

DIETARY ASSESSMENT OF IMMIGRANT AND REFUGEE CHILDREN

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The study results which I am presenting today are part of a larger cooperative study being conducted by the Western Human Nutrition Research Center, United States Department of Agriculture and the Department of Nutritional Sciences, University of California, Berkeley, to determine the nutritional status of newly arrived immigrant and refugee school children in San Francisco, California. Due to difficult environmental conditions in their countries of origin and the disruptive effects of cross-cultural migration, these children were believed to be at a heightened risk of malnutrition. Dietary, anthropometric, biochemical, dental and socio-demographic information were collected from these children to evaluate their nutritional status. We at USDA have been responsible for the collection and evaluation of the nutrient and food intake data.

The objectives of the dietary intake evaluation were to determine: (1) the nutritional adequacy of the children's diets; (2) the accuracy of the recall technique for collection of dietary information from these children; (3) the effects of acculturation on the food and nutrient intake; and (4) the effect of ethnicity on the acceptability of foods served in the school food program. However, since the focus of this morning's presentations is dietary methodology, I will limit my presentation to the evaluation of the recall technique as a method to collect dietary information from immigrant and refugee children.

San Francisco has a Newcomer School system to aid immigrant and refugee children in adapting to life in the United States. Upon arrival in San Francisco, the children enter one of the Newcomer schools for approximately one year. Bilingual education and a curriculum adapted to the needs of the children are provided. Children from three Newcomer schools were studied: the school for Chinese speaking children, the school for Spanish speaking children, and the school comprised mainly of Southeast Asians. Table 1 shows the country of origin by ethnic group for the children studied. Since this study was conducted during 1984, the children's country of origin breakdown reflects the immigration and refugee patterns of that time. Eighty-five percent of the Chinese children were from China; the remainder being from Hong Kong and Vietnam. Sixty percent of the Hispanic children were from El Salvador; the next largest segments were from Mexico and Nicaragua. All of the Filipino children were from the Philippines and the Cambodian children from Cambodia. The children were from varying social and educational backgrounds.

School breakfast and lunch were provided to all the children attending the Newcomer Schools. Therefore, potentially 10 meals per week or about half of a child's weekly meals were provided by the school system. However, not all of the children ate the school breakfast and about 20% ate breakfast at home as well as at school. Foods served were an

American-type menu rather than being culturally adapted. All school meals were prepared at a central kitchen and delivered to the schools approximately 30 minutes before meal time. At the Hispanic school, food was delivered in bulk and portioned out to the children as they passed through the tray line in the school cafeteria. At the Chinese and Southeast Asian schools, foods were provided pre-portioned and pre-packaged.

The accuracy of the recall technique to collect dietary information from these children was determined by comparing the actual food consumed in the cafeteria (weighed intake) with the cafeteria food intake as recalled the next day by the child. Interviews were conducted in the child's native language by bilingual and bicultural interviewers who had been trained in the recall technique adapted for children. All methodology was pilot-tested prior to data collection to minimize differences between interviewers.

In the interview, the children were asked to recall all foods and beverages consumed in the last 24-hour period. For the study being presented today, only data on cafeteria foods consumed at the breakfast and lunch meals will be presented. As a point of reference, the children were asked about their intake in relation to activities during the day such as playing, watching T.V. etc. A food picture book had been prepared by each interviewer to prompt the children if they had difficulty identifying foods. Pictures of American and culturally specific foods, appliances, and cooking utensils, as well as color samples were available to help identify foods and preparation techniques. To help the child describe the portion of food consumed, each child was asked to draw the size of the food item on a paper plate or use dried beans to fill one of the containers to the level they thought accurate. No food models were used. The interviewers had been instructed not to correct the child even if they knew the child had inaccurately identified a food or beverage or misjudged the quantity.

Each interviewer coded for computer processing the dietary data of his/her assigned subjects and verified the correctness of the coded data. Nutrient intakes for the recall and observed methods were calculated using a computerized nutrient data bank based on Handbook 8. School recipes were obtained from the foodservice director and their nutrients calculated.

The age, sex and ethnic breakdown of the children studied are shown in Table 2. Children between the ages of eight and eleven were studied which encompassed the 4th through 6th grades. Half of the children were female and half were male. More Chinese and Hispanic children were available for study and therefore, the group sample sizes are larger than for the Filipino and Cambodian children. Since some of the children skipped school breakfast, less children were studied at breakfast than at lunch.

Analysis of variance was used to test for significant effects of age, sex, and ethnicity on the nutrient intake differences between the two methods. No significant nutrient differences were found for age or sex, but significant differences were found between ethnic groups. Therefore, the data in this paper are presented by ethnic group. As a point of

interest, however, there was a trend, although not significant, for the younger children (8 year olds) to be more accurate than the older children (10 and 11 year olds).

Table 3 shows the mean calculated energy intake for each method by ethnic group and meal. At breakfast, there were no significant differences between the methods. The Chinese children tended to underreport whereas the other groups overreported. At lunch, however, there was a significant difference ($p < .01$) between the methods for the Chinese and Filipino groups. The Chinese children underreported energy intake and the Filipino children overreported. Although not all differences were significant, the Chinese children underreported at both meals, the Hispanic and Filipino children overreported at both meals, and the Cambodian children overreported at one meal and underreported at the other.

Table 4 shows the mean correlations between the weighed and recalled methods for select nutrients consumed at the breakfast meal. For energy, the Filipino children were the most accurate, and the Cambodian children the least accurate. Breakfast usually consisted of milk, fruit or juice, and a bread type item (i.e. roll, waffle, coffee cake etc.). Failure to recall beverages at the breakfast meal was the principal source of error for all ethnic groups. About half of the Cambodian children failed to recall milk which is reflected in their low correlation coefficients for the nutrients shown.

When a larger number and variety of food items were served, as at the lunch meal, the overall accuracy for all ethnic groups, except the Cambodian children, declined. Table 5 shows the mean correlations between the weighed and recalled methods for nutrients consumed at the lunch meal. The correlations for energy intake were: Chinese, .36; Hispanic, .43; Filipino, .54; and Cambodian, .56. These are low to moderate correlation coefficients. However, to put this in perspective, in evaluations of the dietary recall technique, correlations between the recalled and weighed methods rarely exceed .70. The magnitude of the correlation coefficients for the nutrients other than energy varied by nutrient and ethnic group. Particularly low correlations were found for calcium for the Chinese children and calcium and vitamin A for the Filipino children. However, it should be remembered that in addition to being children, these children are recalling food items that for the most part were "new" foods to them. Therefore, it would be expected that the children would be more accurate when recalling familiar foods such as those eaten at home. Unfortunately, we were not able to assess the validity of the recall method for at home meals.

The "flat-slope syndrome" has been reported in adult and pediatric populations when recalled energy intakes are regressed against actual energy intakes. When this occurs, those individuals consuming lower energy intakes are overreporting their intake and those consuming higher intakes are underestimating their intake. By regression analysis, we investigated this in the four ethnic groups for energy intake at lunch. We found the "flat-slope syndrome" for the Chinese and Hispanic children but not for the Filipino or Cambodian children. Instead, the Filipino children consistently overreported their intake and the Cambodian children

consistently underreported theirs. In addition, the Filipino and Cambodian data was scattered close to the regression line; this was not found for the Hispanic and Chinese groups.

Limited data is available in the literature on the accuracy of dietary recall interviews conducted with children. In addition, the studies conducted have shown conflicting results. With increasing numbers of women entering the workforce, the ability of the mother to provide an accurate accounting of the child's food consumption is diminished. Therefore, it may become necessary to rely on dietary interviews with school age children. This study has shown that ethnicity of the child significantly affects the accuracy of the self-reported recall. This is reasonable since a child's culture strongly influences food habits and may also influence the child's ability to function in an interview setting. In addition, accuracy of recall tends to decrease as the number of food items served at a meal increases. It should be remembered, however, that these children were recalling unfamiliar food items and therefore, their accuracy may be higher when recalling foods served at home. Additional studies need to be conducted with school-age children in the United States to determine their ability and accuracy to self-report dietary intake.

TABLE 1. COUNTRY OF BIRTH

<u>CHINESE</u>	
CHINA	85%
HONG KONG	10%
VIETNAM	5%
<u>HISPANIC</u>	
EL SALVADOR	60%
MEXICO	18%
NICARAGUA	16%
GUATEMALA	2%
PERU	2%
COLUMBIA	2%
<u>FILIPINO</u>	
PHILIPPINES	100%
<u>CAMBODIAN</u>	
CAMBODIA	100%

TABLE 2. SEX, AGE, AND ETHNICITY OF STUDY SUBJECTS

	<u>BREAKFAST SUBSET</u>	<u>LUNCH SUBSET</u>
	(N)	(N)
<u>SEX</u>		
MALE	51	59
FEMALE	53	58
<u>AGE</u>		
8 YRS.	32	36
9 YRS.	30	32
10 & 11 YRS.	42	49
<u>ETHNICITY</u>		
CHINESE	30	33
HISPANIC	31	34
FILIPINO	22	28
CAMBODIAN	21	22

TABLE 3. MEAN (+SD) CALCULATED ENERGY INTAKE FOR EACH METHOD BY ETHNIC GROUP AND MEAL

	ETHNIC GROUP			
	CHINESE (KCAL)	HISPANIC (KCAL)	FILIPINO (KCAL)	CAMBODIAN (KCAL)
BREAKFAST				
RECALL METHOD	225 ± 120	252 ± 164	171 ± 90	235 ± 212
WEIGHED METHOD	243 ± 141	232 ± 128	142 ± 120	185 ± 103
DIFFERENCE	-18	+20	+29	+50
LUNCH				
RECALL METHOD	475 ± 136	427 ± 186	400 ± 244	261 ± 152
WEIGHED METHOD	555 ± 123	403 ± 180	260 ± 148	333 ± 141
DIFFERENCE	-80*	+24	+140*	-72

*SIGNIFICANT DIFFERENCE AT P<.01

TABLE 4. CORRELATIONS BETWEEN THE WEIGHED AND RECALL METHODS FOR SELECT NUTRIENTS CONSUMED AT THE BREAKFAST MEAL

	ETHNIC GROUP			
	CHINESE (N=30)	HISPANIC (N=31)	FILIPINO (N=22)	CAMBODIAN (N=21)
ENERGY	.51	.44	.70	.27
PROTEIN	.57	.60	.71	.28
FAT	.19	.54	.66	.35
CALCIUM	.66	.61	.69	.58
VITAMIN A	.69	.67	.77	.45

TABLE 5. CORRELATIONS BETWEEN THE WEIGHED AND RECALL METHODS FOR SELECT NUTRIENTS CONSUMED AT THE LUNCH MEAL

	ETHNIC GROUP			
	CHINESE (N=33)	HISPANIC (N=34)	FILIPINO (N=28)	CAMBODIAN (N=22)
ENERGY	.36	.43	.54	.56
PROTEIN	.43	.32	.24	.53
FAT	.36	.27	.36	.46
CALCIUM	.16	.65	.03	.62
VITAMIN A	.68	.53	.02	.66