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Food Security and Dietary Intake in Midwest Migrant Farmworker Children

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Children of Latino migrant farmworkers in the U.S. are at high risk for significant health problems, including overweight, obesity and diabetes mellitus—problems compounded by nonfinancial barriers to healthcare access, according to the Latino Consortium sponsored by the American Academy of Pediatrics (Committee on Community Health Services, 2005; Flores et al., 2002). Of the estimated 3 to 5 million migrant farmworkers (MFWs) in the U.S., about 90% of those surveyed are Latino and some 61% live with their spouses and children while working in the U.S. (Carroll, Samardick, Bernard, Gabbard & Hernandez, 2005; United States Department of Labor, 2005). Large database studies show that Latino children, ages 6 to 11 years, are disproportionately obese (22%) compared to all U.S. children of the same age group (19%) (U.S. Department of Health and Human Services [USDHHS], 2007). The researcher's previous study in 2005-2006 found that 41% of MFW children ages 6 to 11 years in the test group (n = 44) were obese and 18% were overweight (Kilanowski & Ryan-Wenger, 2007).

Given the high incidence of obesity in Latino MFW children, it is important to examine the influencing factors. To that end, a descriptive cross-sectional study was conducted in MFW camps in Ohio, June to September 2007. The study tested the feasibility of using two survey instruments to collect information from Latino MFW parents on the levels of household food security and the food intake of their children.

Particular targets of the U.S. Department of Health and Human Services' *Healthy People 2010* guidelines are to decrease the overweight rate in children ages 6 to 11 years to 5%, increase food security, and increase the proportion of persons who eat adequate amounts of fruit and vegetables every day (USDHHS, 2008b). The children of MFWs are especially at risk for suboptimal health and need culturally specific intervention programs that educate and actively

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- 32nd Midwest Nursing Research Society Conference, Indianapolis, IN, March 2008
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- National Association of Pediatric Nurse Practitioners (NAPNAP) 29th Annual Conference, Nashville, TN, April 2008

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promote healthy eating. First, however, it is necessary to understand factors that affect the children's weight, particularly those factors that can impede efforts to achieve a healthy body weight and healthy nutrition (Reifsnider, Keller & Gallagher, 2006).

Literature review

In a 2006 study of low-income Latino toddler children (n = 374) enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in a large southwest city, researchers concluded that information on dietary intake, as well as the home environment and community components, were needed to tailor interventions to match client needs (Reifsnider et al., 2006).

In 2007, Langevin and colleagues used the Block Food Frequency Questionnaire for Kids 2004 to evaluate dietary intake of third- through sixth-grade children from a low socioeconomic urban area of New Jersey with an 85% African-American or Latino population. In this group, 22% of the children were classified as overweight and 36% were obese. In addition, over 90% of the children did not meet the recommended fruit and vegetable intake (Langevin et al., 2007). It should be noted that food intake may have been underestimated in this study, as surveys were completed by the children themselves, were not culturally specific, and some children had difficulty determining portion sizes from pictures used in the surveys. With pediatric subjects, parents most often complete dietary intake surveys.

Food security can provide information on well-being that cannot be inferred from income data alone and is defined as whether the household is able to obtain enough food to meet their family's needs (Bickel, Nord, Price, Hamilton & Cook, 2000; Nord, Andrews & Carlson, 2006). When one controls for household income, region of residence, and household composition, food security in Latino households has been consistently lower than national rates (82% versus 89%) (Melgar-Quinonez & Kaiser, 2004; Nord et al.). In low-income California Latino households (n = 212) for example, 45% were marginal food secure, 13% low food secure, and 3% very low food secure (Kaiser et al., 2004).

Among diverse demographic categories, households experiencing low levels of food security were associated with their children being overweight and obese (Casey et al., 2006). Studies of food security and nutritional outcomes of preschool-aged Mexican-American children (n = 211 and 256) found that rates of overweight or obese children (37%) peaked among low and very low food secure families (Kaiser et al., 2002; Kaiser et al., 2003). In very low food secure households, children were less likely to meet U.S. Department of Agriculture (USDA) Food Guide Pyramid recommendations, and this was associated with fewer household supplies of both nutrient-dense (oranges, apples, bananas, carrots, beef, fish) and less nutritious foods (soda, cookies, chips, gelatin and powdered chocolate flavoring) (Kaiser et al., 2004; Quandt, Arcury, Early, Tapia & Davis, 2004). In greater than 90% of households reporting very low food security, traditional foods such as corn tortillas, white rice, onions, beans, and cooking oil remained stable food items, as well as nontraditional foods such as hot dogs, sweetened cereal, ice cream, candy and fruit-flavored punches (Kaiser et al., 2004).

Research continues to show that low-income families experience lower levels of household food security and therefore their children are at greater risk for having unbalanced diets (Alaimo, Olson & Frongillo, 2007). Given the high incidence of obesity in Latino MFW children, it is important to examine in more depth the influencing factors.

Method

This descriptive cross-sectional study was conducted in migrant camps in Ohio during the summer months of June to September 2007, using two survey instruments to obtain information

from Latino farmworker parents on the level of household food security and food intake of their children. Participants were obtained from cluster-sampled farms that employed MFWs (n = 50). Farm A occupied 2000 acres and grew 500 acres of potatoes plus 30 other types of vegetables. Farm B occupied 2500 acres and grew over 60 types of vegetables and fruits. The farms employed MFWs who originated from Mexico, Texas, and Central America.

This study was approved by the Case Institutional Review Board of Case Western Reserve University. Inclusion criteria were: 1) MFW parents 18 years and older with children 2 to 13 years of age; 2) ability to give informed consent; and 3) ability to complete three questionnaires in Spanish or English. Participants completed: 1) a short demographic questionnaire used previously by the researcher, 2) the U.S. Household Food Security Survey short form scale, and 3) the Food Frequency Survey (a dietary food intake survey, completed by parents and designed for low-income Latinos). Placement of data collection areas partially removed participants from each other and maintained subject privacy. The proposed study also underwent a cultural assessment and review, and letters of access were obtained from farm owners. Participants were compensated for their time with a large chain store gift card.

Instruments

A 28-item demographic questionnaire developed by the researcher included typical questions asked of parents in a well-child examination and questions from the literature on dietary intake, food insecurity, and overweight children (Kilanowski, 2006; Kilanowski & Ryan-Wenger, 2007). Questions were available in both Spanish and English and had a Flesch-Kincaid grade level readability score of fifth grade. The demographic questionnaire was translated and back translated by culturally appropriate native Spanish speakers and was assessed by the Institutional Review Board for cultural appropriateness.

U.S. Household Food Security Survey (USHFSS)

The U.S. Household Food Security Survey (USHFSS) short form scale is available in English and Spanish and contains multiple indicator questions that distinguish the various levels of severity of food security (Nord, Andrews & Carlson, 2004). The USHFSS is based on data collected annually by the U.S. Census Bureau as a supplement to the monthly Current Population Survey of interviewed households (Bickel et al., 2000; Coates, Swindale & Bilinsky, 2006; Economic Research Services (ERS)/USDA, 2004; Nord et al.). Households are classified in a range from “food secure” if they report no food-insecure conditions, to “very low food secure” if food-insecure conditions are reported (ERS, 2006). Completed surveys are assigned scale scores and classified into food security levels based on standard values in total number of affirmatives: 0 = food secure; 1 = marginal food security; 2 to 4 = low food security; 5 to 6 = very low food security (Bickel et al.; Nord et al., 2006).

The USHFSS is a valid instrument used to produce prevalence estimates, and documents the presence of hunger in a community (Bickel et al., 2000; Nord, Andrews & Carlson, 2004; USDA, 1998). Non-interview data collections have successfully used the six-question version of the short form of the USHFSS with alternative language formats. Although the USHFSS has been conducted primarily by personal interview, telephone and on-site self-administration with Latino populations have also been used.

In an Iowa study (n = 3018), the USHFSS short form scale was mailed to participants in a WIC program and results showed 43% of households experienced some level of food insecurity with almost 41% of Latinos responding affirmatively (Iowa Department of Public Health, 2004). The six-question short form scale classified 95.6% of households with children correctly (n = 16,914), and underestimated the prevalence of overall food security and of hunger by only 0.3 percentage points (Blumberg, Bialostosky, Hamilton & Briefel, 1999). Sensitivity and

specificity of the short form scale for households with children to determine overall food security are 85.9% and 99.5% respectively, and for the determination of very low food security, 78.4 % and 99.2% (ERS/USDA).

The Spanish language version of the USHFSS was developed with the use of focus groups of low-income Spanish-speaking participants from Mexico, Central America, Puerto Rico and Cuba (Harrison, Stormer, Herman & Winham, 2003). Three professional translators were employed to render the English version into “standard” Spanish, and then both instruments were back translated for integrity. The instrument was pilot-tested and the resulting USHFSS Spanish language version has been well used in research. The USHFSS has shown internal consistencies of Cronbach’s alpha of greater than or equal to 0.85, and accuracy for use in populations and in individuals was established by comparison of three food security measures: the USHFSS, the Radimer/Cornell and the Community Childhood Hunger Identification Project (USDA, 1998).

Food Frequency Questionnaire (FFQ)

The Food Frequency Questionnaire (FFQ) is a 57-item dietary food intake survey developed during focus groups with Mexican-American parents in California and pilot-tested to measure children’s dietary intake (Melgar-Quinonez & Kaiser, 2004). In this study, parents were asked to indicate how many times (frequency) food items typical to the Latino cuisine were consumed (daily, weekly or monthly) and note the portion size (small, medium, large). In its developmental testing, use of the FFQ yielded estimates of Food Guide Pyramid food group servings similar to those based on direct observations (n = 11) (Kaiser et al., 2002).

The USDA Food Guide Pyramid recommendations for children used the calculated number of servings per week from each food group, and minimum requirements for each food group were determined. Scoring is 1 = recommended requirements for each food group (dairy, fruits, vegetables, meat and grains) are achieved, 0 = recommended requirements are not achieved (Kaiser, et al.) A total score is obtained by summing the five groups, with a range of 0 to 5. The greater the score, the more food group requirements suggested by the USDA are met. The FFQ is available in both Spanish and English. The Spanish version of the FFQ was cross-checked independently by three Spanish experts from different Latin American countries and pilot-tested with Mexican-Americans (n =11) who met inclusion criteria for the study but were not included in the final sample.

The USDA introduced the Food Guide Pyramid in 1992 as a simple illustration to help Americans choose healthy diets based on the Dietary Guidelines for Americans (Gao, Wilde, Lichtenstein & Tucker, 2006). In 2005, the USDA retired the old Food Guide Pyramid and replaced it with MyPyramid, a new symbol and an "interactive food guidance system" available online at the USDA Web site. The new pyramid does not contain the number of daily servings for each food group because nutrient intake is different for each individual according to weight, gender, age, and newly added activity level (USDA, 2005). MyPyramid also emphasizes the importance of controlling weight not adequately addressed in previous versions.

In this study, the FFQ evaluated achievement of the minimum recommended daily requirements using the Food Guide Pyramid for age and gender outlined in the Current Dietary Guidelines for Americans (USDHHS & USDA, 2005). The serving sizes for the Food Guide Pyramid and MyPyramid do not differ for age and gender. If a child does not meet the daily recommendations for each food group using the Food Guide Pyramid requirements, they would also not meet MyPyramid requirements.

Results

Participants

The majority of participants were married Spanish-speaking women of Latino ethnicity without a high school diploma, working full time, and with a monthly family income of less than $1000. Two farms (n = 39, 11) were used as research sites and, although not shown here, they had similar demographic characteristics. Demographics for the entire sample (n = 50) can be seen in Table 1. The families resided in buildings provided free of cost by the farm owner, and 12% had their own garden to grow produce. The majority of families felt their house was very safe (38%) or safe (56%) and rated their children's play space as very safe (31%) or safe (56%). When asked if kitchen appliances provided were functioning, this was sometimes not true for stoves (8%), ovens (17%), or refrigerators (4%). Forty-four percent of the MFW parents reported concerns about their child's current weight (not specifically overweight), but only 18% had a scale at home to measure body weight. Forty-three percent of the parents thought their child ate a balanced diet on a daily basis, and 18% thought their children ate too many sweets. Soda pop was consumed daily by 25% of the children, and 76% drank milk daily. In food preparation, 34% of mothers used lard.

Household food security

Only 30% of MFW households scored high on food security, 18% were marginal, 44% low and 8% very low food security. However, there was a significant difference in the level of household food security, with more families on the larger farm having lower food security than families on the smaller farm ($t = 2.25$, $p = 0.029$).

Dietary Intake

The analysis showed that 22% of the children (unequal numbers of girls and boys) met all Food Guide Pyramid/MyPyramid daily minimum food group serving recommendations for age and gender, (13% of the girls and 35% of the boys). Daily minimum food group serving recommendations defined by the Food Guide Pyramid/MyPyramid were met by 50% of the children in the milk and dairy category (37% girls, 70% boys). However, less than half of the children met the minimum daily serving recommendations for vegetables (30%; 27% girls, 35% boys), fruit (48%; 37% girls, 65% boys), and grains (48%; 37% girls, 65% boys). In the category of meat and beans, 66% of the children, including 67% of the girls and 65% of the boys, met minimum daily serving recommendations. The level of attainment in the meat and beans category was lower among children on the larger farm ($t = 2.178$, $p = 0.037$). National pediatric data are analyzed by categories of age and age/gender and the age group of 6 to 11 years is often the benchmark comparison group. When examining this study's sample of 6 to 11 year old children (n = 18), 42% of girls (n = 12) and 50% of boys (n = 6) met the minimum daily serving recommendations for fruit intake and 25% of girls and 0% of boys met the minimum daily servings of vegetables recommendations.

Discussion

In this study, a majority of MFW households experienced low levels of food security and their children did not meet the recommended dietary guidelines. Table 2 compares available national data on food security to this MFW sample. However, samples from Midwest farms may not be representative of the entire region or the nation. Furthermore, information is not available on those who did not choose to participate.

There is little current information available to compare the study findings on the percent of children meeting the USDA Food Guide Pyramid/MyPyramid minimum daily serving recommendations and it often uses the 6 to 11 year old age category. When compared to the

1998 Continuing Survey of Food Intakes by Individuals and the *Healthy People 2010* database, males in this small sample of 6 to 11 year old children showed a higher rate of meeting minimal dietary serving recommendations for fruit, while females had a lower rate of attainment. Males had lower rates of comsuming vegetable serving recommendations, while females had a higher rate of attainment (USDHHS, 2008a; Healthy Youth, 2008; USDA, 1998). However, the sample in this age group was small, and may not be representative of the population. (See Table 3 for comparison data.)

Children from the farms with more acreage that is cultivated, more variety of crops, more employees, a more rural location, and larger migrant housing camps had lower scores on food security and a lower percentage met the serving recommendations in the meats and beans food groups. Casual conversations with MFW employees suggested that more families consistently returned to the small farm annually. The smaller farm employees were also less diverse in the location of their permanent homes, coming from fewer regions of Texas and Mexico and had Texas as their permanent home. The smaller farm also had a produce store on-site that sold fruits and vegetables to local people. In addition, employees were observed carrying ears of corn from the packing plant to their homes in the migrant camp, bypassing the produce store with permission. The larger farm was much more removed from merchants. Thus, the availability of produce may have affected food security and dietary intake.

The USHFSS instrument was easy to complete with minimal test burden to the participants. Subjects appeared to have no difficulty in its completion. The Food Frequency Questionnaire was used because of its cultural and ethnic considerations, but only 18 out of 50 surveys were accurately completed and scored with ease by a registered dietitian. An additional 25 surveys were completed in a way that made it possible, but time- consuming, to evaluate adherence to the Food Guide Pyramid serving recommendations. For example, only one of three food frequency columns (daily, weekly, monthly) was to be completed, but 12 questionnaires had multiple columns filled out. In addition, some parents neglected to choose the serving size of foods, so a medium portion was ascribed for 13 surveys. Seven surveys were lost for a variety of errors: check marks were used instead of numerical counts of times a food was consumed, frequencies of foods chosen did not add up properly, or food portions but not frequency were selected. To avoid missing data in future studies, it will be necessary to be very specific in directions, have a study coordinator help each subject fill out the questionnaire, and double-check all questionnaires after they are completed.

Conclusion

This study tested the feasibility and ease of use of two survey instruments to measure household food security and dietary intake of MFW families and their children: the U.S. Household Food Security Survey short form scale and the Food Frequency Questionnaire. Participants were successfully recruited for the study and were able to complete the research study instruments. From these instruments, the following conclusion was obtained: Migrant farmworker households reported lower than national rates of household food security and their children's diets did not meet the minimum daily serving recommendations of the U.S. Department of Agriculture Food Guide Pyramid and equivalent MyPyramid for age and gender.

Furthermore, from the literature, nutrition interventions can only expect to succeed if they are culturally appropriate and suitable to the subjects' milieu, as well as comprehensible to the participants of the intervention (Germann, Kirschembaum & Rich, 2007; Lindsay, Sussner, Kim & Gortmaker, 2006). Knowledge gained from this study will assist the development of future nutrition interventions to help Latino MFW families achieve better nutrient intakes and more efficient and cost-effective meal preparation, resulting in healthy weight, healthy nutrition, and improved health for their children.

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Table 1

Demographics of study participants

Gender - Parents		**Marital Status**	
Men	8% (4)	Married	72% (36)
Women	92% (46)	Living with partner	16% (8)
		Divorced	2% (1)
Ethnicity		Single parent	6% (3)
Hispanic	96% (48)	Missing	4% (2)
Non-Hispanic	2% (1)		
Missing	2% (1)		
Language at home		***Work status***	
English	6% (3)	Full time	76% (38)
Spanish	66% (33)	Part time	16% (8)
Both	26% (13)	Not employed	6% (3)
Other	2% (1)	Missing	2% (1)
Monthly family income		***Number of children in household***	
Less than $500	32% (16)	1	72% (36)
$500-1000	24% (12)	2	14% (7)
$1000-2000	38% (19)	3	10% (5)
Prefer not to answer	6% (3)	4 or more	2% (1)
		Missing	2% (1)
Highest parental education			
Less than 9th	32% (16)		
9-11	34% (17)		
HS graduate	24% (12)		
Some college	10% (5)		
Age of Study Child		***Gender of study child for dietary intake***	
2 to 5 years	34% (17)	Boys	40% (20)
6 to 11 years	36% (18)	Girls	60% (30)
12 to 13 years	30% (15)		

Table 2

Family household food security levels in sample populations

	Food Secure *	Low Food security	Very Low Food Security
National Rates [1]	89%	7%	4%
Hispanic Families [1]	82%	13%	5%
Families Below Poverty Line **[1]	64%	22%	14%
Sample from Migrant Farmworker Families	48%	44%	8%

* Food secure category include food secure and marginal food security

** Household income-to-poverty ration under 1.0

[1] Nord, M., Andrews, M., & Carlson, S. (2006). *Household Food Security in the United States, 2005. Report No.:29*. Washington, D.C.: United States Department of Agriculture.

Table 3

Attainment of the recommended Food Guide Pyramid (MyPyramid) requirements in the fruit and vegetable groups in 6 to 11 year old migrant farmworker children compared to literature data

	1998 Continuing Survey of Food Intakes by Individuals[1]		*Healthy People 2010 Database*[2]		Migrant Farmworker Children Sample	
	Boys	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
Fruit	23%	24%	37%	66%	50%	42%
Vegetables	18%	19%	NA	NA	0%	25%

[1] United States Department of Agriculture, (1998).

[2] United States Department of Health and Human Services, (2008)