

The Association Between Fruit and Vegetable Consumption and Fruit and Vegetable Stage of Change in Underserved Communities Engaging With Cooperative Extension Services

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ABSTRACT

Objective: To compare differences in fruit and vegetable (FV) intake and FV stage of change in 2 diverse communities engaging with cooperative extension services (Extension).

Methods: Cross-sectional study of FV behaviors of community members enrolled in a team-based challenge offered by Extension. *t* test and chi-square analyses examined differences in FV intake and FV stage of change. Linear regression examined the relationship between FV stage of change and FV intake, adjusting for demographics.

Results: There was a significant ($P = .01$) difference in staging between the African American and Hispanic communities. Of individuals in the African American community, 60% were in the preparation stage; in the Hispanic community, 55% were in the precontemplation/contemplation stage. The FV stage of change was significantly associated with daily FV intake ($\beta = .53$; $P < .001$).

Conclusions and Implications: To promote consumption of FVs better, nutrition education programs such as Extension should differentiate based on stages of change among subpopulations.

Key Words: cooperative extension, Transtheoretical Model, nutrition education, fruit, vegetable (*J Nutr Educ Behav.* 2017; ■:1-5.)

Accepted June 6, 2017.

INTRODUCTION

Most adults do not meet recommendations for fruits and vegetables (FVs) in the US¹ despite the importance of FV consumption to prevent chronic disease.² Data from the 2013 Behavioral Risk Factor Surveillance Systems³ found that among adults, only 13% met fruit recommendations (1.5–2.0 cups/d) and 8.9% met vegetable recommendations (2–3 cups/d). Even fewer racial/ethnic minorities are meeting FV recommendations compared with non-Hispanic white populations.^{4,5} Thus, in the US the greatest diet-related dis-

parities are often presented as non-Hispanic white populations compared with racial/ethnic minorities or underserved populations. Owing to the patterned spatial distribution of racial/ethnic groups, known as residential segregation, diet-related disparities are often a function of a complex set of social, cultural, and economic factors.⁶⁻⁸ These factors contribute to the high proportion of racial/ethnic minorities in the US residing in low-resource communities where there is a disproportional distribution of and exposure to resources such as access to healthy foods (ie, FV).⁷⁻⁹

To address these diet- and health-related disparities, nutrition education programs such as those offered through cooperative extension services (Extension) often target low-resource communities. Often, nutrition education will increase knowledge but it may not result in a positive health behavior change (ie, eating more FV). However, the Transtheoretical Model (TTM) has been used to define stages of readiness to change behavior and is recommended for use in public health interventions such as nutrition education programming.¹⁰ The TTM includes 5 stages of readiness to change a behavior, including precontemplation (no intention to change behavior within 6 months), contemplation (intention to change behavior in the next 6 months), preparation (plan to change behavior in the next 30 days/in the immediate future), action (has changed behavior within the past 6 months), maintenance (has changed the behavior for >6 months), and termination (behaviors have been incorporated into lifestyle successfully with no

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Conflict of Interest Disclosure: The authors' conflict of interest disclosures can be found online with this article on www.jneb.org.

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<http://dx.doi.org/10.1016/j.jneb.2017.06.003>

desire to return to unhealthy behaviors). Although racial/ethnic minorities consume less FVs compared with non-Hispanic white populations,^{4,5} little is known about the differences in stages among ethnic/minority populations engaged in nutrition education programming.

Diet-related disparities are often compared between non-Hispanic white populations and racial/ethnic populations, particularly African Americans. However, the Hispanic population is rapidly growing and is projected to double between 2014 and 2060.¹¹ Understanding diet-related disparities between racial/ethnic minorities may be advantageous, particularly when examining dietary behaviors, which often have a strong cultural influence. Thus, the objective of the current study was to compare differences in FV intake and FV stages of change between a primarily non-Hispanic, African American community and a primarily Hispanic community engaging in Extension programs. The relationship between FV stages of change, adjusted for demographics, and FV intake was also examined.

METHODS

Participants and Setting

A total of 134 adults (aged ≥ 18 years) living in Kent County or New Castle County, DE, were enrolled in this 7-month, community-based participatory research study through the Extension agency. Because nearly all participants residing in New Castle County (92.1%) identified as Hispanic and white, and nearly all participants residing in Kent County identified as African American (89.8% non-Hispanic, African American; and 10.2% Hispanic, African American), the communities are referred to here as Hispanic and African American. Participants were recruited through personal contact between the Extension nutrition educator and local churches and community groups. The Institutional Review Board at the University of Delaware approved the study. All participants completed and signed an informed consent agreement form.

Procedures

Based on a current community-based participatory research study with input from community members through

key informant interviews, focus groups, and community advisory boards, a team-based challenge was created in which community members who had not previously engaged with Extension services logged healthy eating behaviors (eg, eating a family meal) and physical activity behaviors (eg, taking the steps) for points each month. To help participants engage in these behaviors, they were encouraged to participate in Extension programs that formed the basis of the educational programs that were part of the challenge. Participants attended *Meal Time in Less Time*, *Dining With Diabetes*, *How to Stretch Your Food Dollar*, *Keep Your Snack on Track*, and *Bone up on Health* programs to accumulate points. As goals were achieved (based on a determined number of points earned), participants earned gift cards and prizes. Participants who enrolled in Extension programs between September, 2015 and November, 2015 and agreed to participate completed a comprehensive questionnaire at baseline. This was a cross-sectional study examining baseline data collected as part of an ongoing, community-based, participatory research study anticipated to be completed in June, 2017.

Measures

All measures were collected in the baseline self-report questionnaire that was available in both English and Spanish.

The researchers collected demographic information related to age, education level, marital status, income, race, and ethnicity. They asked additional health-related questions regarding weight status and diagnoses of chronic conditions.

Fruit and vegetable staging was evaluated using the TTM by categorizing participants into 1 stage of change based on participants' response to the question *Do you intend to change what you eat so you will eat at least 5 servings of FV every day?* One serving was equal to half-cup equivalents. Responses were coded as follows: *No, I don't intend to change in the next 6 months* indicated precontemplation; *Yes, and I intend to in the next 6 months*, contemplation; and *Yes, and I intend to in the next 30 days*, preparation. Responses to *You report that you have been eating ≥ 5 regular servings of FV. For how many months have you been doing this?* were coded as action for < 6 months and maintenance for ≥ 6

months. Questions were adapted from a validated questionnaire measuring stages of change for physical activity and dietary behaviors in overweight women.¹²

Fruit and vegetable intake was assessed based on servings (in which 1 serving was equal to a half-cup equivalent) with the question *How many FVs do you usually eat each day?* Response options ranged from none to ≥ 5 servings.

Weight and height of each participant were measured by trained research personnel using standard procedures.¹³ Anthropometric training was 1 module in the weeklong training for health educators that included practice and demonstration of the skills. Weight was measured with a digital scale (DR400C, Detecto, Columbia, MD) to the nearest tenth of a pound; height was measured in inches using a stadiometer. Body mass index was used to classify weight status: < 25 kg/m² was normal weight and ≥ 25 kg/m² was overweight/obese.¹⁴ Overweight and obesity were combined for the purposes of analysis.

Data Analysis

The researchers conducted analyses using SPSS software (version 24, IBM, Armonk, NY). Means and frequencies were used to analyze continuous and categorical data, respectively, for demographics, FV staging, servings of FV, and anthropometrics. Independent *t* tests and chi-square test of homogeneity analyses were used to analyze continuous and categorical data by community (African American vs Hispanic). The 5 FV stage of change categories were collapsed into 3 categories (precontemplation/contemplation, action, and preparation/maintenance) owing to small cell sizes (< 5 observations) and were analyzed using chi-square test of homogeneity. The researchers examined the relationship between FV stage of change and the dependent variable, daily servings of FVs, using linear regression. Demographic characteristics significantly associated with the dependent variable and their 2-way interactions were included as covariates in the regression model. $\alpha < .05$ was considered significant *a priori*.

RESULTS

Of the 134 participants (aged 46.7 ± 15.3 years; 77.9% female; body mass

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