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Tailored telephone education to promote awareness and adoption of fruit and vegetable recommendations among urban and mostly immigrant black men: A randomized controlled trial

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Abstract

Background—Fruit and vegetable (FV) intake in black men are far below national recommendations.

Methods—Urban, primarily immigrant, black men (n = 490) from the New York City metropolitan area participating in the Cancer Awareness and Prevention (CAP) Trial (2005–2007) were randomly assigned to one of two intervention groups: 1) FV Education (FVE) or 2) Prostate Education (PE). Both interventions entailed a mailed brochure plus two tailored telephone education (TTE) calls. Outcomes, measured at baseline and at eight months, included knowledge of FV recommendations, perceived benefits, stage of readiness to adopt recommendations and self-reported FV consumption.

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DISCLAIMER

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of National Cancer Institute.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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Results—At follow-up, the FVE group consumed an average of 1.2 more FV servings per day than the PE group ($P<0.001$; adjusted for baseline). The FVE group also demonstrated increases in knowledge about recommended FV amounts ($P<0.01$) and appropriate serving sizes ($P<0.05$), and in the percent of participants moving from a lower to a higher stage of readiness to adopt FV recommendations ($P<0.05$). The FVE group did not demonstrate increases in knowledge related to the importance of eating a colorful variety or in the ability to name potential health benefits.

Conclusions—TTE can be a practical and moderately effective intervention for raising awareness of FV recommendations and for promoting FV consumption in urban and primarily immigrant black men.

Keywords

Diet; Randomized clinical trial; Telephone Education; Fruits and vegetables; Men; Minority; Immigrant Population

INTRODUCTION

Increasing intake of fruit and vegetables (FVs) in the U.S. is a national health priority [DHHS, 2005]. Few Americans currently meet the U.S. Department of Agriculture's (USDA's) *Dietary Guidelines for Americans* [Casagrande et al., 2002; Kant et al., 2007; Guenther et al., 2006; CDC, 2007]. FV consumption is particularly low among blacks [Casagrande et al., 2002; Kant et al., 2007; Guenther et al., 2006], with non-Hispanic blacks being less likely [odds ratio = 0.57] to meet USDA's guidelines than non-Hispanic whites [Casagrande et al., 2002]. For black men, the low rates of FV consumption are especially disconcerting given their high incidence and mortality for diet-related diseases [CDC, 2005; CDC, 2004; Cooper and Rotimi, 1997; Dey and Lucas, 2006; Carter et al., 1996; Crawford, 2001].

In 2003, the National Cancer Institute (NCI) launched the "Shoot for 9" campaign to encourage black men to eat at least 9 daily servings of FVs [NCI 2003]. This campaign was folded into a new federal initiative, "Fruit and Veggies: More Matters" [www.fruitsandveggiesmatter.gov]. The new initiative promotes the 2005 USDA's *Dietary Guidelines for Americans* [DHHS 2005] which recommends that adult men eat a minimum of nine FV servings (4.5 cups) a day, and ranging up to 13 servings (4.5 – 6.5 cups) a day depending on caloric intake and activity level. Messages from various federal agencies are in agreement in their: minimum daily FV recommendations, emphasis on choosing a colorful variety of FVs, focus on whole foods (not supplements), and perception of the potential health benefits associated with a diet rich in FVs [NCI 2003; www.fruitsandveggiesmatter.gov].

Macro-level approaches such as national media campaigns have had somewhat limited success, but if coupled with environmental and policy approaches [Brownson 2006], as well as individual level approaches, we may be able to move people more effectively toward healthier diets. Telephone-based education has become an increasingly popular means for delivering health education [Soet and Basch, 1997; Vanwormer et al., 2006]. Some studies have used it to promote FV consumption in adults [Sorensen et al., 2007; Stevens et al.,

2003; Pierce et al., 2004; Kristal et al., 2000; Marcus et al., 2001; Delichatsios et al., 2001; Rock et al., 2001; Emmons et al., 2005; Pakiz et al., 2005; Resnicow et al., 2005], but none have targeted urban and primarily immigrant black men. Telephone-based education does not require travel, can be done at convenient times, and can be implemented among individuals with low literacy. Tailoring a communication to a person's specific needs has the added advantage of reducing the amount of information that is potentially irrelevant to the recipient. Recipients may be more likely to remember a tailored communication and, consequently, be more likely to change their behavior in the intended direction [Kreuter et al., 1999].

This study evaluated the efficacy of a tailored telephone education (TTE) intervention designed to educate urban and primarily immigrant black men about FV recommendations and to promote increased FV consumption. The sample is unique in that it is comprised of primarily black immigrants from the Caribbean, one of the fastest growing segments of the U.S. population, comprising almost one-third of New York's black population [Mahoney, 2004; Mederios Kent, 2007]. Immigrant populations are at risk for many diet-related chronic diseases [Luke et al., 2001; Solomons, 2003; Okonkwo, 2002; Argeseanu Cunningham et al., 2008] the more so as the duration of their residence in the U.S. increases [Argeseanu Cunningham et al., 2008].

METHODS

Design

The FV Education (FVE) Group served as 'attention-controls' for a four year randomized controlled trial designed to evaluate the efficacy of TTE to promote informed decision making about prostate cancer testing (Cancer Awareness and Prevention Trial) [Lepore et al., 2008]. Half of the participants received a brochure [Weinrich et al., 2008] plus TTE on prostate cancer education (Prostate Education (PE) Group). The other half received a brochure [NCI 2003] plus TTE on FV recommendations (FVE Group). Outcomes were assessed at baseline and eight months post-randomization. Participants received \$10 cash or gift card at baseline and after completing the follow-up survey. The study was approved by Institutional Review Boards and all participants provided informed consent.

Setting and Participants

The sampling frame was constructed from the health insurance beneficiaries (~355,000) list of a large health care workers union in the New York City metropolitan area. Inclusion criteria required that participants be between the ages of 45 and 70 years and that they self-identify as being of African descent (i.e., "black," "African American," "Caribbean," and/or "African"). Exclusion criteria included a prior diagnosis of prostate cancer or a prostate cancer test within the past 12 months.

Enrollment and Randomization

From 2005 through 2006, 1,777 randomly selected individuals were assessed for eligibility by telephone. Of these, 1153 (64.9%) were ineligible, 134 (7.5%) refused after eligibility was confirmed, and 490 (27.6%) were eligible and completed the baseline survey. To

determine the sample size, we assumed a modest intervention effect size of .30 on primary outcomes. This effect size, with 80% power and alpha set at .05 (two-tailed), required a sample of 350, or 175 per group [Cohen 1988]. The sample of 490 allowed attrition and detection of possibly smaller effects. Randomization of the 490 participants was conducted within three age strata (45–49, 50–54, and 55–70 years old) using the PLAN procedure of SAS (v. 9.1.2). Following each baseline survey, the Principal investigator (SL) consulted the randomization table to identify the condition of the participant and emailed it to the next scheduled health educator. Interviewers were kept blind to condition but health educators were not, due to the nature of the interventions.

The participant flow is shown in Figure 1. Attrition was low with 88.1% of the PE group and 87.8% of the FVE group participants completing a follow-up survey. Attrition was unrelated to experimental condition, demographic and outcome variables. A high proportion of participants received the allocated intervention (FVE group 93.4%; PE group 93.8%). Eleven participants with incomplete data related to FV intake at baseline were excluded from the analyses.

Interventions

Participants received a maximum of two TTE calls within a one month period. The initial health education call lasted an average of 20 minutes (range: 6 to 74) with a brief follow-up call (an average of 5 minutes; range 2 to 19 minutes), as necessary. Treatment fidelity checks were conducted on 200 (41%) of the intervention calls. Trained raters listened to audio recordings of the calls and completed a checklist documenting whether specific points were covered and whether the interventionist spoke at an appropriate pace, responded to questions with clear answers and probed at appropriate times. Mean scores were extremely high (PE group 100%; FVE group 99%).

FVE Group

The development of the FVE group intervention was guided by the Health Belief Model [Janz et al., 2002] and the transtheoretical model of change [Prochaska et al., 2002]. Immediately after randomization, participants in the FVE group were mailed NCI's print brochure, "*Men Eat 9 A Day*" [NCI 2003]. TTE was initiated within 2 weeks. The intent was to increase consumption of FVs and awareness about: (1) the recommended amounts; (2) appropriate serving size; (3) the importance of eating a colorful variety of FVs; and (4) potential health benefits linked to FV intake.

The first goal of the health educator was to establish a positive and trusting rapport. Participants were first asked whether or not they were aware of any specific health benefits from eating a lot of FVs. The health educator then tried to bolster motivation to eat more FVs by tailoring to the participant's values (e.g. potential to lower blood pressure), reported health and family history. Next, the health educator identified which FVs were typically consumed, noted the colors, and provided positive reinforcement for eating FVs from the various color groups. Participants were asked to name FVs that they liked from the remaining color groups. This strategy allowed the health educator to tailor tips for promoting FV consumption based on stated preferences.

The health educator then described the current FV recommendations (9 or more servings per day; 5 vegetable and 4 fruit), explaining that a serving is about how much food can fit into the palm of a cupped hand. Participants were asked whether they felt they were currently consuming more, less, or about the recommended amount. Participants who reported meeting or exceeding the recommendation were asked how they included FVs in their diet and if they could think of anything that would make it difficult for them to maintain their current level of FV consumption. Participants who reported eating less than 9 FV servings a day were asked if they were interested in trying to eat more each day and how much more. The health educator attempted to identify practical goals for increasing FVs at meals and snacks, probing for potential barriers, providing social and emotional support and, finally, attempting to elicit a verbal commitment to increase FV intake based on the goals set. Highlights of the call were reviewed and a follow-up call was scheduled, as necessary.

Data Collection and Measures

Baseline and follow-up interviews were audio-recorded. Supervisors performed quality ratings on two-thirds of them using a 10-point rating form that assessed a range of interviewer behaviors. Eighty-four percent of the checked interviews scored 9 (90%) or better. During the formative evaluation phase of this research, the survey materials were subject to a variety of techniques to reduce response error, including cognitive interviewing [Willis, 1994] and readability tests [McLaughlin, 1969; Weinrich et al., 2003] to achieve a 7th grade reading level.

Social and demographic and medical history variables—Age, marital status, education, and immigrant status, and comorbidities [Katz et al., 1996; Sangha et al., 2003] were assessed. Body mass index (BMI; kg/m²) was calculated based on self-reported weight and height [NTFPTO, 2000], with obesity defined as BMI ≥ 30.0 [NIH, 1998].

Knowledge of appropriate portion size, recommended servings, and healthfulness in colorful variety of FVs—Original knowledge items were constructed. Participants were asked, “Would you say that a single serving of beans is ‘more’, ‘less’, or ‘about as much’ as can fit in the palm of your hand?” (correct response = about as much) and “Would you say that health experts recommend that men eat ‘1 - 4’, ‘5 - 8’ or ‘9 or more’ servings of FVs every day?” (correct response = ‘9 or more’). A third item used an agree/disagree response format. “As long as you eat FVs, it does not matter what color they are.” (correct response = disagree). Percent increase in knowledge gained was calculated based on the number of participants that went from an incorrect response at baseline to a correct response at follow-up.

Knowledge of potential health benefits—Participants were asked, “Do you think there are any health benefits from eating a lot of FVs?” Men who answered affirmatively, were probed for specific health benefits. Responses were coded into the following categories: lowers chances for heart disease, stroke, blood pressure, diabetes (‘high sugar’), cancer (all or specific types), and helps to lose/maintain weight. Health benefits were summed to create a total health benefits score (Range 0 – 6). Other named benefits (e.g., clear skin) were documented, but excluded from analysis, as they were not considered to be

among key health benefits provided by FV consumption [NCI 2003; www.fruitsandveggiesmatter.gov]. The percent increase in knowledge gained about potential health benefits was calculated based on the number of participants that went from not being able to mention any of the six health benefits at baseline to being able to mention one or more at follow-up.

Stage of Readiness to Change—We used a stage of readiness to change measure that has previously documented the effects of a behavioral intervention to increase FV intake in a low-income population [Block et al., 2004]. The measure poses a series of questions corresponding to five stages: Precontemplation (“No” to “Have you ever thought about eating more FVs?”), Contemplation (“Yes” to “Have you ever thought about eating more FVs?”), Preparation (“Yes” to “Are you thinking about making an effort to eat more FVs in the next month?”), and Action (“Yes” to “Are you currently making an effort to eat more FVs?”). Maintenance (“Yes” to “Are you currently making an effort to eat more FVs” at both the baseline and the follow-up survey) was applicable only for the follow-up period. This measure was based on Prochaska’s stage of change concept [Prochaska et al., 2002]. The percent increase in stage of readiness to change was calculated based on the number of participants that moved from a lower to a higher stage of readiness at follow-up.

Fruit and vegetable consumption—Participants were asked to respond to a three-item FV screener adapted from Steptoe et al. [Steptoe et al., 2003]. The original measure has been used successfully in an urban, low-income population [Steptoe et al., 2003; Steptoe et al., 2004] and has been validated using biomarkers [Cappuccio et al., 2003]. In the validation study, reported number of servings of FVs consumed was significantly and positively correlated with plasma ascorbic acid, total daily potassium excretion, and potassium-creatinine ratio [Cappuccio et al., 2003]. The adapted three-item measure assessed how many servings of fruit, how many servings of potatoes, and how many servings of other vegetables were consumed on the previous day. Questions included examples of a serving. For fruit: “Think about yesterday. How many servings of fruit did you eat? An example of a serving of fruit is a medium apple, a small glass of fruit juice, or a handful of cut-up fruit.” For potatoes: “Think about yesterday, how many servings of potatoes did you eat? Include baked, mashed, or French-fried. An example of a serving of potatoes is a small sweet potato or yam, or a handful of cut-up potatoes.” For other vegetables: “Think about yesterday. Not including potatoes, how many servings of other vegetables did you eat? An example of a serving of vegetables is a small salad or a handful of cooked beans or cut-up vegetables.” Number of servings were summed to create an estimate of total FV consumption.

STATISTICAL ANALYSES

An intention-to-treat analysis was conducted. A participant’s data were analyzed whether or not the TTE was received. For those with missing follow-up values, baseline values were carried forward [Laird, 1988]. Chi-square was used to compare baseline social and demographic, as well as co-morbid condition variables, across intervention groups. Analysis of covariance was used to examine differences in FV intake across groups at 8-months post-randomization while controlling for baseline FV intake. Paired T-tests were used to examine whether there were differences in baseline and follow-up FV intake within groups. Chi-

square was used to evaluate differences in the percent increase in knowledge about appropriate portion size, recommended servings, and healthfulness in colorful variety of FVs, the percent increase in the ability to name perceived benefits linked to FV intake, and the percent increase in participants that moved from a lower to higher stage of readiness to change. Analyses were performed using SPSS for Windows (version 15.0, release 15.0.0, September 6, 2006, Chicago, IL).

RESULTS

Social and demographic characteristics of the 479 participants did not differ significantly between the groups (Table 1). The sample consists of mostly middle-aged and married non-Hispanic black men from the Caribbean. Nearly one-third had less than a high school education. Approximately one-quarter of the sample was classified as being obese. About one-fifth were taking medication for diabetes and one-third for hypertension.

At baseline, the mean number of reported daily FV servings was approximately 3 per day for both groups (Table 2). At follow-up, the FVE group consumed an average of 1.2 more daily servings of FV than the PE group (adjusted for baseline consumption) ($F [1,476] = 18.35; P < 0.001$). Intervention effects were similar and significant for fruit alone ($F [1,476] = 20.01; P < 0.001$) and vegetables alone ($F [1,476] = 7.06; P < 0.01$). These differences equate to medium standardized effect sizes using partial eta squared [Cohen, 1988]. Within groups, FV intakes increased significantly from baseline to follow-up for the FVE group ($t [239] = -5.83; P < 0.001$), but not the PE group ($t [238] = -1.72; P > 0.05$).

Baseline levels of knowledge and stage of readiness to change did not differ significantly between groups (Table 3). At follow-up, there were significant increases in the percent knowledge gained for: the number of recommended servings (7.1% increase in PE group versus 14.6% increase in the FVE group; $X^2 (1, N = 479) = 6.91, P < 0.01$); estimating appropriate portion size (15.9% increase in PE group versus 23.3% increase in FVE group; $X^2 (1, N = 479) = 4.12; P < 0.05$); and in the percent of participants that moved from a lower to a higher stage of readiness to change (65.7% increase in the PE group versus 74.4% increase in the FVE group; $X^2 (1, N = 477) = 4.28; P < 0.05$). Effect sizes were -0.120 , -0.094 , -0.095 respectively which equate to significant, but small, standardized effect sizes using Phi coefficients. There were no significant increases in knowledge gained related to the importance of eating a colorful variety of FVs or in the ability to name potential health benefits.

DISCUSSION

This study is the first that we are aware of to demonstrate the efficacy of TTE to promote awareness of FV guidelines and FV consumption in urban and primarily immigrant black men. TTE intervention led to significant improvements in FV consumption (e.g., an average of 1.2 servings per day). The magnitude of this increase is similar to that in prior reports of other populations [Vanwormer et al., 2006, Ammerman et al., 2002]. The TTE intervention also led to significant increases in knowledge about recommended servings, appropriate

portion size, and in the percent of participants that moved from a lower to a higher stage of readiness to change.

Our results illustrate both the feasibility and potential efficacy of TTE (supplemented with a print brochure) for increasing knowledge of recommendations and consumption of FVs. Further, the TTE promoted adoption of a greater readiness to change FV consumption, which may be an important antecedent to adoption of healthier eating habits [Campbell et al., 1998, Greene et al., 2004, Perkins-Porras et al., 2005]. Among those eligible, 78.5% were randomized, reflecting a high level of interest in participation. Once enrolled, the level of participation remained high, with 94% of those in the FV group receiving the allocated intervention. Only 6% (n = 16) failed to receive the FV TTE as assigned. We were fortunate to be able to offer TTE in conjunction with the participants' union. The union is highly trusted by its members.

Despite the success of the TTE, there remain points of concern. Perhaps most striking was that ~90% incorrectly reported daily FV recommendations to be either 1 – 4 servings per day or 5 – 8 servings per day at baseline. This is problematic because even though a high proportion of men reported that they were making an effort to eat more FVs, they were underestimating the desired target value. By the end of the study, the majority of men still did not know the recommended levels of consumption. Furthermore, we were not successful in increasing knowledge about the importance of eating a colorful variety of FVs, and about the potential health benefits of FVs. A recent review demonstrated knowledge to be a strong predictor of FV intake [Shaikh et al., 2008]. Greater increases in FV intake may have been possible if we had been able to influence all of the targeted knowledge items.

While we were able to achieve increases in FV intake commensurate to other studies, follow-up level of consumption remained far below national recommendations [Casagrande et al., 2002; Kant et al., 2007; Guenther et al., 2006]. Our previous work [Wolf et al., 2008] suggests that the main barrier was that FVs were consumed only when someone else prepared them. Future interventions to promote FVs in this population may need to include the household member that does the majority of food preparation. Further research might also explore the extent to which a greater intervention dose or TTE coupled with another approach such as motivational interviewing [Resnicow et al., 2001; Resnicow et al., 2008] might impact outcomes. For adult, inner-city, and immigrant male populations, it may be necessary to consider other avenues for education; community centers, the workplace, doctor's offices, buses and subways. Another innovative approach might be the subsidization of fruits and vegetables in urban supermarkets [Bernales-Korins et al., 2008].

Strengths and Limitations

This study has several strengths. Between 2000 and 2008 there have been ten published reports of telephone-based counseling interventions promoting FV consumption among adults [Sorensen et al., 2007; Stevens et al., 2003; Pierce et al., 2004; Kristal et al., 2000; Marcus et al., 2001; Delichatsios et al., 2001; Rock et al., 2001; Emmons et al., 2005; Pakiz et al., 2005; Resnicow et al., 2005]. In all cases, telephone-based counseling was found to be effective. However, these studies were conducted among primarily white [Sorensen et al., 2007; Stevens et al., 2003; Pierce et al., 2004; Kristal et al., 2000; Marcus et al., 2001;

Delichatsios et al., 2001; Rock et al., 2001; Pakiz et al., 2005] or female [Stevens et al., 2003; Pierce et al., 2004; Marcus et al., 2001; Delichatsios et al., 2001; Rock et al., 2001; Emmons et al., 2005; Resnicow et al., 2005] participants. None specifically targeted black men. Our sample was comprised of primarily black immigrants from the Caribbean. The proportion of the U.S. population that is foreign-born has more than doubled over the last three decades [www.cdc.gov/nchs/fastats/black_health.htm], with immigrants from the Caribbean being one of the fastest growing segments [Mahoney, 2004; Mederios Kent, 2007]. This study provided a unique opportunity to improve our understanding regarding intake and awareness of FV recommendations among this group.

This study also has several limitations. First, the results may not generalize to a more broadly representative sample of black men in the U.S.. The sample was, however, similar to national estimates with respect to education levels [www.census.gov] and reported daily intake of FVs [Casagrande et al., 2007]. A second limitation is the reliance on a short self-report measure of FV consumption on a single day. This study of FV consumption was part of a larger randomized controlled trial on prostate cancer education, and minimization of respondent burden was an important concern. Our FV consumption measure was derived from one that has been validated in other studies among similar populations [Steptoe et al., 2003; Steptoe et al., 2004; Cappuccio et al., 2003] and our intake estimates are consistent with others based on more intensive measures [Steptoe et al., 2004]. Further intervention research using objective measures of changes (e.g., biomarkers) in FV intake would be desirable. A third limitation is the potential for social desirability bias. We tried to minimize this source of error by asking men about their FV intake on the prior day, rather than about usual consumption. If it were a major source of reporting error, one might expect to see a large spike in reports of eating 9 servings of FV per day among FV intervention participants, yet such a spike was not found. Finally, it is unknown how these modest gains in FVs might affect disease outcomes.

CONCLUSIONS

The current study suggests that great efforts will be needed to help urban and primarily immigrant black men to realize the importance of and meet recommendations for FV consumption. To our knowledge, this was the first randomized trial demonstrating that TTE increases stage of readiness to change, knowledge of some FV recommendations and FV intake in urban and primarily immigrant black men. These changes were achieved with a relatively minimal intervention and were sustained up to 8 months. Reduction of diet-related chronic conditions among black populations may be addressed, in part, by provider organizations or health plans making use of TTE outreach to promote healthier diets.

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Figure 1.
Participant flow for participants in the Cancer Awareness and Prevention (CAP) Trial (2005–2007)

Table 1

Baseline demographic characteristics (%) of urban and mostly immigrant black men (n = 479) ^a from the New York City metropolitan area participating in the Cancer Awareness and Prevention (CAP) Trial (2005–2007).

Variable	Prostate Education (PE) Group (n = 239)	Fruit and Vegetable Education (FVE) Group (n = 240)
Age in years		
45–49	23.0	24.2
50–54	25.5	28.8
55+	51.5	47.1
Immigrant		
% Yes	81.6	83.8
Married or living with partner ^b		
% Yes	85.7	82.5
Education		
% Less than High School	31.0	31.2
% High School or equivalent	33.5	30.8
% Some College	20.1	24.6
% College graduate or beyond	15.5	13.3
% Obese (BMI >30) ^c	23.3	22.7
Receiving Treatment for Co-morbid Conditions		
% Hypertension ^d	36.7	34.3
% Type 2 diabetes ^c	17.1	18.0

^aNo significant differences between groups (All p-values > 0.05).

^bTotal: n = 477; FVE group: n = 240; PE group: n = 237 due to missing/refused data.

^cTotal: n = 421; FVE group: n = 211; PE group: n = 210 due to missing/refused data.

^dTotal: n = 420; FVE group: n = 210; PE group: n = 210 due to missing/refused data.

Table 2

Baseline and follow-up means and standard deviation, adjusted differences at follow-up, and effect size estimates for fruit and vegetable (FV) consumption of urban and mostly immigrant black men (n = 479)^a from the New York City metropolitan area participating in the Cancer Awareness and Prevention (CAP) Trial (2005–2007).

	Prostate Education (PE) Group (n = 239)		Fruit and Vegetable Education (FVE) Group (n = 240)		Adjusted Change ^b	P-Value	Effect Size Estimate ^c
	Baseline	Follow-up	Baseline	Follow-up			
Fruit & vegetable	3.1 (1.9)	3.4 (2.2)	3.2 (2.5)	4.6 (3.8)*	1.2	<0.001	0.037
Fruit alone	1.6 (1.3)	1.7 (1.2)	1.6 (1.4)	2.4 (2.3)*	0.7	<0.001	0.040
Vegetable alone	1.5 (1.2)	1.7 (1.8)	1.6 (1.6)	2.2 (2.1)*	0.5	0.008	0.015

^aWith imputations (baseline values carried-forward when follow-up data was missing).

^bDifferences in FV consumption across groups adjusted for baseline consumption using ANCOVA analyses.

^cEta squared was computed using the general linear model univariate procedure in SPSS.

* Differences in FV consumption within groups from baseline to follow-up using paired t-tests (P<0.001).

Table 3

Baseline and follow-up knowledge (%) of recommended servings, appropriate portion size, recommended healthfulness in colorful variety, specific health benefits, and stage of readiness to change pertaining to FVs in urban and primarily immigrant black men^{ab} from the New York City metropolitan area participating in the Cancer Awareness and Prevention (CAP) Trial (2005–2007).

Variable	Prostate Education Group (n = 239)		Fruit and Vegetable Education Group (n = 240)	
	Baseline	Follow-up	Baseline	Follow-up
<u>Knowledge items about recommendations</u>				
Health experts recommend that men eat:				
1 – 4 servings/day	62.3	60.3	69.6	53.8
5 – 8 servings/day	28.9	25.9	21.2	26.7
9 or more servings/day ⁺	5.4	8.4	5.8	17.9
Non-responsive (Don't know or refused)	3.3	5.4	3.3	1.7
A single serving of beans is:				
More than can fit in the palm of your hand	22.2	20.5	21.7	20.4
Less than can fit in the palm of your hand	21.3	20.9	22.5	16.7
About as much as can fit in palm ⁺	54.8	56.5	54.2	62.5
Non-responsive (Don't know or refused)	1.7	2.1	1.7	0.4
As long as you eat fruits and vegetables, it does not matter the color they are:				
Agree	56.1	53.1	58.3	50.0
Disagree ⁺	42.3	44.4	38.8	48.8
Non-responsive (Don't know or refused)	1.7	2.5	2.9	1.2
<u>Knowledge item of Specific Health Benefits</u>				
Able to name one of six key health benefits				
No	68.6	74.9	72.9	71.7
Yes	31.4	25.1	27.1	28.3
<u>Stage of readiness to change</u>				
Precontemplation	16.3	18.4	18.5	12.6
Contemplation	4.6	2.1	2.9	0.8
Preparation	10.0	7.5	8.0	6.3
Action/Maintenance	69.0	72.0	70.6	80.3

^aWith imputations (baseline values carried-forward when follow-up data was missing)

^bNo significant differences between groups at baseline (All p-values > 0.05) based on Chi-Square analyses.

⁺Indicates the correct response