Challenging Dietary Research Measures, Concepts, and Definitions to Promote Greater Inclusivity of Immigrant Experiences: Considerations and Practical Recommendations

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NEARLY 30% OF ALL AMERICANS ARE EITHER FIRST- or second-generation immigrants—a population of 84.8 million Americans expected to comprise 36% of the country by 2065. Hispanic, Latino, and Asian American people constitute the majority of this expanding population (44% and 27%, respectively); Asian American people represent the fastest-growing racial and ethnic minority group in the United States, growing by 81% between 2000 and 2019.[1,2] In parallel, there has been an alarming surge in immigrant health disparities in the United States, including a complex and disproportionate noncommunicable disease (NCD) burden .[3-5] Despite this, it has been reported in the recent literature that neither funding nor implementation of nutrition-related initiatives has adequately reached immigrant and racial and ethnic minority communities in recent years.[6-8]

Diet is a major contributor to the NCD burden; 45% of all cardiometabolic mortality is attributable to dietary behaviors.[9] There is a growing realization that the assumptions forming some broadly applied concepts in dietary research fail to appropriately consider the unique and complex multidimensionality of immigrant dietary experiences. Even when included in dietary health research, data from racial and ethnic populations are often aggregated, masking crucial health disparities across subgroups, as well as important nuances in the dietary behaviors across diverse communities.[5,10] It is important to acknowledge that the mainstream understanding of dietary experiences has been informed by decades of dietary research in populations in which racial and ethnic minority or immigrant populations were underrepresented, aggregated, or excluded altogether. The implicit and explicit centering of this oversimplistic and selectively convenient understanding of food-related experiences has meant that researchers are often unable to appropriately consider the complexity of the immigrant dietary experience. Scholarship produced from such a lens ultimately provides researchers with methodological tools or concepts that lack the capacity to effectively intervene in immigrant dietary behaviors, which is a direct result of the assumptions and principles underlying some contemporary dietary research.

There has been a growing call to acknowledge and address how historic and structural biases have elevated the dietary experiences of White and European populations in both dietary research and, subsequently, nutritional standards.[11,12] An excellent example of this is the emergence of the Mediterranean diet in nutritional guidance; although various positive health outcomes have been associated with components of a Mediterranean diet,[13] it is important to consider that much of the research that helped establish its prominence underrepresented many populations around the world,[13,14] lacking a comprehensive cross-cultural lens to compare its healthfulness with a variety of different non-European dietary patterns. Although efforts have since been made to adapt components of the Mediterranean diet to fit foods more prominent in non-Mediterranean contexts,[15] concerns have emerged related to the transferability of the diet in populations with a high diversity of traditional cooking practices, food environments, or socioeconomic contexts,[16,17] and whether other types of non-European or non–White-centric dietary patterns also warrant greater promotion (eg, the Okinawan diet).[18,19] For too long the unique complexity of the immigrant experience has been missing from the mainstream dietary research paradigm, often sidelined as a niche or circumstantial consideration when applying dietary "gold standards" rather than as a factor worth centrally integrating into the very foundation of these approaches. With the pressing need to promote greater equity in how the scientific community understands and intervenes in the dietary behaviors of immigrant populations to address growing diet-related NCD morbidity, our aim was to identify specific facets of the immigrant dietary experience that are often not considered within the existing landscape of dietary health research and, informed by

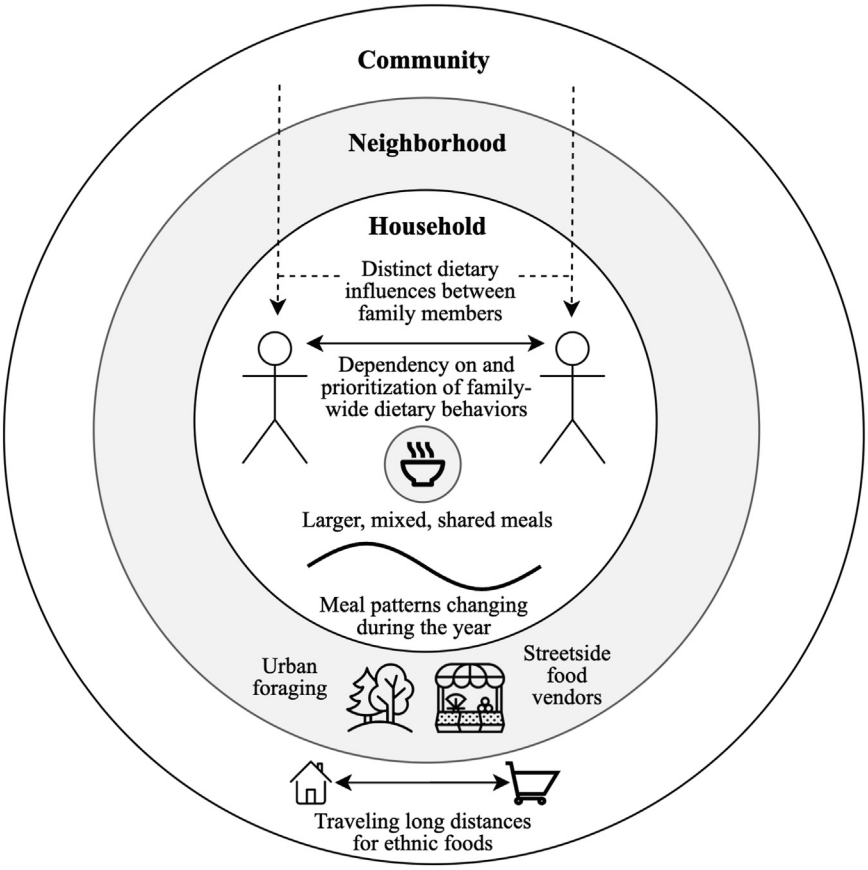

Figure. Dietary experiences of immigrants that often lack consideration in contemporary dietary measures, concepts, and definitions.[20-52]

recent developments in community-based dietary research in immigrant and ethnically diverse populations, provide actionable recommendations to promote immigrant inclusivity and the innovation of current theoretical and methodological tools. These considerations are displayed in the Figure and recommendations are summarized in the Table.

CHALLENGING THE DEFINITION OF THE FOOD ENVIRONMENT: INFORMAL AND DISTANT FOOD SOURCES

Streetside Food Vendors

The food environment has been a dynamic concept within dietary research, but is generally understood as the physical, social, and economic space and context in which individuals purchase, prepare, and consume foods.[53] Although this expansive concept has fostered methodological innovations to ensure that a wide range of socioecological variables relevant to the food environment can be captured appropriately, there remain crucial facets of the immigrant dietary experience that may be missing. For example, small, community-oriented, informal, streetside, fresh fruit and vegetable vendors can play a crucial role as a source of fresh produce in the urban food environment, particularly within ethnically diverse neighborhoods,[20,21] yet have remained elusive to study due to often being less established, localized, and more seasonal. However, the expansion of longitudinal, publicly available geospatial data (eg, Google Street View and Apple Look Around) provide researchers with a novel tool to begin systematically analyzing streetside vendors within communities of interest.[20] In 2021, these platforms were used for the first time to document changes in streetside fruit and vegetable vendors across 6 neighborhoods in New York City (NYC), revealing the disproportionate impact the COVID-19 pandemic had on fruit and vegetable vendors in Chinese ethnic neighborhoods.[20,22] Such methods warrant exploration in other immigrant communities to better document this often overlooked facet of the food environment.

Ethnic Food Outlets

Moreover, the characterization of local food environments is fundamentally based on assumptions about the geographical confines of the term *local* and whether it truly encompasses all relevant food establishments. Indeed, although Americans reported traveling an average of 2.6 miles to access food,[23] Hispanic Americans in central Texas reported traveling 1.6 miles more than non-Hispanic White Americans.[24] Similarly, some Chinese Americans in NYC may travel 1.5 miles farther to shop exclusively at ethnic grocery stores.[25] The importance of ethnic grocery stores lies in their ability to cater to unique cuisines (eg, produce and products) and languages (eg, signage and language of clerks) of ethnically diverse communities, despite often being less geographically proximal

Table. Recommendations to promote greater inclusivity of the dietary experiences of immigrants within research[20-52]

Domain	Consideration	Challenge	Recommendations
Food Environment	Purchasing from streetside food vendors (particularly fresh produce)	Lack of reliable data on informal produce vendors, which are often localized, seasonal, and less established[20,21]	Using geospatial imagery, online data, and regular community-based field assessments to better capture informal produce vendor environment[20,22]
	Traveling long distances for ethnic foods	Overreliance on proximity as measure of food environment; distant yet relevant food vendors may be missed when assessing local food environments[23-27]	Incorporating state and regional level data on ethnic food outlets, and leveraging geospatial and empirical methods to disaggregate relationships between ethnic and nonethnic retail environments[28,29]
	Urban foraging and consumption of wild foods	Sources of wild foods not reflected within the scope of the food environment[30,31]	Conducting community-engaged surveillance research to document the types and locations of wild foods consumed, as well as social, cultural, and nutritional implications of urban foraging[30,32]
Family Dynamics	Dependency on and prioritization of family-wide dietary behaviors	Interdependent dietary patterns driven by collectivism and familism are not considered in individualized understandings of diet[33-36]	Exploring the measurement of interdependency of dietary behaviors and collectivist approaches to assessing dietary behaviors and attitudes[37,38]
	Distinct dietary influences between family members	Inability to generalize intrahousehold eating patterns due to drastic differences in dietary acculturation[34,40,41]	Expanding the measurement of dietary acculturation to inform more tailored interventional approaches that reflect the realities of household eating behaviors [40-42]
Eating Patterns	Consuming foods from larger, mixed, shared plates	Difficulties in measuring individualized food consumption and the intake of specific food groups[44,45]	Leveraging both household-level and individual-level dietary consumption data to better triangulate dietary intake from more group-based styles of eating[46-48]
	Meal patterns changing dramatically during the year	Dietary assessments are unable to appropriately consider these short-term yet consistent, impactful changes in food behaviors[49-51]	Tailoring dietary assessment tools to better capture specific variations in dietary behaviors throughout the year, and considering the sociocultural and religious significance of certain food behaviors[52]

than mainstream grocery outlets. It is crucial that food environment assessments that rely on identifying stores within a certain radius of a community—a paradigm that has already been challenged in recent years[26,27]—do not miss the crucial presence of these often-distant ethnic food outlets. Moreover, it is imperative to also disaggregate the cuisines and communities that different ethnic grocery stores serve; for example, although ethnic grocery stores may be highly prevalent in a local community, if they cater primarily to cuisines of Asian immigrant communities, then Latin or African immigrants may still travel farther distances for food. Considering differences in the clientele of ethnic grocery stores can help researchers better understand the types of communities that are (and are not) served by these local outlets.

There are important lessons to be learned from recent advancements in the study of the ethnic food retail environment. In their 2020 study, Rybarczyk and colleagues[28] described the innovative use of state-level food vendor data, standard industrial classification codes, and publicly available online data (including internet imagery, Google Street View, and Bing maps) to identify ethnic food retailers serving the cities of Flint and Grand Rapids, Michigan. Importantly, authors developed an index to measure the accessibility of ethnic food retailers and geospatial statistical modeling to comprehensively analyze the ethnic food retail environment, providing insights on which communities faced barriers to accessing these outlets. In addition, novel dietary assessment methods, such as Ecological Momentary Assessment, hold enormous potential to enhance the rigor or comprehensiveness of dietary research, particularly in measuring determinants of diet, yet remain underexplored within immigrant settings. These innovations should be the focus of future research to better understanding how immigrants interact with their unique food environments.[29]

Urban Foraging

Finally, beyond both the informal and formal food retail environment, there is a longstanding and growing tradition of urban food foraging across diverse immigrant communities; that is, the harvesting or collection of noncultivated, naturally growing vegetation within urban landscapes for food, medicinal, or other social purposes.[30,31] Urban food foraging can have important nutritional implications and is practiced for a variety of reasons, ranging from the supplementation of food supplies to saving on food expenses, preparing traditional cuisines, recreation, or to better connect with nature and one's community.[30,31]

In a 2022 study among Russian immigrants in NYC, participants described consuming 18 different species of plants foraged from the NYC urban landscape, with many describing foraged foods as better-tasting, and perceived them as both cleaner and more nutritious.[30] However, although emerging efforts using self-reported data and qualitative methodologies have helped better document food-foraging behaviors and sources of "wild" foods,[32] there is now also a need for broader population-wide surveillance of the prevalence, characteristics, and impact—both social and nutritional—of urban food foraging (eg, the types of wild foods consumed and where they are located, as well as the nutrient profiles of these wild foods and their implications for health). Such efforts can pave the way for a more nuanced, culturally sensitive understanding of the significance of foraged foods in the lives of immigrants.

CHALLENGING THE POSITIONING OF FAMILY: INTERDEPENDENT, COMPLEX HOUSEHOLD FOOD BEHAVIORS

Interdependent and Family-Centered Food Behaviors

A hallmark of many immigrant communities is the intergenerational transmission of collectivist values, or the prioritization of group-level interests (such as interpersonal, communal, or societal interests) over those of the individual. A common manifestation of collectivist thinking is familism, which emphasizes the importance of interpersonal family relationships (including among extended family) through mutual interdependence and collaboration,[33] such as through living in multigenerational households and family-centered decision making, which is observed in Latin and Asian American communities.[34-36] However, the presence of familism and collectivist values adds an important yet often overlooked degree of complexity. For example, Asian American young adults have reported eating certain foods out of courtesy or obligation to respect the desires of family members, or changing their eating behaviors to align with the preferences of other family members.[34] Similarly, East Asian Americans with diabetes have reported refraining from dietary modifications to avoid being a burden to others in the household, where dietary behaviors are often interdependent due to shared food purchasing and preparation.[54]

It is thus crucial to consider interdependent dietary behaviors to better capture immigrant experiences (eg, measuring food-related dependency on family members) and integrate collectivist value systems into the understanding of dietary dynamics. This follows in the footsteps of similar innovations in the measurement of happiness and wellbeing, where an interdependent, collectivist approach to understand happiness has helped develop survey instruments that assess perceptions of wellbeing at both individual and group levels.[37,38]

Dietary Acculturation and Intrahousehold Dietary Differences

Especially in immigrant settings, surveilling and intervening in family-wide food behaviors often fails to appropriately consider the high level of heterogeneity in the dietary landscape of each family member. Much of this heterogeneity lies in differences in dietary acculturation, or the experience of integrating the eating patterns and foods of a majority-group culture (ie, host country) and a minority-group culture (ie, region of ethnic origin).[39] Dietary acculturation has been observed to have a considerable impact on eating patterns in diverse immigrant communities,[40,41] but even within immigrant sub-groups, the exact nutritional implications of dietary acculturation on eating behaviors can differ substantially. Within households, dietary acculturation may differ substantially by age and degree of exposure to US and non-US dietary influences, which ultimately drives intrafamily differences in food consumption patterns.[34,41] As a result, assumptions about shared socioecological drivers of eating patterns within a household may not hold within

immigrant settings, where acculturative, generational, and migration differences may result in a unique dietary landscape for each family member.

It is thus imperative to identify methods of systematically assessing dietary acculturation within immigrant families to ensure that tailored household-level dietary interventions can be developed that reflect the realities of immigrant household eating behaviors,[42] while also being respectful to deeply rooted cultural and family traditions related to food. Indeed, this intrafamilial dietary heterogeneity is also nested within important differences even among immigrants sharing common ethnicities or countries of origin (eg, the dietary patterns of Indian Americans from the North vs the South of India, or the diets of Latin Americans from Central America vs South America); thus, the reductionist approach often taken in understanding immigrant dietary experiences also warrants critical consideration.

CHALLENGING ASSUMPTIONS BEHIND EATING PATTERNS: A FOUNDATION TO IMPROVE ASSESSMENT TOOLS

Consuming from Shared, Large, and Mixed Plates of Food

Aside from the food environment and household dynamic, unique considerations regarding eating patterns must be considered within the immigrant context. Much of mainstream dietary health research is premised on the assumption of individualized eating patterns (ie, having an individualized plate filled with, often, separated foods). This understanding of eating behaviors is best evidenced by the portioned, individualized MyPlate visual developed by the US Department of Agriculture.[43] Indeed, 24-hour dietary recalls and other mainstream dietary assessment tools are also structured under this assumed eating style in which individuals consume separated portions of vegetables, meats, and grains as part of meals. However, a survey of diverse Asian American communities revealed that only 13.2% reported eating meals from individualized plates, with many instead reporting eating "family style" in which food is served in large platters and consumed incrementally in smaller dishes and bowls.[44] A similar study of Latino families revealed the popularity of large, 1-pot dishes in which different foods are all cooked together.[45]

It is crucial to challenge these assumptions regarding eating styles in order to enhance the understanding, and obtain appropriate measurements, of immigrant dietary behaviors. In this regard, important lessons can be learned from nutritional research from around the world. For example, the China Health and Nutrition Survey, which launched in 1982 and was informed by the National Health and Nutrition Examination Survey,[55] has annually documented the health of the Chinese population for almost 40 years.[46] Although both the National Health and Nutrition Examination Survey and China Health and Nutrition Survey use 24-hour recalls to measure individual dietary intake, the China Health and Nutrition Survey uses changes in household food inventories to calculate household-level food consumption, which is then integrated into the individual-level intake data by determining the portion of household meals consumed by each person.[47] Indeed, aside from China, analyzing the implementation of population-wide nutritional surveillance in countries with significant racial and ethnic diversity may also hold important lessons (eg, the Brazilian Food and Nutrition Surveillance System).[48] Such innovations in global settings deserve greater exploration in the United States to better reflect the dietary experience of immigrants.

Seasonal and Culturally Significant Fluctuations in Dietary Patterns

Finally, the measurement of dietary intake often assumes a certain degree of regularity in eating behaviors year-round that fails to encompass seasonal variance in diet. Although variability in weekday vs weekend diets is considered in some measurement methods (eg, 24-hour recalls), most dietary screeners are still premised on weekly, monthly, and yearly consistency in eating habits. However, the sociocultural and religious drivers of immigrant diets often foster eating patterns that involve dramatic changes in eating behaviors during certain times of the year. For example, the observance of Ramadan in Islam, practiced widely across Asian and African immigrant communities, involves fasting daily from sunrise until sunset for approximately 30 days each year. Dietary research from diverse Muslim communities has revealed substantial dietary and health implications of the observance of Ramadan,[49,50] as this time period is also associated with the consumption of many traditional and celebratory foods that are consumed less often during other times of the year. However, the seasonality of these eating patterns presents a considerable obstacle for dietary instruments that may dilute these crucial dietary patterns. For instance, consuming dates has a particular religious significance during Ramadan, and dates may be eaten daily during this month but not at all during the rest of the year[51]; a food-frequency questionnaire may average this yearly intake out to 2 to 3 times per month, although the reality may hold very different nutritional implications. Aside from religiously driven food consumption, the seasonality of certain culturally significant meals, fruits, or vegetables can also play a substantial role across diverse immigrant communities.

Improving dietary instruments to better consider seasonal variations in dietary intake will allow more precise assessment of immigrant dietary experiences; here too, lessons can be learned from global settings. In 2021, researchers in Pakistan used 24-hour recall data collected during Ramadan to develop a Ramadan-specific food-frequency questionnaire composed of 80 distinct, common foods consumed during the month[52]; developing such tailored and seasonal dietary instruments may improve the assessment of immigrant eating patterns.

CONCLUSIONS

With the pressing need to better understand and intervene in dietary risk factors contributing to the immigrant NCD crisis, the scientific community must reflect on the conceptual and methodological capacity of mainstream dietary health research to stand up to this challenge. In considering the heterogeneity of immigrant dietary experiences, researchers should also look beyond simply nativity; many of the complex norms and behaviors discussed in this article apply equally to the US-born children of immigrants (ie, second-generation immigrants).[56] The movement toward precision nutrition is promising, with the potential to allow researchers to holistically consider a systems approach to an individual's

nutrition profile and health risks. This is further reinforced by the assertion that the most commonly recommended diets in the United States tend to have a reductionist focus on physical health, crucially forgoing context and setting in some cases.[57]

Through a critical examination of food environments, household dynamics, and eating patterns, we have outlined immigrant-specific experiences that are currently not captured or accounted for in the existing paradigms of dietary research. In doing so, the outlined recommendations provide researchers and public health practitioners the opportunity to begin enhancing the inclusivity of dietary research by expanding the conceptual understanding of eating behaviors and socioecological contributors to diet, as well as innovating the methodological tools needed to capture the unique complexity of food experiences in diverse populations. Importantly, efforts to better understand and intervene in immigrant dietary behaviors must also consider how this work is contextualized within the broader array of socioecological factors driving these nutritional and health disparities. Systemic and multisectoral marginalization, exclusion, and discrimination have contributed enormously to the social and economic disparities behind the immigrant disease burden. As such, improving the inclusion of immigrant experiences in nutritional research represents just 1 important step in efforts needed to better address the complex, structural forces that impact immigrant health.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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AUTHOR CONTRIBUTIONS

S. H. Ali: conceptualization, writing — original draft, visualization. N. Lin: writing — review & editing. S. S. Yi: conceptualization, writing — review & editing, supervision.