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Food Neophobia and its Association with Dietary Intake Among Adults (20-40 Years)

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ABSTRACT:

Food neophobia, the reluctance or fear of consuming unfamiliar foods, is a behavioral trait that influences dietary diversity, nutritional intake, and long-term health. While it may act as a protective mechanism against unsafe foods, high food neophobia can limit food choices and contribute to poor dietary quality. This study aimed to assess the prevalence of food neophobia among adults aged 20–40 years and examine its association with food preferences, dietary habits, and consumption of less familiar foods, with relevance to sustainable nutrition and public health.

A descriptive cross-sectional study was conducted among 200 adults in Hyderabad, Telangana, using a structured and validated online questionnaire. Data collected included socio-demographic characteristics, self-reported anthropometric measurements, dietary practices, food and environmental allergies, factors influencing food choices, and responses to the Food Neophobia Scale (FNS). Statistical analyses comprised descriptive statistics, correlation, regression analysis, and ANOVA to assess associations between food neophobia and dietary variables.

The results showed that 71% of participants were neutral, 15.5% food-neophobic, and 13.5% food-neophilic, with no significant gender differences ($p > 0.05$). Higher food neophobia was associated with significantly lower intake of nutrient-dense but less familiar foods such as fruits, vegetables, and soups, alongside relatively higher consumption of sweets and beverages. Taste was reported as the major barrier to trying new foods (86%), followed by concerns about allergies. Regression analysis demonstrated a significant negative association between food neophobia and dietary diversity, indicating its role as a behavioral barrier to sustainable diets.

From a multidisciplinary life sciences perspective, food neophobia represents an important interface between behavioral nutrition, public health, and sustainable food systems. Reduced acceptance of diverse foods can limit the utilization of underexploited crops and traditional foods, indirectly affecting agricultural biodiversity and food security. Addressing food neophobia through integrative nutrition education and policy-driven interventions is essential for promoting sustainable dietary transitions aligned with global sustainability goals.

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KEYWORDS: Food Neophobia, Dietary Diversity, Nutritional Intake, Public Health, SDGs

INTRODUCTION

Food Neophobia

Food neophobia (FN) is defined as the fear or reluctance to consume novel or unfamiliar foods and represents an important behavioral trait influencing dietary behavior. It affects an individual's motivation to try new food items, openness to unfamiliar cuisines, and tolerance for novel or unconventional flavors. As global food environments become increasingly diverse due to globalization, urbanization, and cultural exchange, exposure to a wide range of cuisines and food products has expanded considerably. Despite this increased availability, individuals vary widely in their responses to novel foods, existing along a behavioral continuum ranging from food neophilia, characterized by curiosity and willingness to try new foods, to food neophobia, marked by avoidance and rejection of unfamiliar food items.

While low to moderate levels of food neophobia may not substantially hinder dietary exploration, elevated levels can significantly restrict food choices and limit dietary diversity. Individuals with higher food neophobia are more likely to reject unfamiliar foods based on sensory cues, perceived risks, or lack of cultural familiarity, which may negatively impact nutritional adequacy and long-term health outcomes. Previous research has highlighted that persistent food neophobia can act as a barrier to the acceptance of nutrient-dense foods, particularly those introduced through dietary diversification and sustainable food initiatives (Ashish Raina et al., 2020). This underscores the importance of understanding food neophobia as a key determinant of food choice behavior in modern, multicultural food environments.

The Evolutionary and Psychological Roots of Neophobia

To understand the persistence of food neophobia in modern adult populations, it is essential to consider the concept of the *Omnivore's Paradox*, first articulated by psychologist Paul Rozin. From an evolutionary perspective, humans are omnivores, a trait that offers a significant adaptive advantage by allowing survival across diverse ecological environments through the consumption of a wide range of plant and animal foods. However, this dietary flexibility is accompanied by an inherent risk, the potential ingestion of toxic or harmful substances. As a result, humans evolved a dual motivational system governing food choice: *neophilia*, the tendency to seek out and explore new foods to enhance nutritional adequacy, and *neophobia*, the tendency to avoid unfamiliar foods as a protective mechanism against potential danger.

Although modern urban food environments are largely regulated and the risk of consuming naturally toxic foods is minimal, these deeply ingrained evolutionary instincts continue to influence contemporary eating behaviors. Food neophobia persists as a subconscious behavioral response, shaping individual preferences and resistance toward unfamiliar foods despite their safety and nutritional value. In today's globalized food systems, where novel foods are often introduced through cultural exchange, technological innovation, and sustainability-driven dietary shifts, this evolutionary legacy can act as a barrier to dietary diversification. Understanding the Omnivore's Paradox therefore provides a critical theoretical framework for explaining why food neophobia remains prevalent among adults and highlights the importance of

behavioral, cultural, and educational strategies to overcome this instinct in support of improved nutrition and sustainable diets.

Factors Influencing Dietary Hesitancy

Food neophobia is a multifactorial behavioral trait influenced by a wide range of biological, social, cultural, and environmental factors. Key determinants include parental eating behaviors, educational attainment, socioeconomic status, and household dietary practices, which collectively shape early food exposure and long-term food preferences. Childhood feeding experiences, peer influences, and the cultural origins of meals further contribute to the acceptance or rejection of unfamiliar foods. In addition, sensory characteristics such as appearance, aroma, texture, and taste, along with food preparation and cooking methods, play a critical role in shaping individual responses to novel foods (Mahsa Mohajeri et al., 2019). Evidence also indicates that place of residence significantly influences food neophobia. Urban populations tend to display lower levels of food neophobia and greater willingness to experiment with diverse food products compared to rural populations. This trend may be attributed to increased exposure to multicultural cuisines, greater availability of global food options, and frequent interaction with varied food environments in urban settings (Ashish Raina et al., 2020). Such exposure can normalize unfamiliar foods and reduce neophobic responses over time, highlighting the importance of environmental and cultural contexts in shaping food-related behaviors.

Impact on Health and Dietary Quality

Food neophobia has been consistently associated with reduced consumption of vegetables, seafood, and other nutrient-dense foods, leading to compromised dietary quality and nutritional adequacy. Previous studies have also linked elevated levels of food neophobia with the development of disordered eating patterns and increased metabolic health risks (Heikki V. Sarin et al., 2019). By limiting exposure to a diverse range of foods, neophobic individuals may consume a narrower spectrum of nutrients, increasing their susceptibility to micronutrient deficiencies, often described as "hidden hunger." Such deficiencies can adversely affect immune function, metabolic health, and overall long-term well-being.

Dietary diversity is closely linked to agricultural biodiversity, as increased consumption of a wider range of foods supports the cultivation and preservation of diverse crop species. Behavioral resistance to unfamiliar foods may therefore indirectly contribute to reduced agrobiodiversity and increased dependence on a limited number of staple crops

Beyond individual health outcomes, food neophobia has important implications for sustainable development. As global efforts intensify to achieve the United Nations Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger) and SDG 12 (Responsible Consumption and Production), there is a growing emphasis on transitioning toward diversified, sustainable, and climate-resilient dietary patterns. The promotion of alternative protein sources, ancient millets, and underutilized crops is central to these goals; however, their successful adoption depends largely on consumer acceptance. Food neophobia poses a significant behavioral barrier to the uptake of such foods, potentially limiting the effectiveness of sustainability-driven nutrition interventions.

Understanding food neophobia is therefore critical for informing science diplomacy, public health policy, and food system innovations aimed at enhancing dietary diversity while minimizing environmental impact. Addressing this behavioral constraint can facilitate the development of resilient food systems that simultaneously support ecological sustainability and human nutritional needs.

In this context, the objective of the present study was to assess food neophobic tendencies among adults aged 20–40 years in the urban setting of Hyderabad and to evaluate their consumption patterns of food groups containing less familiar items. The study seeks to highlight the role of behavioral nutrition in shaping sustainable dietary practices and improving long-term health outcomes.

MATERIALS AND METHODS

A structured questionnaire was developed for the study after reviewing relevant literature to include variables related to food neophobia, dietary habits, and factors influencing food choices. It was pre-tested on a small group of participants to assess clarity and relevance, and necessary modifications were made. The finalized questionnaire was validated to ensure content validity and reliability.

A descriptive cross-sectional design was used to assess food neophobia and associated dietary behaviors among 200 adults aged 20–40 years in Hyderabad, Telangana. The use of convenience sampling may limit the generalizability of the findings beyond the studied urban population. The survey was administered online to facilitate efficient data collection while maintaining confidentiality and anonymity.

The questionnaire captured socio-demographic data, self-reported anthropometrics, dietary habits, food frequency of less familiar foods, allergies, and factors influencing food choices. Food neophobia was measured using the Food Neophobia Scale (FNS), a standardized and validated instrument widely used in behavioral nutrition research.

Data were coded, tabulated, and analyzed using statistical software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, summarized participant characteristics. Correlation analysis examined the strength and direction of associations, regression analysis assessed the predictive relationship between FNS scores and consumption of less familiar foods, and analysis of variance (ANOVA) compared mean FNS scores across groups. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

The data showed that out of the total sample size of 200 adults, the largest proportion of participants (61%, n = 122) belonged to the 20–25 year age group, followed by 17.5% (n = 35) in the 26–30 year group, 11.5% (n = 23) in the 36–40 year group, and the smallest proportion (10%, n = 20) in the 31–35 year group. Gender distribution was equal, with 50% males and 50% females.

In terms of educational qualifications, most respondents (54.5%, n = 109) had completed a diploma or graduation, 40.5% (n = 81) were postgraduates, and 5% (n = 10) had completed matriculation/10th standard. Regarding occupation, 50.5% (n = 101) were employed, 40% (n = 80) were students, and 9.5% (n = 19) were homemakers.

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TABLE 1 General information/ demographic profile of the respondents

Annual income levels revealed that nearly half of the respondents (46%, *n* = 92) reported no earnings.

General information/ Demographic profile	(%)
Age	
20-25 years	61
26-30 years	17.5
31-35years	10
36-40 years	11.5
Gender	
Female	50
Male	50
Education	
Matriculation/10 th	5
Intermediate	-
Diploma/Graduation	54.5
Post graduation	40.5
Occupation	
Student	40
Home maker	50.5
Employee	9.5
Annual Income	
0-3 Lpa	21.5
3-6 Lpa	16.5
>6 Lpa	16
None	46

Among the remaining, 21.5% (*n* = 43) had an annual income of 0–3 lakh per annum (LPA), 16.5% (*n* = 33) earned between 3–6 LPA, and 16% (*n* = 32) reported earnings above 6 LPA.

Anthropometric Measurements

Body Mass Index BMI

Body Mass Index (BMI) was calculated based on self-reported height and weight, following WHO classification. Most respondents (56%, *n* = 112) were within the normal BMI range, while 27% (*n* = 54) were overweight. A smaller proportion were underweight (9.5%, *n* = 19), obese class I (6%, *n* = 12), and obese class II (1.5%, *n* = 3). No participants were classified under obesity class III.

$$\mathbf{BMI = Weight(kg)/height\ (m)^2}$$

TABLE 2 BMI of the respondents

BMI	
Category	**(%)**
Underweight	9.5
Normal	56
Overweight	27
Obese	-
Obesity class I	6
Obesity class II	1.5
Obesity class III	-

DIETARY PATTERN

Dietary preferences revealed that 75% (n = 150) of participants were non-vegetarian, while 25% (n = 50) were vegetarian. Meal-skipping was reported by 44% (n = 88), with the primary reasons being dislike of available food (64.4%) and lack of hunger (35.6%). Food and environmental allergies were reported by 11.5% (n = 23), of which 87.1% (n = 20) were food-related (e.g., dairy products, cabbage, brinjal, gourds, tomatoes, tamarind, sweets), and 12.9% (n = 3) were environmental (dust, pollen, seasonal allergies)

TABLE 3 Dietary patterns of the respondents

Dietary Pattern	**(%)**
Dietary Preference	
Vegetarian	25
Non-Vegetarian	75
Skipping Meals	
YES	44
NO	56
***Reasons for YES**	
I was not Hungry.	35.6
I didn't like what was available to eat	64.4
Food/Environmental Allergies	
YES	11.5
NO	88.5
****Allergy kind/food item**	
Food allergy	87.1
Environmental allergy	12.9

*** Reasons for YES linked with Skipping of Meals.**

**** Allergy kind/food item) linked with Food/Environmental Allergies.**

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Overall, the data indicates higher acceptance of familiar or processed foods, while nutritionally rich but less familiar foods showed lower consumption

Food Neophobia Scale

The Food Neophobia Scale (FNS), developed by Pliner and Hobden (1992), is one of the most widely used and validated instruments for assessing food neophobia and has been extensively employed in behavioral and nutrition research. Its reliability and applicability across diverse populations have been well documented (Helena Dória Ribeiro de Andrade Previato et al., 2015). In the present study, participants were classified into three groups based on their mean FNS scores and standard deviation (SD). Individuals scoring 44 or above were categorized as food-neophobic, those with scores between 24 and 44 were classified as neutral, and participants scoring below 24 were considered food-neophilic. These cut-off points were established at one standard deviation (±1 SD) from the overall mean FNS score of 34.1.

Based on this classification, 31 participants (15.5%) were identified as food-neophobic, 142 participants (71%) were categorized as neutral, and 27 participants (13.5%) were classified as food-neophilic. Among food-neophilic individuals, males constituted 7% (n = 14) and females 6.5% (n = 13). In the neutral group, males and females were equally represented, each accounting for 35.5% (n = 71). Among food-neophobic participants, males accounted for 7.5% (n = 15) and females for 8% (n = 16), indicating a relatively balanced gender distribution across all categories.

To examine the association between gender and food neophobia, mean FNS scores of males and females were compared using a two-way analysis of variance (ANOVA) without replication. The results revealed no statistically significant difference between gender and FNS scores ($p > 0.05$), suggesting that food neophobia levels did not vary significantly between males and females in the study population.

These findings are consistent with previous research. A study conducted by Okumus et al. (2021) on gender and generational differences as antecedents of food neophobia and food neophilia in China reported only marginal differences in food neophobia levels between genders. The similarity of findings across different cultural contexts suggests that while biological and generational factors may influence food neophobia to some extent, gender alone may not be a strong determinant of neophobic behavior.

TABLE 4 FNS category of the respondents
(*p-value<0.05 Significant, p-value>0.05 Insignificant)

Gender	Food Neophilics (%)	Neutral (%)	Food Neophobics (%)	p-value	Result
Male	7	35.5	7.5	**p>0.05**	**Insignificant**
Female	6.5	35.5	8		

Food Consumption pattern of food groups with Less Familiar foods

The food frequency questionnaire (FFQ) used in this study was designed to obtain qualitative and descriptive information on habitual food consumption patterns rather than precise nutrient intake. The findings reveal a clear distinction between foods that are perceived as familiar due to processing, branding, or cultural exposure and those that are genuinely unfamiliar or less integrated into routine diets. This contrast highlights how food neophobia is influenced not only by novelty but also by contextual familiarity shaped through globalization, culinary practices, and marketing.

Within the cereals and millets food group, the highest frequency of consumption among less familiar items was observed for cereal cookie ice cream sandwiches (34.5%), whereas the lowest was for cocoa puff cereal crunch cupcakes (23%). In the pulses and legumes group, Dahi Bhalla showed the highest consumption (44.5%), while Dalma recorded the lowest (14%), reflecting regional culinary exposure and preparation familiarity. Among vegetables, broccoli demonstrated relatively high consumption (44%), while celery had lower acceptance (26.5%). This difference may be attributed to the "global food standard" effect, whereby broccoli has become incorporated into urban Indian continental and Indo-Chinese cuisines, whereas celery remains largely absent from traditional local recipes. These findings suggest that food neophobia is highly contextual and can be reduced through cultural integration and repeated exposure.

In the fruit group, litchi recorded the highest consumption (43.5%), while Buddha's hand (fingered citron) showed minimal consumption (3%), indicating strong preference for seasonally and culturally familiar fruits. Among dairy products, yoghurt had the highest consumption (75.5%), whereas brie cheese had the lowest (6.5%), reflecting traditional dietary practices and taste familiarity. In nuts and seeds, chia seeds showed high consumption (64.5%), possibly due to their promotion as a "superfood," while arecanuts were less frequently consumed (12.5%).

Within meat and poultry, crabs showed relatively higher consumption (27%), whereas ham had minimal acceptance (3.5%), likely influenced by cultural and religious factors. For desserts, cranberry almond streusel with yoghurt was more frequently consumed (24.5%) compared to oatmeal berry parfait (26.5%). In soups, tomato cream cheese and wild rice soup had higher consumption (27.5%), while mulligatawny soup showed very low consumption (3%). Among sweets and beverages, cakes were highly consumed (87%), whereas muesli bars had lower acceptance (34.5%).

Overall, this observed "familiarity gap" underscores the significant role of food processing, marketing, and cultural exposure in masking neophobic responses. Processed and globally marketed foods appear to reduce perceived unfamiliarity, whereas traditional or less-promoted foods continue to evoke neophobic reactions. These findings emphasize the need to address familiarity and exposure in strategies aimed at reducing food neophobia and improving dietary diversity.

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Multiple regression analysis of food consumption of less familiar foods with factors influencing consumption patterns and FNS

Regression analysis was performed to examine the relationship between food consumption of less familiar food groups, mean Food Neophobia Scale (FNS) scores, and factors influencing food consumption. The results indicated a statistically significant association between the consumption of less familiar foods and FNS scores, with a weak negative correlation observed. This suggests that individuals with higher levels of food neophobia tend to exhibit lower consumption of less familiar food groups, whereas those with lower neophobia scores demonstrate greater dietary variety. These findings support the interpretation that food neophobia functions as a behavioral constraint on food choice and consumption patterns.

The observed relationship is consistent with previous research. A study conducted among Portuguese adults by Alexandra Costa et al. (2017) reported a similar negative correlation between food neophobia and food consumption patterns, particularly in relation to food preferences and dietary intake. This alignment with international evidence reinforces the robustness of the present findings and highlights the cross-cultural relevance of food neophobia as a determinant of dietary behavior.

Further regression analysis examined the relationship between food consumption of less familiar food groups and the composite scores of factors influencing consumption. The results revealed a statistically significant association ($p < 0.05$), again with a weak negative correlation. This indicates that as the influence of barriers such as taste aversion, fear of allergies, unfamiliar appearance, or cultural hesitation increases, the consumption of less familiar foods decreases. Conversely, reduced perceived barriers are associated with improved acceptance and consumption. Similar findings were reported in the study "Nutrition in Disguise: Effects of Food Neophobia, Healthy Eating Interests and Provision of Health Information on Liking and Perceptions of Nutrient-Dense Foods in Older Adults" conducted in Guelph, Canada (2020), which demonstrated a negative association between consumption patterns and behavioral influencing factors.

Beyond its nutritional implications, food neophobia has broader consequences for sustainability. Limited acceptance of diverse foods contributes to reduced dietary and agricultural diversification, leading to increased dependence on a narrow range of staple foods. This pattern undermines sustainable food systems and resilience. Encouraging dietary variety aligns closely with the Sustainable Development Goals (SDGs), supports sustainable agricultural practices, and reduces environmental pressure on food systems. Moreover, the findings highlight opportunities for interdisciplinary integration. The application of bioinformatics to model dietary diversity, nutraceutical innovations to enhance food acceptability, and biotechnology to develop consumer-oriented sustainable food products can strengthen behavioral nutrition research. Public health policies, combined with science diplomacy, can further support interventions aimed at reducing food neophobia, ensuring that sustainable diets are not only nutritionally adequate but also culturally acceptable and accessible.

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TABLE 5 Summary output of multiple regression analysis of food consumption of less familiar foods with factors influencing consumption patterns and fns (*p-value<0.05 Significant, p-value>0.05 Insignificant)

Food Group	Less familiar Foods	YES (%)	NO (%)	p-value	Result
Cereals & Millets	Kodo millet burger	25	75	p<0.05	Significant
	Cereal cookie ice cream sandwich	34.5	65.5		
	Coca puff cereal crunch cup cake	23	77		
	Apple cider muffin	25	75		
Pulses & Legumes	Dahi Bhalla	44.5	55.5	p<0.05	Significant
	Jackfruit with split black gram curry	20.5	79.5		
	Dalma	14	86		
Vegetables	Brussels sprouts	38.5	61.5	p<0.05	Significant
	Broccoli	44	56		
	Celery	26.5	73.5		
	Lettuce	40.5	59.5		
Fruits	Litchi	43.5	56.5	p<0.05	Significant
	Wood Apple	21	79		
	Buddha's hand (Fingered citron)	3	97		
	Camachile	7	93		
Dairy products	Yoghurt	75.5	24.5	p<0.05	Significant
	Kefir	11	89		
	Brie	6.5	93.5		
	Cottage/Homogenized cheese	46	54		
Nuts & Seeds	Pecans	13.5	86.5	p<0.05	Significant
	Lotus seeds	31	69		
	Chia seeds	64.5	35.5		
	Arecanuts	12.5	87.5		
Meat & Poultry	Sausages	16	84	p<0.05	Significant
	Hot dogs	11	89		
	Ham	3.5	96.5		

	Crabs	27	73		
Desserts	Cranberry almond streusel with yogurt	24.5	75.5	$p<0.05$	Significant
	Lentil brownie	21	79		
	Oatmeal berry parfait	19.5	80.5		
Soups	Beef and barley soup	3.5	96.5	$p<0.05$	Significant
	Mulligatawny soup	3	97		
	Tomato cream cheese and wild rice soup	27.5	72.5		
Sweets & beverages	Lemonade	77	23	$p<0.05$	Significant
	Cakes	87	13		
	Bars of type Muesli	34.5	65.5		

CONCLUSION

Food neophobia plays a significant role in shaping dietary diversity and nutritional intake among adults aged 20–40 years in Hyderabad. Individuals exhibiting higher levels of food neophobia were found to consume fewer nutrient-dense yet unfamiliar foods, such as certain fruits, vegetables, and traditional preparations, underscoring food neophobia as a critical behavioral barrier to the adoption of diverse and balanced diets. If this behavioral trait is not adequately addressed through targeted nutrition education, repeated exposure, and sensory-based food experiences, individuals are likely to continue relying on a narrow range of familiar foods, irrespective of their economic capacity or food availability. This pattern can lead to suboptimal nutrient intake and increased risk of diet-related non-communicable diseases.

Promoting acceptance of diverse food groups through behavior-focused interventions can significantly improve dietary quality, nutritional adequacy, and long-term health outcomes. Increased dietary diversity also contributes to sustainable food systems by encouraging the consumption of a wider variety of foods, supporting agricultural biodiversity, and reducing dependence on a limited number of staple crops. Addressing food neophobia is therefore closely aligned with several Sustainable Development Goals (SDGs), including SDG 2 (Zero Hunger) by improving food utilization and diversity, SDG 3 (Good Health and Well-being) through better nutrition and disease prevention, SDG 12 (Responsible Consumption and Production) by fostering sustainable dietary choices, and SDG 13 (Climate Action) by supporting environmentally resilient and diversified food systems. Integrating behavioral nutrition strategies into public health policies is essential for advancing both human health and sustainability objectives.

FUTURE RESEARCH AND LIMITATIONS

- The study was limited by a small sample size and was restricted to adults aged 20–40 years in Hyderabad, which may limit the generalizability of the findings to other populations.

- Online data collection and reliance on self-reported information may have introduced reporting and recall bias, as dietary intake and lifestyle behaviors may not accurately reflect actual practices.
- Future studies should include larger and more diverse populations across different age groups, regions, and socio-economic backgrounds to improve external validity.
- Incorporation of psychological, cultural, and environmental determinants is recommended to better understand factors influencing food neophobia.
- Advanced approaches such as bioinformatics tools, sensory exposure techniques, and nutraceutical-based interventions may help in developing effective strategies to address food neophobia.
- Dietary diversity and acceptance of unfamiliar foods are essential for sustainable diets, as they reduce reliance on limited staple foods and support agricultural biodiversity.
- Food neophobia represents a significant behavioral barrier to nutritional quality, biodiversity conservation, and long-term food security, emphasizing the need for integrated nutrition and public health interventions.

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