	8
Reported diagnosed hypertension	14	14
Reported diabetes	9	9
Underweight*	17	17
Overweight/obesity*	19	19

*If anthropometric measurements are collected, BMI categories should be defined using the appropriate population-specific criteria.

Table 5. Illustrative Association Between Dietary Diversity and Health Status

Dietary diversity	Good health n (%)	Moderate/poor health n (%)
Low	13 (48.1)	14 (51.9)
Moderate	32 (66.7)	16 (33.3)
High	18 (72.0)	7 (28.0)

A chi-square test can be applied to determine whether the association is statistically significant. The actual p-value must be calculated from the real dataset and should not be fabricated.

Discussion:

The proposed study examines an important relationship between food consumption patterns and health in rural communities. If the illustrative pattern observed in Tables 2–5 were

reproduced in actual field data, it would indicate a diet strongly centred on cereals, with lower and more variable consumption of fruits, animal-source foods, and other nutrient-dense foods.

The predominance of cereals is consistent with descriptions of Indian dietary patterns in which cereals contribute substantially to energy and protein intake. FAO's discussion of Indian dietary diversification also notes the continuing

importance of cereal-based diets alongside increasing consumption of non-cereal and unhealthy foods.

The observed variation in dietary diversity would also be consistent with research showing that dietary diversity in rural India is influenced by household production patterns and market integration. Gupta et al. found that both production diversity and access to markets were relevant to dietary diversity among rural Indian households.

The lower consumption of fruits and some animal-source foods in a hypothetical rural sample could result from seasonal availability, cost, cultural preferences, household production, and market accessibility. These factors demonstrate that food consumption cannot be explained solely by nutritional knowledge.

Research among rural Indian women also highlights the importance of examining dietary diversity within households rather than assuming that all members receive similar diets. The study by Jin et al. further demonstrates the relevance of dietary diversity when investigating nutritional outcomes such as anaemia among women in rural Odisha.

The presence of both underweight and overweight/obesity in the illustrative data would represent the double burden of malnutrition. This is increasingly important in India because nutritional deficiency and excess can coexist within the same population. The nutrition transition described in the Indian literature involves changes in dietary patterns and increasing chronic disease risks alongside persistent nutritional deficiencies.

Consumption of packaged snacks and sugar-sweetened beverages should also be examined carefully. WHO reports that increased availability of highly processed foods has contributed to dietary patterns characterized by greater consumption of energy, free sugars, unhealthy fats, and sodium.

Therefore, improving rural nutrition should not focus only on increasing food quantity. Dietary diversity, food quality, affordability, food literacy, local food production, and access to healthy foods must be addressed together. The 2024 ICMR-NIN Dietary Guidelines provide an Indian framework for improving dietary practices and emphasize balanced and diverse food choices.

Conclusion:

Food consumption patterns are important determinants of nutritional status and health in rural communities. Rural diets are shaped by a complex interaction of agricultural production, household income, food availability, market access, cultural traditions, education, gender roles, seasonal changes, and nutrition knowledge. Traditional cereal-based diets can provide substantial energy but may become nutritionally inadequate when consumption of pulses, vegetables, fruits, dairy products, nuts, seeds, and other nutrient-rich foods is limited.

At the same time, rural communities are experiencing changes in food habits, including increasing availability and consumption of packaged snacks, refined foods, sugary beverages, and other processed products. This dietary transition can contribute to a double burden in which undernutrition and micronutrient deficiencies coexist with overweight, obesity, diabetes, hypertension, and other diet-related diseases.

Dietary diversity is therefore an important component of healthy food consumption. Evidence from rural India indicates that food production diversity, market access, and household socioeconomic conditions influence dietary diversity.

Improving rural health requires an integrated approach involving nutrition education, dietary diversification, kitchen gardens, improved access to affordable nutritious foods, women's empowerment, food safety, and community health services. Future research should combine dietary assessment with anthropometric, biochemical, and health indicators to establish stronger evidence regarding the relationship between food consumption and health.

Recommendations:

1. **Promote dietary diversity:** Rural households should be encouraged to include cereals, pulses, vegetables, fruits, dairy products, nuts/seeds, and appropriate animal-source foods according to local availability and cultural practices.
2. **Strengthen nutrition education:** Community nutrition programmes should provide practical education on balanced diets, portion sizes, food safety, meal planning, and healthy cooking.

3. **Encourage kitchen gardens:** Household and community gardens can improve access to fresh vegetables and contribute to dietary diversification.
4. **Improve women's nutrition:** Women, particularly women of reproductive age, should be prioritized in community nutrition programmes because dietary diversity and micronutrient adequacy are important for their health.
5. **Reduce unhealthy processed foods:** Nutrition education should encourage reduced consumption of foods high in free sugars, sodium, unhealthy fats, and excessive energy.
6. **Improve food accessibility:** Local markets, public nutrition programmes, agriculture initiatives, and community organizations should work together to improve access to affordable nutritious foods.
7. **Integrate agriculture and nutrition:** Agricultural programmes should encourage production of diverse foods rather than focusing exclusively on staple crops.
8. **Conduct regular nutrition assessment:** Rural health programmes should monitor dietary diversity, nutritional status, food insecurity, and diet-related health conditions periodically.

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