

Walk Texas! 5-A-Day Intervention for Women, Infant, and Children (WIC) Clients: A Quasi-experimental Study

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Abstract This study was conducted to evaluate the Walk Texas! Clinical Counseling Guide for Nutrition, which is a brief, stage-based nutritional counseling guide designed for use in clinical settings. This study utilized a pre-test post-test quasi-experimental design, with two intervention and two comparison clinics that were matched for size and ethnicity. Intervention participants were staged for readiness to meet the 5-A-Day criteria for fruits and vegetables (F&V) and provided stage-based counseling. Women, Infant, and Children (WIC) counselors were trained to utilize the Walk Texas! brief staging instrument and to provide all counseling. Primary measures included: stage of change, barriers to change, attitudes toward F&V, self-efficacy, and self-reports of F&V consumption. These were collected at baseline and during follow-up visits to the WIC clinic. A total of 433 participants completed pre-test data across the four sites. A number of individuals transferred from their original clinic or did not return to their clinic during the study ($n = 62$). Of the remaining 371 participants, a total of 225 participants returned at least two surveys, for a response rate of 60.6%. These were primarily native Spanish speaking, Hispanic women, of low educational level. Results were

mixed. Although there was no significant increase in the cognitive constructs (self-efficacy, attitudes, etc.), participants in the intervention clinics reported a significant increase in stage of change and a composite measure of F&V in-take. In contrast, participants in the control clinics reported no change in these variables. Thus, there appears to be some utility in the use of the Walk Texas! Clinical Counseling Guide for Nutrition in this population.

Keywords Nutrition · WIC · Community intervention · Stage of change

Introduction

Poor diet is a major risk factor for chronic disease. Consuming five to nine servings of fruits and vegetables (F&V) daily appear to reduce the risk of cancer and cardiovascular disease [1]. Specifically, the consumption of F&V has been associated with a lower occurrence of coronary heart disease and prostate cancer [2, 3]. In addition, green leafy vegetables and citrus fruits have been shown to protect against ischemic stroke risk [4]. As a result, it is not surprising that a recent prospective study of 41,358 men and women aged 30–49 found that those with the highest level of fresh fruit, root vegetables, and fruiting vegetables intake had a significantly lower rate of all-cause mortality [5].

Despite the clear benefits of eating a diet high in F&V, fewer than one quarter of Americans eat the recommend minimum of five servings of F&V each day [6]. In 1991, a national 5-A-Day study indicated that U.S. residents ate an average of 3.8 servings of F&V per day when including French fries, and 3.4 servings per day when not including French fries [7]. This is particularly problematic for those of low socioeconomic status; as low income adolescents

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and adults eat less F&V than their more affluent counterparts [8, 9]. Likewise, two samples of Women, Infant, and Children (WIC) clients reported their average daily consumption of F&V to be 3.9 and 4.2 servings, respectively [10]. Both the national average and the WIC sample, in particular, fail to eat the recommended five servings of F&V per day. Because socioeconomic status appears to be a strong predictor of both F&V consumption, as well as morbidity and mortality [5, 11], interventions to increase the consumption of F&V may be particularly efficacious in this population. Unfortunately, too few interventions have targeted this population.

Recently, it has been shown that psychosocial variables (i.e., attitudes, beliefs, and intrinsic motivation) are tied to the consumption of F&V [12–14]. Unfortunately, low-income individuals report barriers across several of these constructs to a greater extent than do high-income individuals [15]. Specifically, low-income individuals have described: the inconvenience and time needed to prepare, lack of availability when not at home, storage and perishability, and expense of F&V as major barriers [16, 17]. In addition, low-income parents are less aware of diet and disease relationships than are high-income parents [18]. As these reflect negative attitudes, lack of knowledge and low self-efficacy regarding F&V intake, it would be appropriate to utilize the Transtheoretical Model to guide an intervention for this population [19]. In fact, previous studies have supported a stage-based model to be applicable to F&V consumption, as one found significant differences in the stage status of intervention and control participants [20, 21]. These researchers also found a consistent relationship between stage of change, knowledge, and self-efficacy across diverse populations [21].

Other stage-based interventions to increase F&V consumption have been conducted in worksites, schools, and churches [22]. However, some of the most promising data have been collected in clinical settings. For example, a 5-A-Day intervention for WIC clients was conducted at 16 Maryland WIC clinics [10, 23]. This intervention included three components: peer educators who provided stage-based nutrition education sessions, visual reminders and other printed materials, and direct mail. Although both intervention and control participants demonstrated a mean increase in daily F&V consumption, intervention participants demonstrated a significantly greater change. Similar results were found for an intervention completed within a managed care facility [24]. In this case, the intervention utilized a stage-based booklet focusing on dietary changes, physician, or nurse practitioner encouragement to follow the recommendations, as well as two motivational counseling sessions by phone. At the 3-month follow-up, the intervention group showed a significantly greater increase in the number of servings of F&V they were consuming per

day compared to the control group. Thus, a stage-based intervention can be successful within a clinical setting. Unfortunately, both of the preceding interventions require a degree of involvement that is beyond the scope of most clinical interactions. As a result, although these interventions were successful, a more brief intervention is required before this approach can be widely disseminated.

The current study was, therefore, designed to determine whether a brief stage-based counseling guide would be sufficient to increase the consumption of F&V within a clinical setting. We choose to utilize WIC clinics as this has been demonstrated as a useful setting for nutritional interventions with low-income women [10, 20, 25]. Specifically, WIC programs are available in every state and more than 7.3 million women participate in the program each month [26]. Because the eligibility for WIC is partially based on income, the mothers in the WIC program represent the low SES individuals that are at greater risk for low consumption of F&V [26]. In addition, the WIC program provides individual and group health behavior counseling that includes nutritional information. As such, there exists a unique opportunity to reach an at-risk population with a brief, stage-based counseling guide to increase F&V consumption.

Methods

Objective

This study was designed to evaluate the Walk Texas! Clinical Counseling Guide for Nutrition, which is a brief, stage-based nutritional counseling guide that is designed for use in clinical settings.

Design

To achieve this objective, this study utilized a pre-test post-test quasi-experimental design, with intervention and comparison clinics matched for size and ethnicity. All research was approved by the Institutional Review Boards for Human Subject Research at both The University of Texas at Austin and the Texas Department of Health.

Participants

A total of 433 women were recruited over a 2-month period from nutrition education classes in four WIC clinics. An overview of the study was provided and informed consent was obtained. Demographic characteristics of the participants at baseline are shown in Table 1. Consistent with the clinic populations, the majority of the participants were Spanish-speaking, Hispanic women with relative low educational attainment. As a result, all materials were

offered in English and Spanish. Participants completed the baseline surveys at the time of recruitment and were asked to complete follow-up surveys at each certification and classroom visit through the following 12 months.

Setting

Four WIC clinics in central Texas were matched based on location, demographics of clientele, and clinic size, with two randomly assigned to the intervention condition and two assigned to the control. Because WIC clients are required to come to the clinic once a quarter to receive individual counseling and classroom visits, these visits were utilized to recruit participants, conduct the intervention and to collect data.

Intervention

This was a 12-month intervention utilizing the Walk Texas! Clinical Counseling Guide for Nutrition. The Walk Texas! Clinical Counseling Guide for Nutrition is designed to direct counseling through a number of steps. First the individual is staged for their readiness to adopt the 5-A-Day message into their diet based on their present behavior and attitudes. To stage participants, clients complete a Fruit/Vegetable (F/V) Assessment Form, which

places them in one of three stages: (1) not attempting to eat 5 F/V a-day, (2) attempting to eat 5 F/V a-day but not reaching that goal, or, (3) presently eating 5 F/V a-day. Although traditional stage-based approaches categorize individuals amongst six categories, pilot testing revealed this to be overly burdensome for clinical counseling settings. As a compromise, these three stages were utilized in the Walk Texas! Clinical Counseling Guide for Nutrition. Second, participants were provided stage-based counseling. Direct counseling was provided and supplemented by stage-matched information sheets. Participants in the first stage receive counseling intended to raise awareness of the importance of regular consumption of F/V. Participants in the second stage received counseling emphasizing strategies to incorporate F/V into their diet. Participants in the final stage received counseling designed to encourage continued consumption of F/V. Again, this intervention was designed to ease the counseling process, while allowing for assignment to and counseling by stage for 5 F/V a-day.

WIC counselors were recruited to implement the intervention, with multiple steps taken to ensure that each participant received the intended counseling. First, to prepare the counselors for this role, each WIC counselor received 90 min of training. This training covered both the general theory of staged-based counseling for health behavior based upon the principles of the Transtheoretical Model; and specific training in the use of the Walk Texas! Clinical Counseling Guide for Nutrition. Second, the clinical chart for each participant was flagged and the WIC counselors were asked to utilize the Walk Texas! Clinical Counseling Guide for Nutrition for each visit over a 12-month period. This included the assessment form, the stage-matched counseling information, and the written, stage-matched materials.

Measurement Instruments

The survey consisted of a 43-item self-administered questionnaire that required approximately 10 min to complete. The questionnaire was designed to measure specific behaviors: (1) responsibility for shopping and preparation of food; (2) stages of change for 5 a-day F/V consumption; (3) F&V consumption; (4) self-efficacy for 5 a-day F/V consumption; (5) barriers to F/V consumption; and (6) perceived importance of F/V consumption. A Spanish and an English version was available for all participants. Detailed descriptions of each measure are provided below.

Responsibility for Meal Planning and Preparation

Responsibility for meal planning and preparation was measured with three one-item questions using the response

Table 1 Demographic characteristics of the sample by clinic at baseline

	Intervention clinic		Control clinic	
	A (%)	B (%)	C (%)	D (%)
Ethnicity				
White	6.8	20.2	14.7	13.0
Black	12.6	6.7	14.7	7.0
Hispanic	75.7	70.6	64.7	73.0
Other	4.9	2.4	5.9	7.0
Language				
English	35.8	64.2	51.4	52.0
Spanish	64.2	35.8	48.6	48.0
Education				
<grade 8	46.4	21.4	35.7	42.4
Some high school	19.6	15.4	14.3	16.2
H.S. or GED completed	16.5	36.8	24.5	26.3
Some college	10.3	16.2	10.2	9.1
College graduate	3.1	6.8	6.1	3.0
Other	4.1	3.4	9.2	3.0
Marital status				
Single	27.4	35.9	32.7	27.8
Married	58.5	55.0	57.7	59.5
Separated	11.3	3.3	7.7	9.2
Divorced	2.8	4.2	1.9	3.1

stem, “How often do you...” followed by the three behaviors in question: (a) Shop for food? (b) Plan the meals? (c) Prepare the food? The items were scored on a 3-point Likert-typed scale from never (1) to always (3). The coefficient alpha for these items was $\alpha = .63$ in this study.

Stage of Change

Stage of change for F&V consumption was measured for five behavioral outcomes: (a) eating five or more servings of F&V a-day most days, (b) eating two or more vegetables for dinner most days, (c) eating a green salad or another vegetable for lunch most days, (d) having 100% juice or fruit in the morning most days, and (e) eating more F&V. The responses to the five items were summed to create the stage composite score for stage across all five areas of F&V consumption.

F&V Consumption

F&V consumption was measured using both a one-item question and a behavioral composite. The one-item, open-ended, question asked the individual, “How many servings of F&V are you eating each day?” The behavioral composite is a combination of five items from the food frequency questionnaire. The questionnaire asked how often the individuals ate (or drank) the specified food (e.g., 100% orange juice, other fruit juices, green salad, other vegetables not counting salad or potatoes, and other fruit not counting juices) within the past week. Response options given were “not at all,” “1 to 2 times per day,” “3 to 4 times per day,” and “5 or more times per day.” The responses to the five items were summed to create the behavioral composite for consumption of F&V.

Self-efficacy

Self-efficacy was measured using the response stem, “How sure are you that you can...,” followed by ten specific behaviors (e.g., eat more F&V every day; eat F&V when you are in a rush; plan meals with more F&V) [10]. A 3-point scale was used where responses ranged from unsure (0) to sure (2). Responses for the ten items were summed to create an overall self-efficacy score with possible scores ranging from 0 to 20 (the higher the score, the greater the self-efficacy). The coefficient alpha for these items was $\alpha = .81$ in this study.

Perceived Barriers

Perceived barriers were measured using a seven-item scale [10]. Participants were asked whether they agreed or disagreed with the barrier statements (e.g., eating more F&V

is difficult because I don’t like the taste of many F&V; eating more F&V is difficult because my family doesn’t like them). A 3-point scale was used where responses ranged from disagree (0) to agree (2). The responses for the seven items were summed to create an overall barrier score with possible scores ranging from 0 to 14 (the higher the score, the greater the perceived barriers). The coefficient alpha for these items was $\alpha = .82$ in this study.

Attitude/importance

Attitude was measured using five items asking how the participant felt about each statements (e.g., having 100% juice or fruit in the morning is very important to me) [10]. A 3-point scale was used where the responses ranged from disagree (0) to agree (2). The responses from each individual item were summed to create an overall importance score with possible scores ranging from 0 to 10 (the higher the score, the greater the perceived importance or attitude). The coefficient alpha for these items was $\alpha = .67$ in this study.

Results

Overall, 433 participants were recruited across the four sites. However, a number of individuals transferred from their original clinic or did not return to their clinic during the study ($n = 62$). These figures were verified through a computer audit of the WIC files and the individuals were eliminated from the analysis. Of the remaining 371 participants, a total of 225 participants returned at least two surveys, for a response rate of 60.6%. There was no difference in drop out rates by clinic, leaving 116 participants in the intervention clinics and 109 participants in the control clinics. Where multiple, follow-up surveys were completed, the initial follow-up was used for the post-test comparison. The mean length of time between the initial assessment and the follow-up test was 9 months for the intervention clinics and 4 months for the control clinics.

To determine if the final sample of 225 differed from those who dropped-out, a series of one-way analyses of variance on baseline measures were conducted. These revealed no significant differences (all p -values $> .15$) on any demographic, dietary self-report, or cognitive variable between those women who completed the study and those women who dropped out or were lost to another clinic. In addition, clinics did not differ in drop-out rates. Thus, the loss of participants did not appear to bias the sample.

Outcome measures are presented in Table 2. To determine the impact of the intervention on the outcome variables, a series of 2 Group (intervention versus comparison) \times 2 Time (baseline versus follow-up) analysis of

Table 2 Beliefs and behaviors related to F&V consumption of the combined sample at baseline and the combined intervention and comparison groups before and after the intervention

	Total sample	Intervention		Comparison	
	Pre	Pre	Post	Pre	Post
How many servings of F/V should a person eat each day?	4.0 (2.3)	4.0 (2.6)	4.0 (1.6)	4.0 (2.0)	4.2 (1.9)
How many servings of F/V are you eating each day?	3.2 (1.7)	3.2 (1.7)	3.5 (1.5)	3.2 (1.6)	3.2 (1.8)
Composite F&V consumption ^a	5.7 (2.7)	5.9 (2.9)	6.1 (2.4)	5.6 (2.4)	5.4 (2.2)
Staging questions: Are you...					
...eating five or more servings of F/V a day most days? ^b	3.8 (1.8)	3.9 (1.8)	4.1 (1.8)	3.7 (1.9)	4.0 (1.8)
...eating two or more vegetables for dinner most days? ^b	4.3 (1.8)	4.2 (1.8)	4.7 (1.8)	4.4 (1.9)	4.6 (1.7)
...eating a green salad or another vegetable for lunch most days? ^b	4.2 (1.9)	4.1 (1.9)	4.2 (2.1)	4.2 (1.9)	4.1 (2.1)
...having 100% juice or fruit in the morning most days? ^b	4.7 (1.7)	4.8 (1.7)	4.8 (1.8)	4.7 (1.8)	4.7 (1.8)
...eating more F&V? ^b	4.7 (1.5)	4.8 (1.4)	4.9 (1.4)	4.7 (1.6)	4.6 (1.5)
Composite stage of change ^c	18.0 (5.0)	17.9 (4.8)	18.9 (4.9)	18.1 (5.3)	18.0 (5.1)
General self-efficacy ^d	16.2 (3.7)	16.1 (3.7)	15.9 (4.0)	16.4 (3.7)	15.7 (4.1)
General barriers ^e	5.4 (4.5)	5.2 (4.4)	5.0 (4.1)	5.5 (4.7)	5.3 (4.0)
General Attitude/importance ^f	9.0 (1.5)	8.9 (1.4)	9.2 (1.2)	9.0 (1.5)	9.1 (1.5)

^a Sum of five specific individual daily F&V consumption scores

^b 0 = not at all thinking about it; 2 = thinking about it; 4 = planning to do it; 6 = already doing it

^c Sum of the five staging questions

^d Scores range from 0 (low self-efficacy) to 20 (high self-efficacy)

^e Scores range from 0 (low barriers) to 14 (high barriers)

^f Scores range from 0 (low importance) to 10 (high importance)

variance (ANOVA) were conducted with repeated measures on the second factor. The dependent variables were: the behavioral composite, composite stage of change, self-efficacy, barriers, and importance. Of these, only the behavioral composite showed a significant group by time interaction, $F(1,107) = 8.346, p < .01$. Behavioral composite data are shown in Fig. 1. For the stage of change composite there was a similar pattern of results, but the interaction was not significant, $F(1,173) = 2.77, p = .098$. However, given the relatively low power for a test of interaction, we probed the interaction through separate univariate test for each condition [27]. These revealed a significant increases in stage for the intervention group, $F(1,86) = 4.589, p < .05$ while the comparison group reported no change. Stage composite data are shown in

Fig. 2. There was no main effect or interaction effects for self-efficacy, barriers or importance, all p -values $> .15$.

Discussion

This study was designed to evaluate the impact of a brief counseling guide to increase the consumption of F&V. The guide was designed for use in clinical settings, with information tailored to the stage of the participant. Results indicated that the guide was moderately successful in modifying behavior. Intervention participants reported increased consumption of F&V as well as an increase in stage of change. Despite the small change in behavior, such a shift in the population can have a significant public health

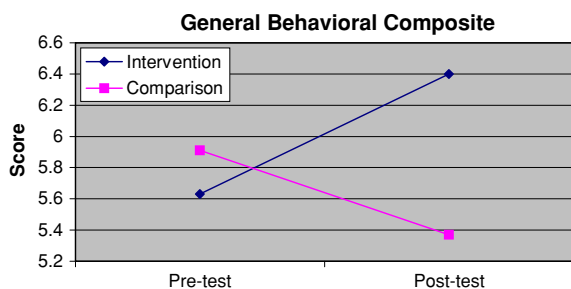


Fig. 1 Pre- and post-test scores on composite F&V consumption by intervention group and time

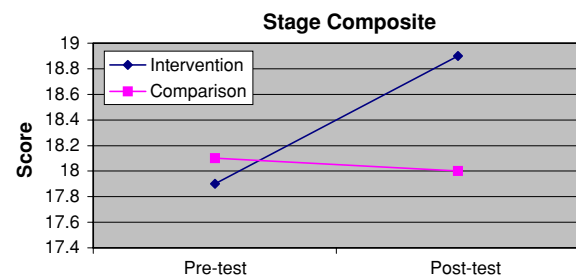


Fig. 2 Pre- and post-test scores on composite stage by intervention group and time

effect [28]. Thus, given the barriers to implementing a more ambitious intervention, even a small effect supports the continued use of the counseling guide utilized for this study.

These results indicate that a simple systems change intervention to increase F&V assessment and nutrition counseling can increase self-reported F&V consumption among WIC clients. This occurred despite the number of challenges to implementation that occur in naturalistic settings with at-risk populations. For example, because visits are scheduled monthly in WIC clinics, we expected to collect multiple assessments for each participant. Unfortunately, these WIC clients demonstrated an inconsistent rate of return to the clinic, i.e., multiple months between visits, as well as a relatively high turnover rate. The failure to obtain a standardized frequency of delivery likely lessened the impact of the intervention. This provides a clear threat to internal validity with which most field researchers are all too familiar. Although replication is, therefore, required, this does enhance the generalizability of the resulting data. Specifically, it is likely that a similar degree of implementation is likely in other WIC clinics. Thus, the lack of experimental rigor is offset, to some degree, by enhanced confidence in the magnitude of the effect.

It is surprising that we observed a change in behavior despite no change in knowledge, barriers and self-efficacy—as these are the primary behavioral determinants within the Transtheoretical Model. There are, however, a number of reasons why this might have occurred. Our sample of WIC mothers strongly endorsed the importance of F&V at baseline, especially for their families. They also did not report barriers that are common to low-income families, i.e., not having F&V in the house, difficulty in obtaining them when eating out, and unfavorable taste were rarely seen in this sample. In addition, self-efficacy was high for all but two of the perceived difficult situations: being rushed and eating away from home. Given these high baseline values, the primary benefit of the intervention may have been to provide sufficient motivation to act on the existing levels of self-efficacy.

Despite these strengths, there are reasons to interpret these data with caution. Our sample size was lowered due to transfer and drop-out of study participants. Although the respondents and non-respondents did not differ on the outcome variables at baseline, the representativeness of our sample is limited. In addition, the scheduling of certification and education visits was not as controlled as we had expected. Our desire to have multiple follow-up points was not feasible. Others have noted these challenges in conducting research with low SES families [29]. Future research should be designed to develop strategies for addressing these barriers.

Implications for Practice

Follow-up interviews of WIC counselors and staff led to a number of recommendations for improvement and institutionalization of the assessment and counseling program within WIC. Stage-based counseling has great promise for improving client outcomes at WIC, particularly when made brief and easy to implement. Ideally, the assessment, counseling, and educational materials should be incorporated into standard WIC materials in order to be embraced by the counselors. Additional paperwork is seen as a burden in a system that is already bound by tight time constraints. Finally, we were fortunate that the counseling was reinforced by classroom nutrition education concerning F&V consumption. Although not a limitation in this study (as both groups received equal nutritional classes) it likely served to strengthen the message.

Despite these limitations, it is clear that a minimal intervention can be successful in changing eating patterns. Nutritional counselors should, therefore, be trained in a stage-based approach to counseling for F&V consumption.

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