J Community Health (2010) 35:10–17
DOI 10.1007/s10900-009-9197-x

ORIGINAL PAPER

Addressing Health Disparities Among African Americans: Using the Stages of Change Model to Document Attitudes and Decisions About Nutrition and Physical Activity

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Published online: 24 October 2009

Abstract Physical activity (PA) and poor fruit/vegetable intake are contributors of health disparities among African Americans (AA). In order to design effective interventions to address these behaviors, it is essential to assess where individuals are in terms of their attitudes and decisions. The aim of this study was to use the Stages of Change Model to assess AA's attitudes and decisions regarding pertinent health behaviors and provide suggestions about how to address them. A survey was administered to 242 low-income, medically underserved adults (47% AA, 27% White, and 26% "Others"). The majority was in the SOC's: "contemplation" stage for PA (they were considering PA); "maintenance" stage for vegetable intake (they had consumed ≥3 vegetable servings daily for ≥6 months); and in the "contemplation" stage for fruit intake (those grouped as "Others" were significantly more likely to be in the "maintenance" stage). Although education and awareness are important, this study has implications for interventions with greater emphasis on creating environments or providing resources to promote or support behavioral change.

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Keywords African American · Black · Health behaviors · Attitudes · Stages of change

Introduction

Research indicates that inadequate physical activity and poor fruit/vegetable intake are contributors of health disparities among African Americans and are associated with poor health outcomes such as chronic depression, stress and anxiety [1–5], and other chronic diseases and conditions [6–9]. Yet, despite the positive benefits of regular physical activity, nearly one-half (49%) of African Americans are physically inactive compared to 39% of Whites [10, 11]. These figures are worse for African Americans in Kansas, where approximately 84% do not participate in regular physical activity for at least 20 minutes three times per week [12].

Similar to inadequate physical activity, most African Americans do not consume recommended amounts of fruits and vegetables. Only about 35% of African Americans eat two or more fruits per day; compared to 31% among Whites. Approximately 24% of African Americans consume three or more vegetables daily compared to 29% of Whites [13]. In Kansas, 83% of African Americans consume less than five fruits and vegetables on a daily basis [12].

The purpose of this study was to address health disparities among African Americans through appropriate assessment of their attitudes and decisions regarding pertinent health behaviors, and to provide suggestions about how to address them. The Transtheoretical Model of Behavior Change (TTM) or the Stages of Change Model (SOC) provides a useful framework to assess these factors and document change.

The SOC was initially developed by Prochaska and DiClemente to examine smoking cessation [14] and has become one of the most widely used stage models in behavioral health. According to the model, behavior change is a progressive and continuous event and occurs in separate stages that are based on a past behavior and plans for future action [15, 16]. The five stages, precontemplation, contemplation, preparation, action, maintenance, and termination, are summarized in Table 1 [14].

The SOC framework has been applied to a broad array of health behaviors including physical activity [17–19], tobacco usage [15, 20], mammography screening [21], and weight control and dietary behaviors [22–25]. The SOC model has been used in interventions as a way of assessing [26, 27] and measuring [28] participants' readiness for change.

The SOC framework has also been applied specifically in studies conducted among African American populations. For instance, Hawkins et al. [18] applied the SOC to weight loss intention among overweight and obese rural African American women aged 18–40 years. In another example, Walcott-McQuigg and Prohaska [19] examined the exercise behavior of African American elders through the use of focus groups, classifying participants into groups based on components of the SOC. It has also been used to predict physical activity and low-fat diet in low-income African American and Hispanic adolescents [22, 29–31]. In addition, Reimer et al. [32] applied the SOC to the child-feeding strategies of African American women.

Although some studies have researched African Americans' fruit and vegetable intake and physical activity as it applies to the SOC model, the focus of these studies is varied with research being conducted on African Americans from all socioeconomic statuses. There is a need, however, to focus on this issue specifically in relation to low income, medically underserved populations and in particular African Americans. Thus, the purpose of this study is to address health disparities among low-income African Americans residing in a medically underserved community (comparing results to other low-income racial/ethnic groups), through appropriate assessment of their attitudes and decisions regarding pertinent health behaviors, and to provide suggestions about them.

Methods

Background and Context

Participants for this study were recruited in 2005 from the Center for Health & Wellness, Inc., a 501(c)3 primary health care facility. Established in 1998, the Center is a unique partnership venture between area businesses, the Northeast community, local hospitals, universities, the faith-based community, city and county governments, and the Wichita Black Nurses Association. The mission of the Center for Health & Wellness is to provide family healthcare through improved access to care, and a heightened focus on health education and prevention, and state-of-the-art treatment and control. While the primary patient base for the Clinic is African American (~70%), the Center is also a medical home to Hispanics, Whites, and other groups. Providing affordable, oftentimes free primary health care services, the Center provides an extensive outreach program, using lay health workers and professionals representing the diverse community. Programs and activities include counseling services, parenting classes, physical fitness classes, diabetes/nutrition/hypertension courses, etc.

The Center for Health & Wellness is located in an urban community identified as Northeast Wichita, a Health Resources and Services Administration (HRSA)-designated medically underserved area [33]. Individuals residing in this community are disproportionately poor in comparison to the rest of Sedgwick County. For example, the U.S. Census Bureau indicates that 27.2% of families and 31.6% of individuals in the priority population live below the poverty level. These figures compare to 7.0 and 9.5%, respectively, among the entire county [34].

Table 1 Stages of change

Precontemplation	In the "precontemplation" stage an individual has no intention of changing a behavior. This might be due to a number of factors (e.g., lack of awareness or knowledge about a problem, being in denial about it)
Contemplation	In the "contemplation" stage there is awareness that change needs to occur and there might be a general intent to do so. However, the individual is not prepared to take action within the next six months
Preparation	In the "preparation" stage the individual makes specific plans or preparatory actions (e.g., buying membership to a gym) to change his/her behaviors
Action	In the "action" phase the individual has actually engaged in the desired behavioral change (e.g., exercising), but for less than six months
Maintenance	In the "maintenance" stage the individual has sustained the behavior change for at least 6 months

Source: Prochaska and Diclemente [14]

In addition to differences in low income, compared to the rest of the county this community is also comprised of a greater percentage (75%) of racial/ethnic minorities (55% Black; 19% Latino; 5% Asian), compared to 80% of Whites representing the county as a whole. Because racial and ethnic minority status are associated with higher disease morbidity and mortality, the unique demographic characteristics of the priority population place individuals at greater health risk and highlight the need for culturally appropriate, effective health promotion and education programs.

After obtaining Institutional Review Board (IRB) approval from the University of Kansas School of Medicine-Wichita, a cross-sectional study design was implemented for this study by using a convenient sample from the Center for Health & Wellness. The study surveys were administered only to adults 18 years of age and older that visited the center for services. Of the 271 surveys were collected, 242 participants indicated their race and ethnicity: 47% were Black, 27% were White, and due to a limited number of individuals representing other racial and ethnic categories, a third category, "Other", was developed, which included Hispanic, Asian/Pacific Islanders, American Indians, biracial and multiracial individuals, and accounted for 26% of the sample.

Analysis revealed that the three groups (Black, White, Other) were comparable in terms of demographics. The majority of individuals were 18–30-years-old, female (68%), had an educational attainment equivalent to a high school diploma or GED (39%), had some form of medical insurance coverage (53%), and lived in households with total incomes of $20,000 or less (60%). Racial and ethnic group results are shown in Table 2.

Survey Instrument and Procedures

In developing the survey, university researchers consulted with the director and a health outreach worker from the

Table 2 Sample demographics

Race/ethnicity	Percentage	Age	Sex	Education	Medical coverage	Income
Black	47% ($n = 127$)	13–17 = 6%	Male = 32%	<12 years = 27%	Yes = 51%	Under $10,000 = 35%
		18–30 = 35%	Female = 68%	12 years = 38%	No = 49%	$10–20,000 = 25%
		31–40 = 23%		12+ = 35%		$21–30,000 = 6%
		41–50 = 25%				$31–40,000 = 5%
		51–60 = 9%				$41–50,000 = 3%
		61–70 = 1%				Over $50,000 = 1%
		71+ = 1%				Did not specify = 25%
White	27% ($n = 74$)	13–17 = 5%	Male = 38%	<12 years = 25%	Yes = 55%	Under $10,000 = 42%
		18–30 = 43%	Female = 62%	12 years = 44%	No = 45%	$10–20,000 = 23%
		31–40 = 24%		12+ = 32%		$21–30,000 = 8%
		41–50 = 18%				$31–40,000 = 4%
		51–60 = 8%				$41–50,000 = 2%
		61–70 = 2%				Over $50,000 = 3%
		71+ = 0%				Did not specify = 18%
Other	26% ($n = 41$)	13–17 = 32%	Male = 24%	<12 years = 39.5%	Yes = 61%	Under $10,000 = 24%
		18–30 = 33%	Female = 76%	12 years = 34.5%	No = 39%	$10–20,000 = 29%
		31–40 = 22%		12+ = 26%		$21–30,000 = 8%
		41–50 = 10%				$31–40,000 = 5%
		51–60 = 2%				$41–50,000 = 0
		61–70 = 1%				Over $50,000 = 0
		71+ = 0%				Did not specify = 34%
Total	100% ($n = 242$)	13–17 = 10%	Male = 32.5%	<12 years = 28%	Yes = 54%	Under $10,000 = 36%
	For those reporting race	18–30 = 37%	Female = 67.5%	12 years = 39%	No = 46%	$10–20,000 = 25%
		31–40 = 23%		12+ years = 33%		$21–30,000 = 7%
		41–50 = 21%				$31–40,000 = 4%
		51–60 = 7%				$41–50,000 = 2%
		61–70 = 2%				Over $50,000 = 2%
		71+ = 0%				Did not specify = 24%

clinic, to determine what health questions were most important to ask and what information would be most helpful to the healthcare facility. The survey consisted of 26 forced-choice items that covered questions pertaining to participants' demographics, physical activity, fruit and vegetable intake, and other health issues. Most survey questions were designed to assess participants' status regarding the stages of change model. For example, participants were asked to indicate their level of physical activity by marking one of the five sentences (e.g., "I seldom exercise on a regular basis, but I've considered starting in the next four weeks"; "I have been exercising on a regular basis for longer than 6 months",) that best describes them.

To ensure that questions were appropriately framed and that literacy and cultural relevancy were considered, the survey was piloted on three adults participating in a health and wellness program, after which a final survey was administered to patients receiving services at the Center. Participants were asked to complete the survey while waiting to be seen by a staff member (i.e., physician assistant or physician). Participants were informed that the survey was completely voluntary, their identity would be anonymous, and that the information they provided would not be linked to their health records. Completed surveys were placed in a box at the receptionist desk.

Data Analysis

Statistical analyses were performed using SPSS Version 15.0. Results were compared to national statistics for some variables. One-way analysis of variance (ANOVA) was used to determine whether statistically significant differences existed between racial/ethnic groups for stages of change among the three target behaviors (physical activity, vegetable consumption, and fruit intake) as well as other health habits. Games-Howell was used as a post hoc test procedure to further analyze statistical differences. Brown-Forsythe was reported as appropriate.

Results

The results showed that overall the majority of participants across all racial/ethnic groups were in the "contemplation" stage for physical activity and in the "maintenance stage" of vegetable consumption. A significant difference existed between groups' responses to fruit intake, with those in the "Other" category significantly more likely to be in the "maintenance" stage of fruit intake than other groups, and with overall study participants being in the "contemplation" stage. In addition, a statistical significant difference was found among Whites for smoking.

Physical Activity

The relationship between participants' stage of change for physical activity and racial/ethnic group identification was examined. Analysis did not indicate significant differences across groups. The majority of participants, across all race/ethnic groups, were in the "contemplation" stage, meaning they were not yet in the "action" stage of change for physical activity but were considering it. Approximately one-half (51%) of African Americans, compared to 43% of Whites, and 54% of "Others" indicated they were contemplating the start of regular physical activity. Survey responses to the other stages of change for physical activity did not indicate high percentages. Nonetheless, it should be noted that individuals in this sample were very inactive: 77% of African Americans, 66% of Whites, and 72% of "Other" individuals were not physically active (Table 3).

Vegetable Intake

The relationship between participants' stage of change for vegetable intake and racial/ethnic group identification was examined. Analysis did not indicate significant differences between groups. Nonetheless, the majority of participants indicated they were in the "maintenance" stage of vegetable intake, ranging from 40 to 50% among all racial/ethnic groups. When combining responses the of those in the "maintenance" stage along with those in the "action" stage, about 49% of Blacks, 55% of Whites, and 55% of individuals in other racial/ethnic groups reported they were consuming vegetables at least three times daily (or at least three servings a day). The next most frequently cited stage of vegetable intake was "contemplation", with 30% of African Americans, 26% of Whites, and 38% of other groups indicating they were contemplating increasing vegetable intake.

Fruit Intake

The relationship between participants' stage of change for fruit intake and racial/ethnic group identification was examined. There was a significant difference between race/ethnicity for stages of change for fruit intake, $F(2,231) = 3.13$, $P < .05$ (the Brown-Forsythe indicated similar results with the significance value being $<.05$). In order to determine which racial/ethnic group(s) was responsible for this difference, the Games-Howell post hoc test procedure was applied. Results indicated individuals in the "Other" category produced significantly different results from the other two groups (White and African American) for fruit intake. Approximately, 40% of those indicating race/ethnicity other than African American or White (i.e., "Other"), stated they were in the

Table 3 Stages of change for physical activity, vegetable intake, and fruit intake by race and ethnicity

	African Americans ($n = 127$) (%)	Caucasians ($n = 74$) (%)	Other ($n = 41$) (%)	Total ($n = 242$) (%)
Physical activity				
Precontemplation	9	11	5	9
Contemplation	51	43	54	49
Preparation	17	12	13	15
Action	9	12	7	10
Maintenance	14	21	21	17
Vegetable intake				
Precontemplation	6	7	2	6
Contemplation	30	26	38	29
Preparation	15	12	5	13
Action	5	5	15	7
Maintenance	44	50	40	45
Fruit intake				
Precontemplation	7	10	3	7
Contemplation	47	38	33	41
Preparation	16	13	12	15
Action	4	4	12	5

"maintenance" stage for fruit intake, specifically indicating they had been eating fruits at least twice a day or more than two servings a day, for longer than 6 months. African Americans and Whites, at 26 and 35% respectively, had lower numbers by comparison.

Additional variation in the stages of change between racial/ethnic groups for fruit consumption was not statistically significant. Almost one-half of African Americans (47%) indicated they were in the "contemplation" stage, compared to 38% of Whites and 33% of individuals in other racial/ethnic categories.

Other Health Habits and Conditions

Other habits were noted. The results of the following survey responses might provide further insight into health issues and disparities among African Americans and others from similar medically underserved communities. In addition, comparisons from national study results are provided.

Tobacco Usage. A statistically significant difference was found between race/ethnicity and smoking, $F(2,235) = 3.81$, $P < .05$ (the Brown-Forsythe indicated similar results with the significance value being <.05). In order to determine which racial/ethnic group(s) was responsible for this difference, the Games-Howell post hoc test procedure was applied. Results indicated that individuals who self-identified as White produced significantly different results from the other two groups (White and Black). About one-half of Whites (51%) were smokers compared to 40% of African Americans and 27% of "Others". The participants in this sample reported a higher percentage of smoking than the national rate, which was 18.5–22.7% for Whites and 19.1–25.4% for Blacks in 2006 [10]. No statistically significant associations were found between smoking and the stages of change for physical activity or fruit and vegetable intake among participants in this sample.

Body Weight. While actual weights of participants were not assessed, nearly one-half of all groups indicated being near their ideal weight (45% of Blacks, 49% of Whites, 49% of Others). However, when asked to indicate what best describes their current weight, the results were as follows: "Underweight" = Blacks 10%, Whites 12%, Other 12%; "Average/Normal Weight" = Black 49%, White 41%, Other 29%; "Overweight" = Blacks 31%, Whites 37%, Other 51%; and "Obese" = Blacks 10%, Whites 10%, Other 7%. These differences were statistically insignificant. While the rates for "overweight" reported from this sample are comparable to the national rate of 33%, the "obesity" rates for this sample (7–10%) are markedly lower than national reported figures (34%) [10].

Overall Physical Health. When asked to rate their overall physical health using a Likert Scale with responses ranging from excellent, good, average fair, and poor, results were similar among the three groups overall. There were no statistically significant differences between groups.

Discussion

Given that a healthy diet and regular physical activity are associated with a decreased risk for several chronic diseases, it is essential that healthy eating habits and physical

activity be promoted as one way to close the gaps in health. In response to the need to develop culturally relevant programs that might lead to reductions in health disparities, a survey was developed and administered to participants seeking care from a community-based primary health care center. The center was located in a predominantly African American, medically underserved community. The purpose of the health survey was to assess health behaviors of participants based on the Stages of Change Model (SOC).

The majority of study participants indicated household incomes of less than $20,000. While many participants (approximately 54%) indicated having some form of medical insurance coverage, these were more likely to be Medicaid and Medicare plans considering the income levels of the sample. While over three-fourths of the participants were African American, efforts were made to acquire a substantial number of surveys from diverse groups. As a result, almost one-half of the sample was African American.

Improvements in physical activity and fruit and vegetable intake were needed among all racial and ethnic groups in this study sample. Nonetheless, application of the SOC model indicated that regardless of race or ethnicity, the majority of participants were in the "contemplation" stage of physical activity and in the "maintenance" stage of vegetable intake. There was a mix of responses for fruit intake, with most participants in the "contemplation" stage and with those in the "Other" category significantly more likely to be in the "maintenance" stage. Taken together, these results have significant implications for the types of interventions that could be developed, whether at the individual, clinic, or community-level. Interventions are needed that make the transition easier from "contemplation" to "preparation", especially in the case of physical activity.

Since participants in this sample appeared further along the SOC model for fruit/vegetable intake compared to physical activity, researchers might consider developing an intervention that would focus on the introduction of healthy eating prior to implementing a physical activity component. At the patient level, for example, providers might consider how individuals in similar low-income populations might already understand the importance of being physically fit, and instead focus their efforts on providing suggestions or resources to help support the individual in moving toward preparation, followed by action and then maintenance.

What is striking about the study findings is that the survey responses from African American participants differed little from other racial/ethnic groups in respect to current health behaviors and/or their propensity to improve them. The similarities in household income, residential location, and educational attainment might have transcended race/ethnicity in this case. Nonetheless, the study results indicated that African Americans and their low-income counterparts are prone to disparities in health due to relatively poor physical activity and low fruit/vegetable intake.

While the SOC-based survey in this study was one step towards developing culturally relevant programs or interventions for the low-income study population, using a community-based participatory research approach to design the actual intervention should be considered. For instance, participants in this study were more likely to be aware of the benefits of physical activity and adequate fruit intake but had not put into action these behavioral changes. So, interventions that promote or create a supportive environment for behavioral change might be more effective (e.g., free, easy access to physical fitness centers or classes; babysitting services provided during sessions; access to fresh, affordable fruits in local stores in these communities). Yet, these interventions should be informed by community members or study participants.

While the stages of change were not assessed for all survey items, results showed some racial and ethnic variations which might call further attention to the need for culturally relevant programs or interventions among low-income populations. For instance, tobacco usage among all participants was relatively high compared to national averages [35], yet Whites in this study were significantly more likely to smoke than other groups. In addition, participants prescribed to the "Other" category indicated more favorable results for "action" and "maintenance" of fruit intake, showing a statistically significant difference in comparison to African Americans and Whites.

A limitation of this study lies in the self-reported nature of the data. For example, participants reported on their weight without regard to clinical health measures (e.g., calculating body mass index). This exclusion might have interfered with the results. Second, the participants who came to the center may not represent all low-income or medically under-insured or uninsured residents in the area. Third, there may have been problems with participants' interpretation of the questions. For instance, the study results for "ideal weight" and "description of weight" in this sample are inconsistent with results in former studies conducted among similar low-income populations [36–38]. Thus, self-image among these participants might not be consistent with recommended health standards.

Another limitation of this study is the sample composition. Several racial/ethnic groups were categorized as "Other", including Hispanics, Asian/Pacific Islanders, and American Indians. Although the fruit intake of this group differed significantly from the other two groups, it is impossible to distinguish which specific subgroup(s) represented this change and whether this change persists with a larger sample size.

Lastly, the majority of participants in this study were female, which may have created bias in the sample. Nonetheless, a substantial proportion of surveys (33%) were collected from male participants. Analysis of study results across groups did not indicate significant differences in gender responses to questions. Yet studies should explore what male and female participants in low-income, medically underserved communities might consider motivating or supportive for behavioral changes and examine whether there are differences by race and ethnicity.

The results in this study have implications for programs and interventions that do not focus solely on awareness and education, but rather place greater emphasis on creating environments or providing resources that might actually promote or support these changes. Future studies should assess what individuals in similar communities believe could help them readily adopt improved health habits. It is important that health professionals understand the health behaviors of low-income, medically underserved groups in terms of their attitudes and decisions in order to improve low levels of physical activity and fruit/vegetable intake. While cross-comparisons with other groups should also be considered in future studies, culturally relevant approaches that consider race/ethnicity, income, and education levels should be examined as well.

The purpose of this study was to assess where individuals are in terms of their motivation to change their eating habits and physical fitness routines. These behaviors have implications for mental and physical health status. Although a number of studies have been conducted with African Americans regarding fruit and vegetable intake and physical activity levels, samples have included a wide range of socioeconomic statuses. Thus, there is a need to focus on medically underserved populations and to help researchers and practitioners design effective interventions and wellness-focused programs in order to help reduce poor health outcomes among African Americans.

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