Dietary Acculturation: Definition, Process, Assessment, and Implications

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Abstract : Over the past few decades, changes in patterns of behavior (e.g., diet, smoking, alcohol consumption, and physical activity) have led to major changes in health status, characterized by increases in obesity, Type II diabetes mellitus, cardiovascular disease, and some cancers. This epidemiologic transition is largely the result of rapid increases in immigration to developed countries and rural-urban migration within developing countries, which is usually accompanied by environmental and lifestyle changes. In particular, adoption of "Western" dietary patterns, which tend to be high in fat and low in fruits and vegetables, is of concern since diet is a potent contributor to chronic disease risk. However, until recently, the process by which immigrants and rural-urban migrants adopt the dietary practices predominant in their new environments, known as dietary acculturation, has received very little research attention. Dietary acculturation is multidimensional, dynamic, and complex, and varies considerably depending on a variety of personal, cultural, and environmental characteristics. Therefore, to intervene successfully on the negative aspects of dietary acculturation, it is important to understand the process and identify factors that predispose and enable it to occur. The purpose of this article is to provide a practical model for understanding and investigating the effect of dietary acculturation on food and nutrient intake. Thus, this report 1) gives an overview of acculturation, 2) defines dietary acculturation and presents a model for how it occurs, 3) discusses measurement issues around dietary acculturation, 4) reviews the literature on dietary acculturation in Korean Americans; 4) suggests a paradigm for acculturation research; and 5) offers some recommendations for future research in this area.

Key Words : acculturation; culture; diet; dietary acculturation; eating habits; Korean Americans; minorities

I. Introduction

Over the past few decades, there have been changes in patterns of behavior (e.g., diet, smoking, alcohol consumption, and physical activity) that have led to major changes in health status, characterized by increases in obesity, Type II diabetes mellitus, cardiovascular disease, and some cancers (1-3). This epidemiological transition, first described by Omran (2), describes the shift from a pattern of high prevalence of infectious diseases associated with malnutrition, and periodic famine and poor environmental sanitation, to a pattern of high prevalence of

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chronic diseases associated with urban-industrial lifestyles (3).

Rates of urbanization are increasing globally: 36.6% of the world's population was living in urban areas in 1970 compared to 44.8% in 1994, and experts predict that by the year 2025, the urbanization level will be 74% in developing countries and 77% in developed countries (4).

Urbanization is associated with a marked increase in consumption of energy-rich foods, a decrease in energy expenditure (through less physical activity), and a loss of the traditional social support mechanisms. Furthermore, there is also a transformation in rural areas: increased mechanization in agriculture and increased use of automobile and bus transportation in rural areas are leading to a decrease in physical activity, and increased availability of processed foods are changing the types of foods consumed (1, 3-5).

There has also been a rapid increase in immigration to the United States (U.S.) and other industrialized (i.e., developed) countries. For example, according to 2000 U.S. Census Bureau estimates, 28.4 million foreign-born persons resided in the U.S. in 2000, representing 10.4% of the total population (6,7). Among foreign-born persons in the U.S., 51% were born in Latin America, 25.5% in Asia, and 15.3% in Europe (6,7). Given this remarkable growth in immigration, it is increasingly important to address the health status of various racial/ethnic minorities living in the U.S. and other developed countries.

Immigration to developed countries or rural-urban migration within developing countries can represent a substantial shift in a person's lifestyle and environment, and these changes can result in surprisingly rapid modifications in the risk of chronic diseases. For instance, Ziegler and colleagues reported that Asian-American female migrants who had lived in the West for a decade or longer had an 80% higher risk of breast cancer than more recent immigrants (8). In another study, U.S. born Japanese-American women were found to have significantly higher body fat than immigrant Japanese-American women (9). Between 1962 and 1999, urbanization in Morocco, North Africa, was associated with higher intakes of animal products, sugars, and cereals as well as higher levels of obesity in adults, while undernourishment persisted in children (10).

Overall, evidence from migrant studies consistently indicates that change toward a "Westernized" lifestyle increases risks of several major chronic diseases.

These lifestyle changes include access to health care, reproductive factors, physical activity, and diet. In particular, adoption of a "Western" diet (i.e., high in fat and low in fruits and vegetables) is of concern because this dietary pattern is a risk factor for several chronic diseases (11-13). Given that diet likely plays a major role in increasing the risk of chronic disease among immigrants, an important public health objective would be to encourage racial/ethnic minority groups to retain healthful eating patterns from their original country or rural area, while adopting the healthy dietary practices of their new environment. To meet this objective, we need a better understanding of the process by which immigrants adopt new dietary practices, known as *dietary acculturation*, and need to identify the factors that predispose and enable it to occur. However, until recently, this

dimension of acculturation has received little research attention.

The goal of this article is promote a better understanding of the construct of dietary acculturation and how dietary acculturation affects dietary intake. Therefore, this report 1) gives an overview of acculturation, 2) defines dietary acculturation and presents a model for how it occurs, 3) discusses measurement issues around dietary acculturation, 4) reviews the literature on dietary acculturation in Korean Americans; 4) suggests a paradigm for acculturation research; and 5) offers some recommendations for future research in this area. In this paper, I use the term "*immigrant*" to denote foreign-born racial/ethnic minorities who migrate to a developed country or persons who migrate from an urban to a rural area, and "*host*" to describe the dominant group in the new environment (for example, the predominant population of a developed country or an urban area).

II. What is Acculturation?

The term "acculturation" is commonly used to denote the process by which a group, usually a minority group, adopts the cultural patterns (e.g., beliefs, religion, folkways, language) of a dominant or host group. Although social scientists do not agree on either a standard definition of acculturation or on a uniform method of its measurement (14), there are two generally accepted theories that describe this complex construct. Robert Park described acculturation as a series of distinct, irreversible stages (contact, competition, accommodation, and assimilation) where completion of one stage is required before moving to the next (14). Park's model accurately reflects the experience of many European immigrants, but it has been criticized by social scientists as a weak model for migrants who are especially physically and culturally distinct. For example, social scientists who have tested this model with African and Asian immigrants have found that those groups do not pass through irreversible stages of acculturation and do not become completely homogeneous, which Park claims is synonymous with assimilation (14). The other well-accepted model, proposed by Milton Gordon, consists of seven stages of assimilation, which range from cultural assimilation to civic assimilation. The Gordon model explains acculturation as a dynamic process with bi-directional movement between stages (14). During this process, an individual is acquiring, retaining, and/or relinquishing behaviors and values of his or her original culture and the host culture (14,15).

Regardless of which theory is used to describe the process, acculturation is believed to occur at both the micro (individual) and macro (social/group) levels. Acculturation at the individual level is referred to as "psychological acculturation" and refers to changes in attitudes, beliefs, behaviors, and values in individuals due to acculturation (16,17). At the macro level, acculturation results in physical, biological, political, economic, and cultural changes in the acculturating group or in the society as a whole (14-17).

Several factors influence the facility of an individual or group to assimilate into a new society, be it a new country or a different area

within the same country. Clearly, the larger the contrast between the immigrant's original and host cultures, the more difficult acculturation will be. Highly educated or skilled immigrants from urban areas are less likely to experience cultural isolation or major changes in lifestyle upon immigration to a developed country. On the other hand, immigrants who locate in ethnic enclaves (i.e., geographically close communities of people of the same ethnic group, such as Chinatown-type settlements in the U.S.) or who migrate involuntarily (e.g., refugees) may acculturate with considerably less speed and facility.

III. What is Dietary Acculturation?

While acculturation pertains to adopting cultural traits, "*dietary acculturation*" specifically refers to the process that occurs when members of a migrating group adopt the eating patterns/food choices of their new environment (18,19). For example, dietary acculturation for a Korean immigrant to the U.S. may be characterized by increased consumption of "Western" foods such as hamburgers, French fries, and potato chips; and a decreased consumption of traditional Korean dishes such as Kimchi, Galbi gui, and Doenjang jigae. Unlike some dimensions of acculturation in which the immigrant group unilaterally adopts the traits of the host culture, dietary acculturation is a more reciprocal process, as the host group may adopt some of the foods and dietary practices of the minority group(s). As an example, there are a variety of ethnic supermarkets and restaurants available throughout most of the U.S.

Similar to other forms of acculturation, dietary acculturation is multidimensional, dynamic, and complex and does not appear to be a simple process in which a person moves linearly from one end of the acculturation continuum (traditional) to the other (acculturated) (15-19). Rather, available research indicates that as part of the acculturation process, immigrants may retain traditional foods, exclude others, find new ways to use traditional foods, and/or adopt the diets of the host country (19-26). For example, among many Asian immigrants, rice remains an important staple, but cereal, bread, sandwiches, and milk may replace other traditional foods (21-23). As part of dietary acculturation, people of Asian descent may replace hom bau (a steamed or baked bread stuffed with chopped meat and/or vegetables) with meat sandwiches to which they add mayonnaise. Immigrants may also incorporate the foods available in the host country in preparing traditional meals. For example, in a study of 102 first-generation Chinese immigrants in Nebraska by Yang and colleagues, the participants reported that they used American foods (e.g., canned and frozen American vegetables) for preparation of Chinese dishes (22). Some studies have also shown that immigrants are more likely to consume traditional foods at dinner, probably because they eat the evening meal with other family members, while breakfast and lunch are more likely to be "Westernized" (21,25). Finally, some immigrants may fully adopt (i.e., acculturate to) the dietary patterns of the new environment.

It is important to note that dietary acculturation can result in both healthful and less- healthful dietary changes. Among Hispanic immigrants, for

example, consumption of fewer highly saturated fats such as lard and creams is a healthful change, while drinking sodas instead of traditional fruit-based beverages is a less healthful behavior associated with dietary acculturation (26). Decreased consumption of seafood and increased intake of red meat are unhealthful changes resulting from dietary acculturation in Asian immigrants, while eating a greater variety of fruit can be a positive behavior modification (21-24). Therefore, although dietary acculturation can have negative health consequences, not all dietary changes are necessarily detrimental.

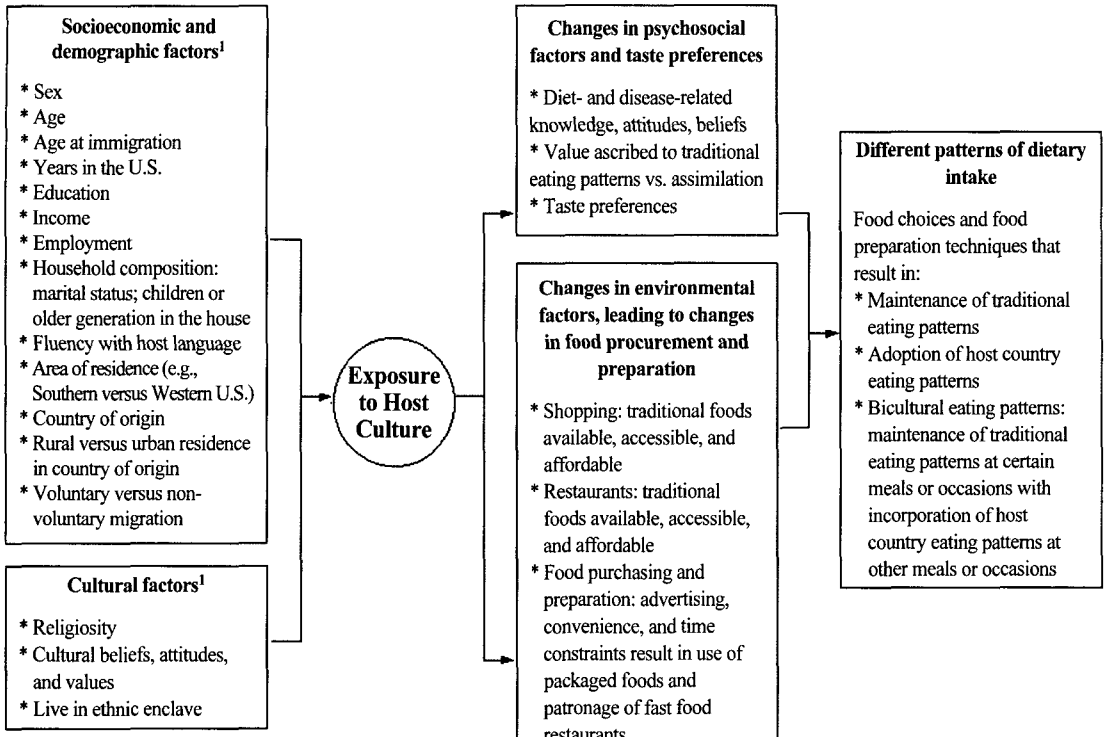
Dietary acculturation is influenced by a number of factors and can result in considerably different patterns of dietary intake. Here, we present a model of this multifaceted process by which racial/ethnic minority immigrant groups adopt the eating patterns of their new environment.

IV. How does Dietary Acculturation Occur?

<Figure 1> shows a proposed model of dietary acculturation. The model posits that there is a complex and dynamic relationship of socioeconomic, demographic, and cultural factors with exposure to the host culture. This set of characteristics predicts the extent to which new immigrants may change their attitudes and beliefs about food, taste preferences, and food purchasing and preparation behavior. Ultimately, these factors can lead to changes in dietary intake.

Several studies have shown that longer residence in the host country, high education and income, employment outside the home, being married, having young children, and fluency with the host language results in increased exposure to mainstream culture, and consequently acculturation (15-19, 21-26). Exposure to host culture (through television, radio, books, magazines, advertisements, friendships, etc.) may lead to changes in diet- and disease-related knowledge, attitudes, and beliefs; values ascribed to traditional eating patterns; and/or taste preferences. For example, advertisements in fashion magazines emphasizing a slim figure may lead to alterations in perceptions of body image among teenage immigrant girls (27,28); and exposure to nutrition and health messages can modify beliefs about the relationship between diet and chronic disease risk (29,30). Another consequence of immigration is exposure to a new food supply, which can lead to changes in food procurement and preparation. For instance, unavailability of traditional foods and ingredients such as certain types of vegetables or spices will result in increased consumption of the foods of host country (21). Similarly, if traditional foods are expensive and time-consuming to prepare, it may be more convenient and affordable to eat pre-packaged dinners or to frequent fast food restaurants (21,24). Studies in immigrant and minority populations indicate that these environmental or "daily life" factors are among the most commonly cited reasons for dietary acculturation (21,24,25).

Sociodemographic and cultural factors, exposure to host culture, and changes in diet-related psychosocial and environmental factors can cumulatively affect the dietary intake of immigrants



<Figure 1> Proposed Model of Dietary Acculturation: The process by which racial/ethnic immigrant or rural-urban migrant groups adopt the dietary patterns of their new environment

in three principal ways. An immigrant may 1) maintain traditional dietary patterns, 2) completely adopt host environment foods and dietary behavior, or 3) incorporate the host environment eating patterns into their diet while maintaining some traditional dietary practices (biculturalism).

It is important to note that some sociodemographic and cultural factors may directly influence dietary acculturation independent of exposure to the host country or changes in psychosocial and environmental factors. For example, a female Chinese immigrant who has extensive exposure to the host country (e.g., is fluent in English and works outside the home) may still not adopt U.S. eating patterns because she lives with her mother-in-law and elderly Chinese typically prefer a traditional diet and have a strong influence on their children's behavior (29,31). Therefore, although this hypothetical immigrant has characteristics that predict full acculturation, she is likely to have bicultural eating patterns. This example also illustrates that the fact that an immigrant is acculturated with respect to other dimensions does not necessarily mean that he or she is fully acculturated regarding diet.

V. How is Dietary Acculturation Measured?

Most of the scales and indices commonly used in acculturation research have been developed and validated in social science and psychological research, and some have been applied to studies examining dietary behavior. In <Table 1>, we show that there are three major approaches to measuring dietary acculturation in the literature: single item measures of general acculturation, acculturation scales, and food-based assessments.

1. Single item measures

The major limitation of the single item measures is that they are quite general, focusing on items such as length of residence in the host country, language proficiency and preference, generation level, etc. While these items may yield a general assessment of acculturation, they may not provide the kind of specific information needed for designing health promotion programs, such as dietary interventions.

"Language" and "generation level" are illustrative examples because they are commonly used in studies examining acculturation and diet. Familiarity with the host language, e.g., English, is likely a useful indicator of dietary acculturation since individuals who can read and speak English are more likely to interact with mainstream society and be exposed to nutrition information. However, simply being able to speak or read a national language may not be a good indicator of the degree to which the individual has adopted the dietary patterns of the host country, as some immigrants may speak English fluently but continue to maintain traditional eating patterns. In addition, language preference may simply be measuring the strong effects of education and socioeconomic status. Similarly, generation level is likely a good index of dietary acculturation, as studies have shown that higher generations (third and fourth) of ethnic/racial minorities groups are more likely to have adopted the dietary patterns of the host environment compared to first generation immigrants (32,33). However, generation level may not be applicable in situations in which immigrants live so close to their country of birth that they essentially maintain their traditional practices. This is particularly applicable to Hispanics who live near the Texas/Mexico border and speak Spanish as well as share Mexican traditional beliefs and dietary practices although they are officially U.S. residents.

2. Acculturation Scales

Acculturation scales are considerably more comprehensive and measure several facets of exposure to the host country; therefore, they are less likely to misclassify a person's level of acculturation. However, they do not typically include diet-specific acculturation indicators. In addition, it is important to note that most of these scales were validated against single-item measures and demographic characteristics rather than any type of "gold standard" (34-37). Finally, validation samples have usually consisted of homogenous, non-representative populations such as college students (35,37) and hospital patients (34,37).

<Table 1> Indices and Scales that have been Used in Studies of Dietary Acculturation

Single-Item Measures of General Acculturation	Examples of Questions	Comments
Residency		
* Length of residency in the host country * Length of residence in country of origin * Place of birth	* How long have you lived in the U.S.? (less than 10 years or greater than 10 years) * How long did you live in Korea? * Where were you born? (Japan, U.S.)	* Commonly and successfully used for assessing general acculturation in many studies. * Provide a global measure of exposure to host culture. * Have the advantage of being short, factual questions that do not require interpretation by the respondent. * Are very non-specific and therefore may misclassify a respondent's level of acculturation.
Language		
* Proficiency	* What language do you usually speak, read, and write? (Spanish, English, other)	* As above, these are commonly used questions that are short, simple, and non-specific.
* Preference	* What language do you prefer to speak, read, and write? (Spanish, English, other)	* Provide valuable information for many public health and intervention settings regarding the need for interpreters and translated materials.
Generation Level	* Where was your mother/father born?	* Simple, factual question, but only indirectly measures exposure to host culture.
Friendship Preferences	* Who do you associate with in the outside community? (mostly Mexicans, mostly Americans, both about equally)	* Intended to assess the respondent's degree of ethnic identification with the host or original culture.
Self-identification	* How do you identify yourself? (Chinese, American, bicultural)	* Has the advantage of allowing the participant to assess his or her own degree of acculturation. * Very open to interpretation by respondents. * Social desirability may influence responses.
Acculturation Scales (Ref)	Scale Description and Characteristics	Comments
An Acculturation Rating Scale for Mexican Americans (30) (Cuellar et al)	20 items with 4 subscales: language familiarity, usage, and preference; ethnic identification and generation; reading, writing, and cultural exposure; ethnic interaction	* Have widespread use in studies of acculturation and have been validated in comparison to single item questions. * Because they assess many domains related to acculturation, they are less likely to misclassify respondents than single-item questions. * May be too long to be practical for some research or programmatic applications. * Except for the scale developed by Anderson et al, they also do not specifically address issues related to dietary acculturation.
The Suinn-Lew Asian Self-Identity Acculturation Scale (31) (Suinn et al)	21 items with 6 dimensions: language; identity; friendship choices; behaviors; geographic history; attitudes	
An Acculturation Scale for Southeast Asians (32)(Anderson et al)	13 items with 2 subscales: language proficiency; language, social, and food preferences	

<Table 1> Continued

Acculturation Scales (Ref)	Scale Description and Characteristics	Comments
A Short Acculturation Scale for Hispanics (33) (Marin et al)	12 items with 3 subscales: language use; media preferences; social interactions	
Food-Based Assessments	**Scale Description and Characteristics**	**Comments**
Food Lists: Participants identify the foods they usually eat now versus when they were in their country of origin from a food list	Yang et al compiled a list of 47 food items common in Chinese and American cuisine. Respondents indicated whether they ate the foods in past month (yes/no). Score derived from summing responses.	* Both measures assess dietary acculturation by directly measuring the outcome of dietary acculturation, i.e., traditional versus Western eating patterns or both. * Do not assess other steps or factors in the process of dietary acculturation and may therefore need to be supplemented with other instruments when the objective is to design effective dietary interventions.
Dietary Acculturation Scales: Instruments specifically designed to measure changes in dietary patterns	Satia et al developed a list of 15 food items and dietary behaviors that are reflective of traditional Chinese behavior and of Westernization of eating patterns. Two subscales were identified: a "Chinese" and a "Western" scale. Scores derived by obtaining the mean of the non-missing responses for each scale.	

3. Food-based measures

The two food-based measures (food lists and dietary acculturation scales) are promising, as they assess dietary acculturation by measuring eating patterns. Therefore, they directly assess the outcome of dietary acculturation, i.e., adoption of the dietary patterns of the host country, maintenance of traditional eating patterns, or both. However, these food-based measures do not assess other steps in the process of acculturation as delineated in the model (Figure 1). Assessment of these other factors (e.g., psychosocial factors predicting food choices) is necessary for the design of effective dietary intervention and education programs.

VI. What do We Know about Dietary Acculturation in Korean Americans?

Most studies of dietary acculturation among Koreans have focused on first generation Koreans residing in the U.S. Overall, the results suggest a transition in diet among Koreans who immigrate to or are born in the U.S. For example, in a cross-sectional survey of 348 Korean Americans, being more acculturated (as measured by English proficiency, American education, and longer length of stay in the U.S.) was significantly positively correlated with frequency of consumption of American foods (Pearson's r = 0.15 to 0.31) and

negatively correlated with frequency of consumption of Korean foods (r = -0.31 to -0.46); but fat intake, dietary quality, and dietary diversity did not vary by acculturation status (23). Park et al (38) compared the diets of Korean, Korean American, and American adolescents and reported that Korean Americans had lower energy and cholesterol intakes, but a higher percentage of energy from fat compared to Koreans. Also, Korean American adolescents consumed cooked rice and Kimchi less often, but consumed cookies, sweets, and soda more often than Koreans. Finally, in a study of 103 middle-aged and older Korean Americans who had lived in Chicago, Illinois, for an average length of 8 years, the majority of participants reported maintaining traditional Korean food patterns and preferences (39).

The findings from these studies are generally in agreement with other dietary acculturation research. Specifically, these results suggest that persons who have adapted to the U.S. lifestyle by, for example, attending American schools, speaking English fluently, or residing in the U.S. for a long period of time are more likely to adopt a Western dietary pattern (i.e., acculturate), while those who immigrate at an older age or live in metropolitan areas where traditional foods are available and affordable are more likely to maintain traditional dietary patterns.

It is important to note that although there is a nutrition transition underway in Korea, in South Korea in particular, the effects have been less dramatic than in other areas. According to Lee et al (40), the level and rate of increase in fat intake have remained very low, whereas vegetable intake has been high and fruit intake has increased greatly. South Korea also has a relatively low prevalence of obesity compared with other Asian countries. This relatively healthy profile is largely the result of efforts by the government and nutrition specialists to educate the public that the traditional diet is a healthy diet, and initiatives that provide contemporary Koreans with modern approaches to preparing traditional foods and meals.

VII. Paradigm for Research on Dietary Acculturation: Combination of Qualitative and Quantitative Methodologies

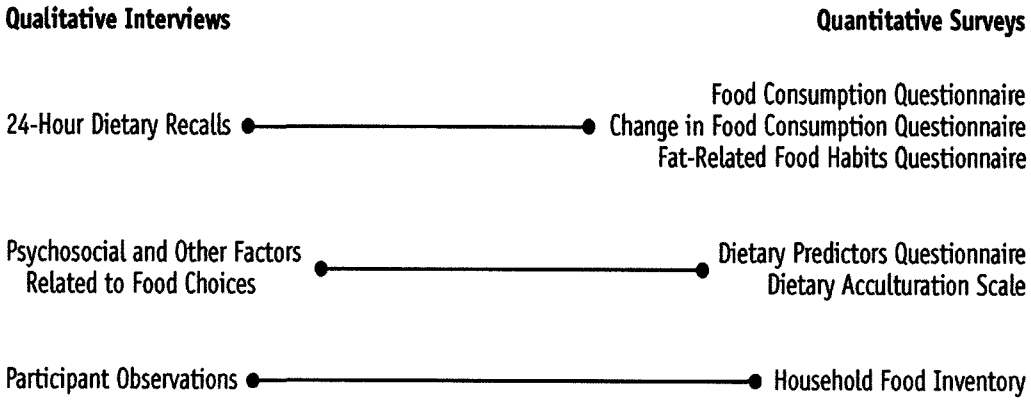
In many studies of dietary acculturation, little is known about factors affecting dietary choices and/or determinants of dietary acculturation. In such instances, it is critical to do formative (or qualitative) research to identify cultural issues around food, traditional eating patterns, and the most commonly consumed foods because such information is vital for guiding the design of quantitative (survey) tools (for example, dietary assessment instruments) and interventions specific to the population of interest.

The qualitative approach applies anthropologic research methods to elicit the "insider's" viewpoint, and provides a contextual understanding of cultural variables and their relationships. Because qualitative techniques allow participants to discuss a range of topics unencumbered by a rigid format, they facilitate the identification of new and unanticipated information. Qualitative research is used to elicit in-depth opinions and views regarding various

issues, and therefore generates rich, valid data that reflects the participant's perceptive (41,42). Using such information around dietary choices, the researcher will better understand and become familiar with the dietary patterns of the population, which will enable the development of quantitative survey instruments and the design of intervention and education programs that are appropriate for that group (41-43).

We applied the qualitative-quantitative paradigm to a study of dietary acculturation in first generation Chinese American women. A time of the study in 1998, there was little published information regarding the dietary practices of Chinese living in North America and factors that influence their diets. In addition, the phenomenon of acculturation from eastern to western dietary patterns was not well described in published literature. Therefore, we conducted 30 qualitative interviews and 2 focus groups with Chinese women in Seattle, Washington in their native language (Cantonese or Mandarin), soliciting information regarding usual food consumption, knowledge and beliefs about diet/disease, and factors influencing dietary change after immigration (21). Using these data, we designed six dietary survey instruments focused on 1) current dietary patterns, 2) changes in food consumption since immigration and reasons for those changes, and 3) factors that affect current food choices and decisions made with respect to maintenance of an eastern versus adoption of a western diet. <Figure 2> shows how the data collected during the qualitative interviews and focus groups were used to design the six survey instruments. These instruments were subsequently piloted and validated in 250 first generation Chinese women residing in Seattle and Vancouver, BC (19,29,44).

Based on this research, we conclude that a combination of qualitative and quantitative methodologies enables the development of dietary acculturation-related survey instruments that are



<Figure 2> Development of Quantitative (Survey) Diet Acculturation-related Instruments from Qualitative Data

practical, appropriate, and culturally appropriate for the population of interest.

VIII. Suggestions for Future Dietary Acculturation Research

1. Determinants of Dietary Acculturation

The dietary acculturation model presented in this report offers a way for nutrition researchers and practitioners to understand this complex construct; however, it is likely incomplete. Clearly, more work is needed to identify other determinants of dietary acculturation. Specifically, researchers need to conduct quantitative, longitudinal studies to determine the relative importance of various determinants in influencing acculturation-associated changes in eating patterns and the impacts of those changes on health status. It is important to note that because Asians and Hispanics include highly diverse subgroups, factors that influence dietary acculturation in one subgroup (e.g., Chinese Americans) may be very different from those in another subgroup (e.g., Korean Americans).

2. Assessment of Dietary Acculturation

As discussed above, single-item acculturation indices, acculturation scales, and food-based measures are applicable to dietary acculturation research and should be included in nutrition studies of immigrant populations. In addition, methodological work is needed to design instruments that more accurately measure the various steps in the process of acculturation. For example, instruments to assess different patterns of dietary intake associated with acculturation should reflect the population's traditional diet as well as examine indicator foods and dietary behaviors associated with changes in eating patterns (19). Also, to identify acculturation and biculturalism, it would be important to include response options that allow the respondent to identify with either adoption of the dietary patterns of the host environment, maintenance of traditional practices, or with the dietary behaviors of both cultures. For example, a question about restaurant preferences for an Asian-American population could be phrased as follows: "When you go out to eat, do you typically go to: a) Asian restaurants, b) American restaurants, or c) both about equally?" Finally, because these instruments must be specific to the racial/ethnic group of interest, it may be necessary to conduct formative or qualitative research in the target population to identify typical dietary habits as well as salient cultural, environmental, and psychosocial predictors of diet (21).

3. Separating the effects of sociodemographic characteristics and acculturation

As noted above, socioeconomic and demographic characteristics are strongly related to acculturation status; specifically, acculturation is associated with and varies by sociodemographic characteristics. Consequently, the effects of acculturation are often confounded with sociodemographic factors such as age, education,

and income (45). However, many studies fail to account for the potentially confounding effects of demographic characteristics on acculturation. Furthermore, in some studies, controlling for demographic characteristics weakens or eliminates observed relationships between acculturation and health status or health behavior. For example, in an analysis of the use of preventive health services in the Hispanic Health and Nutrition Examination Survey (HHANES), Solis and colleagues (46) found that of all the acculturation variables examined, only language significantly predicted utilization of services after controlling for age, education, and income. Since socioeconomic characteristics are strongly associated with acculturation and both are associated with diet, it is important to identify the independent effects of acculturation on dietary behavior to appropriately interpret study results.

IX. Conclusions

Research on dietary acculturation is sparse, but supports the viewpoint that it is an important determinant of diet, and therefore health, in immigrant and populations and those undergoing a rural-urban transition. This overview provides a practical model for understanding and investigating the effect of dietary acculturation on food and nutrient intake. A useful goal would be the development of a reference document or compendium that can assist researchers with understanding specific issues around conducting research in, and providing dietary services to, immigrant/urbanizing groups. Development of such a document consisting of diet acculturation-related instruments used in various population groups could help stimulate cross-cultural exchange and discussion as well as promote the development of new tools and help improve existing research efforts.

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