CPE Self-Perceived Barriers and Facilitators to Dietary Approaches to Stop Hypertension Diet Adherence Among Black Americans With Chronic Kidney Disease: A Qualitative Study

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Objective: The Dietary Approaches to Stop Hypertension (DASH) eating plan improves hypertension in Black individuals and is associated with favorable chronic kidney disease (CKD) outcomes. Yet, adherence to DASH is low among US adults in general, particularly among Black Americans. We assessed perceptions about DASH, its cultural compatibility, and barriers and facilitators to DASH adherence in Black adults with CKD.

Design and Methods: We conducted focus groups and semistructured individual interviews involving 22 Black men and women with CKD Stages 3-4 from outpatient clinics at a US academic medical center. Transcripts of audio-recorded interviews were analyzed using thematic analysis.

Results: Among participants (2 focus groups [N = 8 and 5] and 9 individual interviews), 13 (59%) had CKD Stage 3, 13 (59%) were female, the median age was 61 years, and 19 (90%) had hypertension. After receiving information about DASH, participants perceived it as culturally compatible based on 3 emergent themes: (1) Black individuals already eat DASH-recommended foods ("*Blacks eat pretty much like this*"), (2) traditional recipes (e.g., southern or soul food) can be modified into healthy versions ("*you can come up with decent substitutes to make it just as good*"), and (3) diet is not uniform among Black individuals ("*I can't say that I eat traditional*"). Perceived barriers to DASH adherence included unfamiliarity with serving sizes, poor cooking skills, unsupportive household members, and high cost of healthy food. Eleven (52%) reported after paying monthly bills that they "rarely" or "never" had leftover money to purchase healthy food. Perceived facilitators included having local access to healthy food, living alone or with supportive household members, and having willpower and internal/external motivation for change.

Conclusions: Black adults with CKD viewed DASH as a healthy, culturally compatible diet. Recognizing that diet in Black adults is not uniform, interventions should emphasize person-centered, rather than stereotypically culture-centered, approaches to DASH adherence.

Key words: Chronic kidney disease; Diet; Barriers and facilitators; Qualitative research; African American

Introduction

BLACK AMERICANS ARE disproportionately burdened by hypertension, chronic kidney disease (CKD), and cardiovascular disease. The Dietary Approaches to Stop Hypertension (DASH) eating plan improves hypertension[1] and is associated with favorable

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CKD[2-8] and cardiovascular disease[9,10] outcomes. Yet, adherence to DASH is low among Americans.[11] Diet counseling enhances DASH adherence among Black men and women[12,13] and reduces racial disparities in hypertension control rates.[14] However, even in the context of diet counseling, adherence to DASH is suboptimal, and racial disparities in adherence are evident. For example, Black adults who received weekly counseling during a 4-month behavioral intervention were less adherent to DASH compared with White adults.[14] These findings suggest that Black individuals may face unique challenges to following DASH. Gaining a better understanding of barriers and facilitators to diet modification is important to improve DASH adherence in Black adults.

Factors that contribute to low adherence to DASH in Black adults have not been fully elucidated. Prior studies have identified several potential barriers, such as the high costs of healthful food, lack of available and/or accessible healthful foods,[15-17] overaccessibility and convenience of unhealthy food,[16] and discordant cultural influences on food preferences and diet norms.[18-22] Whereas prior studies have sought to determine barriers to DASH adherence in individuals with normal kidney function, studies to assess barriers in individuals with CKD have not been conducted. Indeed, individuals with CKD may face unique challenges to modifying their diet, such as difficulty changing negative health behaviors that perpetuate known modifiable risk factor for CKD such as diabetes and hypertension. Further complicating matters is the fact that patients with CKD may be advised to restrict healthy foods that are emphasized by DASH, such as fruits, vegetables, whole grains, and legumes, because they contain a high potassium and/or phosphorus content that could cause CKD-associated metabolic complications. Formative research to determine factors that influence DASH adherence in individuals with CKD is essential to develop an effective intervention. To inform the design of a future intervention, we interviewed Black men and women with CKD to assess their opinions about DASH and CKD, its cultural compatibility, and self-perceived barriers and facilitators to DASH adherence.

Methods

Study Setting and Participants

Using purposive sampling, we queried the electronic health record (EHR) at a US academic health system and identified Black or African American patients who were aged 21 years or older, had CKD Stages 3 or 4 (estimated glomerular filtration rate of 30-59 or 20-30 mL/minute/1.73 m^2, respectively), and completed an outpatient primary care or nephrology clinic visit between November 2019 and March 2020. Potentially eligible participants were informed about the study via their EHR patient portal and invited to complete an online screening questionnaire using REDCap (Research Electronic Data Capture), a secure, web-based study data capture and management application.[23] Questionnaire respondents met inclusion criteria if they self-identified as Black or African American, acknowledged being aware of their CKD diagnosis, were able to read and understand English on their own, and denied being on dialysis or having a history of kidney transplantation. All participants provided consent and completed online questionnaires to provide their sociodemographic information and self-reported health histories. The institutional review board approved the study protocol, and we conducted the study according to Consolidated Criteria for Reporting Qualitative studies guidelines.[24]

Data Collection

Focus group discussions (FGDs) were conducted from December 2019 to January 2020 in a private conference room. FGD lasted approximately 90 minutes and were led by an experienced qualitative moderator using an interview guide (see Appendix S1: "Moderator Guide") that was developed by the study team. Because we anticipated that perspectives on diet would vary by severity of kidney disease, we planned to conduct FGD for participants with CKD Stage 3 separately from those with Stage 4. Because of the implementation of coronavirus 2019 (COVID-19) social distancing mandates in March 2020, we performed individual telephone interviews from April to May 2020 to complete data collection for the remainder of participants, all with CKD Stage 4. Telephone interviews lasted approximately 60 minutes and were performed by 1 of 2 race-concordant, experienced qualitative moderators using the same interview guide that was used during FGD. DASH was introduced to FGD participants via a 3-minute informational video[25] and a 1-page handout (see Appendix S1: "DASH Handout") that described food group targets. Participants who completed telephone interviews were emailed a copy of the handout and a weblink to the video and asked to review the material before their scheduled interview. All participants were asked semi-structured, open-ended questions to obtain their opinions about DASH, their perspectives about its cultural compatibility, and self-perceived barriers and facilitators to DASH adherence. To elicit discussion about DASH's cultural compatibility, we asked participants to react to the following statement: "*DASH is not an African American diet because it doesn't take into account cultural traditions or food preferences*." We deliberately did not provide a definition for "African American diet." All FGD and interviews were audio-recorded, transcribed verbatim, and checked for accuracy.

Analytic Strategy

Experienced qualitative researchers used a 5-stage approach (familiarization, identifying a thematic framework, indexing, charting and mapping, and interpretation) to conduct thematic analysis.[26,27] Three reviewers (C.C.T., I.G., and L.J.F.) familiarized themselves with the data by reviewing 2 transcripts to identify initial coding themes.

Identified themes were used as the initial coding framework to conduct line-by-line coding of a single transcript. The reviewers then met to discuss the transcript and modify the initial framework. Two experienced qualitative researchers (I.G. and C.C.T.) then conducted line-by-line coding of remaining transcripts. The team met to discuss themes, sort codes, and restructure the initial framework as similarities and differences were identified. In the final stage, the team identified major themes and associated quotes to summarize the results. Data were analyzed using NVivo 12 (QRS International).

Results

Participant Characteristics

Study invitations were sent to 987 patients via the EHR. Of the 320 (32%) patients who viewed the invitation, there were 138 responders, and 86 expressed interest in screening for the study. Our final sample size of participants who met inclusion criteria and were able to meet in groups or for individual interviews was 22. A total of 13 (59%) participants with CKD Stage 3 attended 1 FDG involving 8 participants or 1 FGD involving 5 participants, and 9 (41%) participants with CKD Stage 4 completed 1 telephone interview. Participant characteristics are shown in Table 1. Thirteen (59%) participants were female, the median age was 61 years, and hypertension was the most commonly reported comorbid condition (90%). Among the 21 participants who completed the study questionnaire, 15 (71%) reported having little to no money left over to purchase "special things" that they wanted after paying their monthly bills, and 11 (52%) reported during a typical month "rarely" or "never" having enough money left over to purchase healthy food (Table 2).

Participant Perceptions About DASH

A sample of illustrative quotations for participants' opinions about DASH is shown in Table 3.

General Opinions About DASH

In general, participants' familiarity with DASH varied from not having any prior knowledge about the diet to having heard about it but not in detail. One individual was a former participant of the DASH feeding trial and was very familiar with the diet. After receiving information about DASH, participants generally agreed that it was an overall healthy diet. Several participants viewed the quantity of food recommended for DASH was much more than they typically consumed in a 24-hour period. One participant felt that the daily limit for fat and cholesterol was too restrictive, yet not much different from other diets he/she had tried in the past.

Opinions About DASH for Patients with CKD

Although the majority of participants perceived DASH to be appropriate for patients with CKD, 3 participants, all with CKD Stage 4, identified potential conflicts. One participant perceived DASH to contain too much protein, and another perceived DASH to contain too much potassium based on receiving prior advice to restrict those nutrients. The third participant reported that having a poor appetite related to his CKD would make it difficult to consume the amount of food that is recommended by DASH.

Opinions About the Cultural Compatibility of DASH

When referring to an African American diet, participants used terms such as "southern cuisine" and "soul food," and emphasis was placed on "pork," "salt," "sweets," and "fried foods." Participants had mixed responses concerning the cultural compatibility of DASH. A few participants agreed that DASH did not account for cultural traditions, yet they did not perceive that it would hinder their ability to follow the diet. However, most participants perceived DASH to be culturally compatible for various reasons. One reason was that Black individuals typically consumed foods recommended by DASH; culture only influenced how those foods were seasoned and prepared. A second reason provided for the cultural compatibility of DASH was that traditional (e.g., southern or soul food) recipes could be modified into healthful, DASH-friendly versions. Healthful modifications would involve using olive oil as a source of fat, using less pork, salt and sugar, and avoiding frying foods. Third, several participants regarded DASH as culturally compatible because they did not perceive all Black individuals to follow the same diet; thus, DASH would align well for some individuals. Two participants ascribed their nontraditional dietary pattern to their geographic location (i.e., previously residing in a non-Southern state or not having a southern upbringing) and being exposed to food from other cultures as a result of traveling. A final reaction to the cultural compatibility of DASH was that cultural traditions were irrelevant when it comes to health; health takes precedence over tradition.

Perceived Barriers and Facilitators to Following DASH

A sample of illustrative quotations for participants' self-perceived barriers and facilitators to adhering to DASH are shown in Table 4.

Food Availability, Accessibility, and Costs

Participants generally reported that healthful foods were available and accessible to them in their local environment. In fact, several participants reported having more than one option (e.g., grocery stores, farmer's market) to purchase food that allowed them to shop for competitive prices. Although only one participant did not anticipate there would be a cost difference between healthful and unhealthful foods, most participants reported that following DASH

Table 1. Characteristics of 22 Black Men and Women With Chronic Kidney Disease Stages 3 and 4 Who Completed Qualitative Interviews

N	22
Female sex, n (%)	13 (59)
Age, median (range)	61 (41-73)
Hispanic, n (%)	0 (0)
Marital status*	
Single	5 (23)
Married	6 (27)
Divorced	6 (27)
Widowed	2 (9)
Separated	2 (9)
Education*	
High school diploma	2 (9)
Vocation/trade school	2 (9)
Associate/2-year degree	9 (41)
Bachelor/4-year degree	4 (18)
Graduate degree	4 (18)
Work status*	
Full time	6 (27)
Part time	2 (9)
Unemployed	1 (5)
Disabled	6 (27)
Retired	6 (27)
CKD stage*	
3	13 (59)
4	9 (41)
Comorbidity*	
Diabetes	11 (52)
Hypertension	19 (90)
Overweight/obesity	15 (71)
CHD/CHF	8 (38)
Liver disease	1 (5)
Hyperlipidemia	12 (57)
Total household income per year*	
<$12,500	2 (10)
$12,500-24,999	6 (29)
$25,000-49,999	2 (10)
$50,000-99,999	7 (33)
I don't know/prefer not to answer	4 (19)

CKD, chronic kidney disease; CHD, coronary heart disease; CHF, congestive heart failure.

Data are presented as frequency counts (percentages) unless otherwise noted.

*Data are missing for 1 participant (n = 21).

would cost more than their typical dietary pattern. Some participants felt that food spoilage would contribute to additional costs because fresh produce was likely to spoil before they got a chance to consume it, and they would need to make extra trips to the grocery store to replace wasted food. For several participants with fixed incomes or time constraints, these factors would make following DASH challenging. Despite its potentially higher cost, most participants generally perceived the tradeoff of improving their health to be worth the added expense. Some participants reported that food costs could be lowered by purchasing canned goods, frozen food, bulk items, and using discount coupons.

Food Preparation and Cooking Skills

Several participants expressed concern that factors involving food preparation and cooking would make adhering to DASH difficult. These factors included having poor cooking skills, lack of familiarity measuring serving sizes, not owning the proper kitchen tools to measure food (e.g., measuring cups and food scales), and the inconvenience of having to measure and/or weigh food. Some participants also mentioned that incorporating more healthful foods into their diets would expose them to new foods that they would not know where to purchase or how to use or cook. Participants offered strategies to overcome some of these barriers, such as having access to simple, easy-to-follow DASH recipes that incorporate simple ingredients, receiving information about how to prepare unfamiliar food, and learning how to accurately determine serving sizes.

Household Responsibilities Involving Food

Participants' household responsibilities involving food (e.g., meal planning, shopping, and cooking) and the attitudes and/or behaviors of household members influenced their perceived ability to adhere to DASH. Several participants perceived that living alone and being solely responsible for their own meals would facilitate diet adherence because they could avoid negative influence from others with different taste preferences or nutritional needs. On the other hand, participants perceived living with others as beneficial if household members were supportive and assisted their efforts to eat healthy, such as helped to purchase and cook healthful meals or follow DASH themselves. Conversely, living with household members who had conflicting food preferences, demands, and needs were perceived as barriers. For example, one participant

Table 2. Responses to Questionnaire Items Addressing the Financial Status of 21* Black Men and Women With Chronic Kidney Disease Stages 3 and 4

How would you describe your household's financial situation right now:	
"After paying the bills, I have enough money left over to buy special things that I want."	6 (29%)
"I have enough money to pay the bills, but little money left over to buy special things that I want."	5 (24%)
"I have money to pay the bills, but only because I have to cut back on things."	4 (19%)
"It is difficult to pay the bills, no matter what I do."	6 (29%)
During a typical month, after you pay your bills, how often do you have enough money left over to buy healthy food?	
"Always"	3 (14%)
"Most of the time"	5 (24%)
"Sometimes"	2 (10%)
"Rarely"	10 (48%)
"Never"	1 (5%)

*Data presented are for 21 of 22 participants who completed the study questionnaire.

Table 3. Sample of Illustrative Quotations of the Opinions of Black Men and Women With Chronic Kidney Disease Stages 3 and 4 About the DASH Diet

Perceptions about the DASH diet for individuals with CKD
DASH contains too much protein
"*I was told that I needed to lower my protein intake and then at some point when I get stage 4 kidney disease I was told okay you can eat a normal, what they call a normal amount of protein, should be amount of weight that I have. I'm not real sure what the reasoning was but I'm guessing it was to put less strain on my kidneys by consuming less protein.*"
DASH contains too much potassium
"Looking at it I don't think it was geared toward people with kidney disease. …The things that they [DASH diet video] were telling me to eat was high in potassium. They were saying eat whole wheat this and whole wheat that and that is not geared toward kidney disease…I also like spinach and collards. Greens like that they told me to cut back on. That's something that people with kidney disease are supposed to cut back on or avoid. Things which you're suggesting with the DASH diet is going against what a nutritionist,…I've talked to two nutritionists so it's going against what those two have said."
DASH consists of too much food (for individuals with CKD-associated appetite loss)
"*…I have a hard time, my kidney disease has progressed, I have a hard time eating a lot of food period like in a day…that seems like a lot for me right now. Before it probably wouldn't have been a problem but now like I said I might not even eat. Sometimes I eat once a day. Sometimes I eat twice a day. I really only eat when I'm hungry…"*
Cultural perceptions about the DASH diet
DASH is not culturally centered
"It is definitely not your typical southern or African American cuisine"
"You know, leafy vegetables, well we [African Americans] going to add some pork in there and season it, some ham hocks".
DASH is culturally compatible
• Blacks individuals typically eat DASH-recommended foods
"I think African Americans eat pretty much like this. I think it's portions and how we prepare it."
• Traditional (e.g., southern or soul food) recipes can be modified into healthy versions
◦ *"I can and have on many occasions cooked southern style with all the necessary evils that go along with that but I've also learned how to cook healthy and I've also decided when I'm not going to cook healthy…normally Black people cook collard greens with ham hocks. It is a smoked pork product. Some of us have switched to turkey tails. Yes, they're still smoked. Yes, they still have a certain amount of salt but they're not as "deadly" as ham hock. And I've been cooking with turkey tails for years and years and years. When I make my lima beans I make them with turkey tails instead of…what my mother used to put in them…So substitutions, I have made baked macaroni and left out some of the cheese, some of the whatever you call it, the evaporated milk and definitely the salt. Does it taste a little different? Yes, but if I'm cooking it for me it doesn't matter. So I can still fix "so-called" soul food without killing myself especially if I'm just feeding me. It can be a problem when you are part of a family that's for sure, but with me being by myself that's not an issue."*
◦ *"I do like to have some of that southern soul food stuff every now and then but I believe that, I just believe that that's a personal decision because like for instance we still eat a lot of the same things that we ate coming up but it's just you can fix it different to, like collards, you know? She don't cook that stuff with pork anymore. She do it like with maybe chicken broth or low sodium chicken broth. You don't cook with the pork anymore but she's doing dried beans so you know, stuff like that. I think that's just a choice and people say 'well you know it don't taste the same' but I think you can come up with decent substitutes to make it just as good."*
• Black individuals eat the same foods as other cultures
◦ *"People like to put labels on stuff. White folk and everybody else do all of the same thing. I'm with a lot of races and all of us sit down and eat and cook predominantly the same way cause if you don't put pork fat in there, and olive oil is oil, so it's oil. It's not necessarily the animal that you get it from, it's the oil…it's a little bit better, but it's still oil."*
• Many Black individuals follow nontraditional diets
◦ *"Like I told you, I moved from Oregon…I can't say that I eat traditional. I mean I eat collards but I don't. I'll put it to you this way. I don't eat pork. I don't eat any pork. No pork at all. So when I cook my vegetables, I do not put pork in it. I put olive oil. I don't eat a whole bunch of fried foods. If I eat fried foods, it's when I'm out. I don't prepare fried foods. I can't say that this diet interferes with my culture."*
◦ *"I'm more open to eating things that I didn't eat traditionally growing up, you know, just being exposed to going and traveling and eating different places so I can't say that it would be too difficult in my opinion because like I said I've been exposed to a lot of different foods that I wouldn't normally eat growing up. It's different for me. I don't see that really being a problem or an issue. My mom ain't trying nothing new. She's not going outside of what she ate growing up and that's just how she grew up so it's just different."*
Cultural-centeredness is irrelevant when health is concerned
"Well, forget your traditions. Your health means more than any tradition, especially as you get older and what works. If you eating a raw carrot every day and eating pig feet or fried chicken or whatever, you know it might taste better but it's not good for you."

expressed not being able to afford to prepare 2 separate meals to accommodate her own needs and her children's taste preferences, so she often compromised by either cooking a less healthful meal or forcing them to eat something that they did not enjoy. Participants expressed that time and convenience were important factors in their ability to eat healthful and generally perceived foods that were quick and easy to prepare as discordant with DASH.

Table 4. Sample of Illustrative Quotations From Black Men and Women With Chronic Kidney Disease About Self-Perceived Barriers and Facilitators to DASH Diet Adherence

Barriers to adhering to the DASH diet
High cost of healthful foods
"Yeah because the stores that I shop, they have all of this but I would still say the expense… I'm on disability so I make a certain amount of money and after paying the car note and some other stuff and then for my food stamps I only get like $19 a month so that doesn't go very far."
Food spoilage
"When we buy them [blueberries or strawberries]in the container you can't pick at it, so the top looks very good but when you get home and you open the containers or whatever the bottom is not as fresh and then if you take it back then it's your time going back and forth…what you see looks good but once you get it home and open it up and see what's in it, it's not good."
"And I don't eat a whole lot of salads mainly because if I buy a bag of salad it wilts before I finish so I'm better off with my frozen mixed vegetables that I can cook what I need and the rest is in the freezer."
"…to buy salad and bring it home it's dead before I finish it so that's just a waste."
Poor cooking skills
"See, my problem would be in the preparation because I was never that great of a cook to begin with. So when I finally actually started being able to cook, I only learned to cook a certain way….now I'm having to not only have restrictions, but I only could have certain things. So, it's like if I don't have something that can really lay it out for me in simple terms, what I'm supposed to have, then it's difficult for me to be able to understand it enough to be able to say this is the correct amount because I don't have all the things to measure stuff with in my kitchen or I think that just not having all those things that maybe a really good cook would probably have in their kitchen, it's hard for me to know what the exact amounts are."
"The way the instructions are they don't make it as simple for people that doesn't have experience in cooking. When they try to describe how much you should have and put this and then, a lot of the recipes have stuff you never heard of and I'm like, what is this? I just know the basic seasonings and the basic stuff like, thyme or stuff like that. But then the recipe might call for something a little bit more exotic or something…So, where do you go buy it? So, I'm trying to figure out well, what kind of substitute because I don't know what it's supposed to do or what it is. That's the difficulties that I have. It's not necessarily not being able to follow the recipe but just not understanding what all the ingredients are or where I can buy the things or how much to use and stuff like that."
Lack of familiarity with serving sizes
"Like where you determined the amount of meat, the size of half a deck of cards or half a bar of soap is amusing to say the least."… "and I guess I could stop and weigh it because I do have one of those small scales but I don't normally do that."…It's the portions that would be a challenge."
Competing preferences/needs of household members
"I couldn't afford to make two separate meals every time or something different for them and me something different, so a lot of the time, whatever I made had to be something that I can have and that they had to eat."
Controlling food cravings
"You know what, I almost feel like it has to be similar to alcoholic trying to stop eating…It's in your mouth and you're just like, oh my God, I'm just, I want this so bad. But in the end, I have to really control myself because I know that the result of me constantly doing that could mean that, in the long run, I could potentially lose my life so I quickly get a reality check and then I get it back under control again and then I'm able to restrain, but it's like you go through that roller coaster so often it becomes difficult."
Facilitators of DASH adherence
Support from household members
"My husband was fussing at me the other day. They made a big salad and he said now you're going to help me eat this salad. I think I ate off it twice."
Willpower and motivation for change
"I think it's just a mind over matter and willpower and this is just a change of habit. A change of lifestyle…Cause I tell people this. It doesn't matter how bad or how much somebody tells you to do something or what they do and stuff if you don't want to do it yourself, it ain't going to happen. You can have 150 people in your face telling you to do this, do that, until you want it, it ain't going to happen."
"It's all willpower. You really have to make set in our mind, have a mindset that you're going to do it. It's not hard to do it's just like when I started eating the salads every day for lunch. It wasn't hard. I just need to do it. Put up the effort to do and then I just decided I was going to sit down and just do it every day and I did it. I haven't had no problem. Like I said, I need to get back on it."
Adhering to DASH diet food categories
The ease of consuming vegetables
"We do exceptional well with that [vegetables] considering the past, you know, gardening was one of my hobbies and so you know the greens, I've grown things like Chinese cabbage, regular cabbage, collards, broccoli, asparagus and so that's, Brussel sprouts. We pretty much eat something of that nature every meal."
The difficulty of limiting sweets
"I'd say eating sweets are probably one of the most difficult things for me because that's, I don't know, it's just an addiction for sure…I've always felt like I had to have something sweet after I had dinner or whatever. That's just one of those things. If I could probably transition to having some kind of fruit that still satisfies that sweet tooth but I definitely have a real sweet tooth and I know that that was one of the most difficult things for me cutting out sugar."

Knowledge and Motivation for Change

Some participants reported that becoming informed about the benefits of a healthful diet and the consequences of an unhealthful diet on kidney health would facilitate diet change. Several participants felt that having willpower and self-discipline would be necessary to adhere to DASH. One participant expressed that if he did not have the personal resolve to change his diet, no amount of physician advice or resources could facilitate diet change. Some participants also mentioned that having external motivation for change, such as being fearful of dialysis, witnessing a close relative on dialysis, desiring to live longer and have the functional capacity to help their family, and a desire to feel physically well would facilitate adherence to DASH.

Achieving Recommended DASH Food Targets

The results for participants' perceptions of the easiest and most difficult DASH food categories to adhere to are shown in Figure 1. DASH food categories that were ranked as the first, second, and third easiest to adhere to were vegetables, fruits, and nuts/seeds/legumes, respectively. These foods were ranked as the easiest because participants generally viewed them as ready to eat, easy to prepare, and congruent with their taste preferences. The DASH categories that were ranked as the most difficult to achieve were limiting sweets, limiting fats/oils, and meeting daily whole grain targets. Many participants discussed having difficulty controlling cravings for desserts/snacks (e.g., cakes, bread, and ice cream), sugar-sweetened beverages (e.g., sweet tea, lemonade, and carbonated drinks), and fried foods. Others discussed preferring whole-fat cheeses to reduced-fat cheeses and preferring the taste of refined/processed cooking oils (e.g., vegetable or canola oil) to healthier, unrefined/unprocessed oils (e.g., olive oil). Whole grains were considered challenging because participants either did not eat them often or they preferred the taste of refined grains, such as white rice and pasta to unrefined grains, such as brown rice and whole-wheat pasta. Participants who regularly consumed whole grains thought it would be difficult not to exceed daily limits. Overall, factors that influenced participants' perceptions about their ability to meet DASH food targets included their individual taste preferences, ability to control food cravings, known food intolerances or allergies, food purchasing habits, availability of refrigerator or freezer space to preserve food, likelihood of food spoilage, ease and convenience of food preparation, how similar a specific recommendation was to their habitual dietary pattern, acceptability of DASH foods by other household members (e.g., spouse or children), and whether a specific serving size was perceived to be liberal or restrictive.

Discussion

In this qualitative study, Black men and women with CKD regarded DASH as a healthy, culturally compatible diet. Perceived barriers to following DASH included the high cost of healthful food, unfamiliarity with serving sizes, poor cooking skills, and negative influence from household members. Facilitators included having access to healthful food, living with supportive household members, and having willpower and internal/external motivations for change. A few concerns about CKD-related diet restrictions were exclusive to participants with CKD Stage 4 only.

Our study is novel because we assessed perceived barriers and facilitators of DASH adherence in individuals with CKD. Unlike individuals with normal kidney function, the diets of individuals with CKD may be influenced by the severity of their kidney disease, prior advice to follow restricted diets, and health-related motivations for change.[28,29] Our findings that the majority of our participants were not previously aware of DASH and lacked a general awareness of common CKD-related diet concerns suggests that effective strategies are needed to disseminate evidence-based diet information to the general public and disease-relevant diet information to patients with CKD.

Another novelty of our study is that we explicitly elicited perspectives from a sample of southern Black men and women about the cultural compatibility of DASH. In general, participants did not perceive that their culture would interfere with their ability to follow DASH. Some participants denied following a "traditional" diet. The reasons provided for their nonconformity included having their own unique taste preferences, not having a southern upbringing, or developing an appreciation for foods from other cultures. Participants who reported following a "traditional" diet felt that they could comply with DASH by making healthy substitutions to their meals. Indeed, several participants reported that it was already common practice for them to modify their meals by using olive oil and reducing fat, salt, and sugar. The wide variability of food preferences in our sample of 22 participants makes it apparent that culturally adapting DASH, although not necessarily impossible, would be quite challenging. Although prior research has aimed to make DASH more appealing to Black Americans by modifying southern or soul food recipes,[30] it is important to recognize that these measures may be relevant for only a segment of the Black American population due to the intrinsic diversity that exists within the population. For example, in addition to cultural factors, diet is also influenced by individual factors, such as personal knowledge, health status, income, time constraints, hunger level, and mood, as well as environmental factors, such as geographic location, food availability and accessibility, cost, and marketing.[31-33]

We observed several perceived barriers to DASH adherence that were consistent with prior qualitative studies involving Black men and women without CKD. Johnson et al.[16] and Bertoni et al.[17] assessed the feasibility of following DASH in Black individuals with low socioeconomic status residing in Baltimore, MD, and Winston

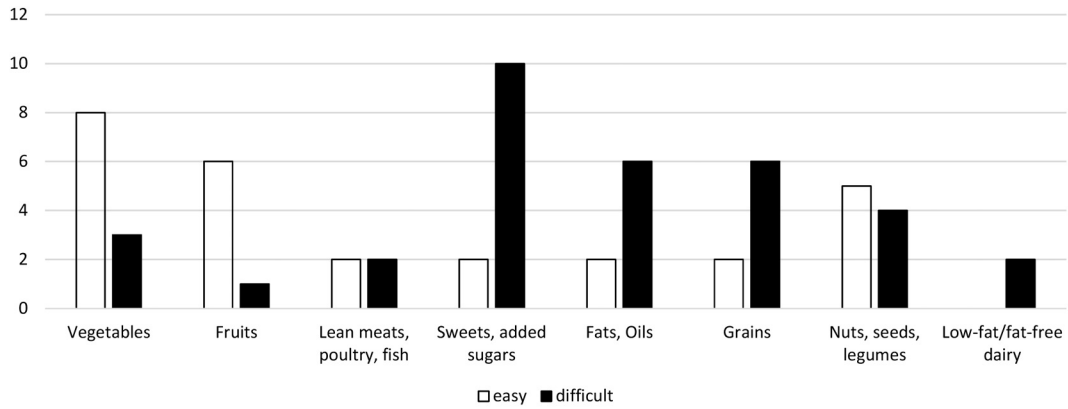

Figure 1. Rankings* by Black men and women with chronic kidney disease stages 3 and 4 of the easiest and most difficult DASH targets to achieve. *Results do not include all participants, and some participants provided less than 3 rankings per category. DASH, Dietary Approaches to Stop Hypertension diet.

Salem, NC, respectively. Barriers that we identified that were common to one or both of those studies were high costs of healthy food, concerns about food spoilage, difficulty changing diet patterns from childhood, and conflicting dietary preferences of household members. Unlike our study, their participants highlighted additional barriers, which included the ease and quick convenience of preparing unhealthy foods, an abundance and overaccessibility of unhealthy food in their local environment, and the lack of locally available and accessible high-quality healthy food. Interestingly, our participants reported that healthy food was readily accessible to them, even in the midst of the COVID-19 pandemic. This finding is unique from other studies that explored barriers to healthy eating in Black men and women and in individuals with CKD. Black race, CKD, and poverty are all factors that are associated with higher rates of food insecurity.[34–36] The fact that we did not restrict study participation to individuals with low socioeconomic status is a likely reason for the difference in our findings. Barriers that were unique to our study were difficulty controlling food cravings, poor cooking skills, not knowing where to purchase or how to cook unfamiliar healthy foods, lack of familiarity with serving sizes, and not owning cooking tools (e.g., food scale, measuring cups) to determine serving sizes.

Based on our study results, an intervention designed to increase DASH adherence in Black men and women with CKD should include cost-effective and time-efficient strategies to follow a healthy diet, emphasizing the use of food sources that are convenient and accessible in their immediate environment. For example, compared with fresh produce, canned or frozen produce tend to be less expensive, less likely to spoil before eaten, and more readily accessible in underresourced areas or at food banks. As DASH does not require fresh produce, it may be appropriate to emphasize canned or frozen goods that lack potassium and phosphorus additives as acceptable alternatives.[37] In addition, our participants perceived that they would have varying levels of difficulty achieving certain DASH food targets, which suggests that individualized coaching is necessary to help patients overcome their own personal challenges to adhering to specific DASH components. An intervention should also teach recipients how to measure serving sizes, introduce unfamiliar healthful foods/ingredients into their diet, provide cooking tips for individuals with poor cooking skills, evoke intrinsic motivation for change, and elicit the support of household members. With respect to CKD, an intervention should address kidney-related diet concerns by informing recipients about the risks of diet-related complications and how to make food choices that mitigate those risks, such as choosing foods low in potassium.

Our study has some limitations. First, we recruited a relatively small sample of participants residing in an urban area of a southern state, whose perspectives may or may not be representative of individuals living in other US regions. Second, we exclusively recruited patients via the EHR. Considering that the demographics of EHR users differ from non-EHR users,[38] our sample of participants may be more resourced (e.g., health insurance, transportation, Internet access, computer skills), empowered, and willing/motivated to change their diet. Third, a few participants reported learning about their CKD status just before enrolling in our study, which could have impacted their knowledge about CKD, diet and health behavior at the time of enrollment. Fourth, participants with CKD Stage 4 were recruited during the COVID-19 pandemic and completed individual phone interviews instead of FGD. The pandemic could have influenced their self-perceived barriers and facilitators to DASH adherence. For example, the need to socially distance could have changed the dynamics of their social support, shopping/spending habits, and food purchasing patterns. In addition, participating in individual interviews may have created a private

environment for some participants to be more candid about potentially sensitive health topics involving their diet and whether they could afford to purchase food; alternatively, some participants may have been more comfortable disclosing such information in a supportive peer environment created by FGD.[39] Lastly, our individual interviews were conducted by Black moderators, whereas our FGD was led by a White moderator. Racial discordance and a potential lack of shared identity can influence the level of communication and trust, which could influence participants' responses to interview questions.[40]

A strength of our study is that we intentionally grouped participants by CKD stage because the severity of the disease can influence prior diet advice and motivation to change health behavior. Not restricting our sample to individuals with low socioeconomic status, which has been done in prior studies that assessed barriers to DASH adherence in Black adults, is also a strength. Black Americans do not all live in underresourced areas, and eliciting opinions from higher resourced individuals provide a different perspective about challenges to DASH adherence that exist when healthy foods are more readily available and accessible. Interestingly, despite having access to healthy food, our participants shared similar concerns about food costs and challenges to changing their behavior. Although there is evidence demonstrating beneficial associations of DASH with BP,[41-43] kidney function,[3-5] and cardiovascular outcomes[9,10] in individuals with various degrees of kidney dysfunction, definitive evidence and safety data across different stages of CKD are still needed.

Our study highlights culturally relevant and disease-specific factors that should be taken into consideration when designing a diet intervention for Black individuals with CKD. Specifically, it is important to recognize the breadth of cultural diversity that exists among Black Americans. In our study alone, participants expressed how their dietary habits were influenced by their childhood upbringing, familial norms, geographic location, local customs, access to food, and the extent to which they have been exposed to foods from other cultures. In addition, there are CKD-relevant factors that should also be considered, such as reconciling the appropriateness of prior advice to restrict certain heart-healthy foods such as fruit, vegetables, whole grains, and protein and how to consume a healthy diet in the context of CKD-associated symptoms, such as nausea, early satiety, and anorexia. Although population and community-level approaches to implementing DASH have its benefits,[44] these large-scale approaches may allow individual-level needs to go unmet. To address the intracultural diversity and disease-specific concerns of Black Americans with CKD, rather than taking a one-size-fits-all approach, diet interventions should allow for tailoring to meet individual needs and preferences.

Practical Application

Black adults with CKD consume diverse diets that are influenced by several factors, including personal taste preferences, familial norms, local customs, geographic location, intrinsic and extrinsic cultural influences, and CKD-specific factors. Interventions aimed to improve adherence to DASH among Black Americans will have a broader reach and may be more effective if they center on person-level, rather than stereotypical culture-level, adaptations.

CrediT authorship contribution statement

Crystal C. Tyson: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Visualization, Supervision, Project administration, Funding acquisition. **Laura P. Svetkey:** Conceptualization, Writing – review & editing, Supervision. **Pao-Hwa Lin:** Writing – review & editing. **Isa Granados:** Investigation, Writing – review & editing. **Danielle Kennedy:** Investigation, Writing – review & editing. **Kayla T. Dunbar:** Investigation, Writing – review & editing. **Cynthia Redd:** Investigation, Writing – review & editing. **Gary Bennett:** Writing – review & editing. **L. Ebony Boulware:** Writing – review & editing. **Laura J. Fish:** Conceptualization, Methodology, Investigation, Writing – review & editing, Supervision.

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Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1053/j.jrn.2022.05.002.

References

1. Appel LJ, Moore TJ, Obarzanek E, et al. A clinical trial of the effects of dietary patterns on blood pressure. DASH Collaborative Research Group. *N Engl J Med.* 1997;336:1117-1124.

2. Rebholz CM, Crews DC, Grams ME, et al. DASH (dietary approaches to stop hypertension) diet and risk of Subsequent kidney disease. *Am J Kidney Dis.* 2016;68:853-861.

3. Banerjee T, Crews DC, Tuot DS, et al. Poor accordance to a DASH dietary pattern is associated with higher risk of ESRD among adults with moderate chronic kidney disease and hypertension. *Kidney Int.* 2019;95:1433-1442.

4. Taghavi M, Sadeghi A, Maleki V, et al. Adherence to the dietary approaches to stop hypertension-style diet is inversely associated with chronic kidney disease: a systematic review and meta-analysis of prospective cohort studies. *Nutr Res.* 2019;72:46-56.

5. Hu EA, Coresh J, Anderson CAM, et al. Adherence to healthy dietary patterns and risk of CKD Progression and all-cause Mortality: findings from the CRIC (chronic Renal Insufficiency cohort) study. *Am J Kidney Dis.* 2021;77:235-244.

6. Yuzbashian E, Asghari G, Mirmiran P, Amouzegar-Bahambari P, Azizi F. Adherence to low-sodium Dietary Approaches to Stop Hypertension-style diet may decrease the risk of incident chronic kidney disease among

high-risk patients: a secondary prevention in prospective cohort study. *Nephrol Dial Transplant*. 2018;33:1159-1168.

7. Liu Y, Kuczmarski MF, Miller ER 3rd, et al. Dietary habits and risk of kidney function decline in an urban population. *J Ren Nutr.* 2017;27:16-25.

8. Lin J, Fung TT, Hu FB, Curhan GC. Association of dietary patterns with albuminuria and kidney function decline in older white women: a subgroup analysis from the Nurses' Health Study. *Am J Kidney Dis.* 2011;57:245-254.

9. Fung TT, Chiuve SE, McCullough ML, Rexrode KM, Logroscino G, Hu FB. Adherence to a DASH-style diet and risk of coronary heart disease and stroke in women. *Arch Intern Med*. 2008;168:713-720.

10. Siervo M, Lara J, Chowdhury S, Ashor A, Oggioni C, Mathers JC. Effects of the Dietary Approach to Stop Hypertension (DASH) diet on cardiovascular risk factors: a systematic review and meta-analysis. *Br J Nutr.* 2015;113:1-15.

11. Steinberg D, Bennett GG, Svetkey L. The DASH diet, 20 Years Later. *JAMA*. 2017;317:1529-1530.

12. Appel LJ, Champagne CM, Harsha DW, et al. Effects of comprehensive lifestyle modification on blood pressure control: main results of the PREMIER clinical trial. *JAMA*. 2003;289:2083-2093.

13. Blumenthal JA, Babyak MA, Hinderliter A, et al. Effects of the DASH diet alone and in combination with exercise and weight loss on blood pressure and cardiovascular biomarkers in men and women with high blood pressure: the ENCORE study. *Arch Intern Med*. 2010;170:126-135.

14. Epstein DE, Sherwood A, Smith PJ, et al. Determinants and consequences of adherence to the dietary approaches to stop hypertension diet in African-American and white adults with high blood pressure: results from the ENCORE trial. *J Acad Nutr Diet*. 2012;112:1763-1773.

15. Hiza HA, Casavale KO, Guenther PM, Davis CA. Diet quality of Americans differs by age, sex, race/ethnicity, income, and education level. *J Acad Nutr Diet*. 2013;113:297-306.

16. Johnson AE, Boulware LE, Anderson CA, et al. Perceived barriers and facilitators of using dietary modification for CKD prevention among African Americans of low socioeconomic status: a qualitative study. *BMC Nephrol.* 2014;15:194.

17. Bertoni AG, Foy CG, Hunter JC, Quandt SA, Vitolins MZ, Whitt-Glover MC. A multilevel assessment of barriers to adoption of Dietary Approaches to Stop Hypertension (DASH) among African Americans of low socioeconomic status. *J Health Care Poor Underserved*. 2011;22:1205-1220.

18. Block JP, Scribner RA, DeSalvo KB. Fast food, race/ethnicity, and income: a geographic analysis. *Am J Prev Med*. 2004;27:211-217.

19. Morland K, Wing S, Diez Roux A. The contextual effect of the local food environment on residents' diets: the atherosclerosis risk in communities study. *Am J Public Health*. 2002;92:1761-1767.

20. Williams JH, Auslander WF, de Groot M, Robinson AD, Houston C, Haire-Joshu D. Cultural relevancy of a diabetes prevention nutrition program for African American women. *Health Promot Pract*. 2006;7:56-67.

21. Winham DM, Knoblauch ST, Heer MM, Thompson SV, Der Ananian C. African-American views of food choices and Use of traditional foods. *Am J Health Behav.* 2020;44:848-863.

22. James DC. Factors influencing food choices, dietary intake, and nutrition-related attitudes among African Americans: application of a culturally sensitive model. *Ethn Health*. 2004;9:349-367.

23. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)–a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42:377-381.

24. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19:349-357.

25. Steinberg DM, Kay MC, Svetkey LP, et al. Feasibility of a Digital health intervention to improve diet quality among women with high blood pressure: randomized controlled feasibility trial. *JMIR Mhealth Uhealth*. 2020;8:e17536.

26. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol*. 2013;13:117.

27. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3:77-101.

28. Santin F, Canella DS, Avesani CM. Food Consumption in chronic kidney disease: Association with sociodemographic and geographical Variables and Comparison with healthy individuals. *J Ren Nutr.* 2019;29:333-342.

29. Palmer SC, Hanson CS, Craig JC, et al. Dietary and fluid restrictions in CKD: a thematic synthesis of patient views from qualitative studies. *Am J Kidney Dis.* 2015;65:559-573.

30. Rankins J, Wortham J, Brown LL. Modifying soul food for the Dietary Approaches to Stop Hypertension diet (DASH) plan: implications for metabolic syndrome (DASH of Soul). *Ethn Dis.* 2007;17(3 Suppl 4):S4-7-12.

31. McGuire S. Supplemental nutrition assistance program: Examining the evidence to define benefit Adequacy. *Adv Nutr.* 2013;4:477-478.

32. Williams JD, Crockett D, Harrison RL, Thomas KD. The role of food culture and marketing activity in health disparities. *Prev Med*. 2012;55:382-386.

33. Winham DM. Culturally tailored foods and CVD prevention. *Am J Lifestyle Med*. 2009;3:64S-68S.

34. Norton JM, Moxey-Mims MM, Eggers PW, et al. Social Determinants of racial disparities in CKD. *J Am Soc Nephrol*. 2016;27:2576-2595.

35. Walker RE, Keane CR, Burke JG. Disparities and access to healthy food in the United States: a review of food deserts literature. *Health Place.* 2010;16:876-884.

36. Quinones J, Hammad Z. Social Determinants of health and chronic kidney disease. *Cureus.* 2020;12:e10266.

37. Young CM, Batch BC, Svetkey LP. Effect of socioeconomic status on food availability and cost of the Dietary Approaches to Stop Hypertension (DASH) dietary pattern. *J Clin Hypertens.* 2008;10:603-611.

38. Miller HN, Gleason KT, Juraschek SP, et al. Electronic medical record-based cohort selection and direct-to-patient, targeted recruitment: early efficacy and lessons learned. *J Am Med Inform Assoc.* 2019;26:1209-1217.

39. Guest G, Namey E, Taylor J, Eley N, McKenna K. Comparing focus groups and individual interviews: findings from a randomized study. *Int J Social Res Methodol.* 2017;20:693-708.

40. Fryer CS, Passmore SR, Maietta RC, et al. The Symbolic Value and limitations of racial concordance in Minority research Engagement. *Qual Health Res.* 2016;26:830-841.

41. Tyson CC, Barnhart H, Sapp S, Poon V, Lin PH, Svetkey LP. Ambulatory blood pressure in the dash diet trial: effects of race and albuminuria. *J Clin Hypertens.* 2018;20:308-314.

42. Tyson CC, Lin PH, Corsino L, et al. Short-term effects of the DASH diet in adults with moderate chronic kidney disease: a pilot feeding study. *Clin Kidney J.* 2016;9:592-598.

43. Tyson CC, Davenport CA, Lin PH, et al. DASH diet and blood pressure among Black Americans with and without CKD: the Jackson heart study. *Am J Hypertens.* 2019;32:975-982.

44. Baker EA, Barnidge EK, Schootman M, Sawicki M, Motton-Kershaw FL. Adaptation of a modified DASH diet to a Rural African American community Setting. *Am J Prev Med*. 2016;51:967-974.