

Women, Infants and the Food Environment: Influences on Food Security and Obesity

Final Report

Barbara A. Laraia, Ph.D., MPH, RD

Margaret Bentley, Ph.D.

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Barbara Laraia is a Research Assistant Professor of Nutrition at the University of North Carolina. Her research interests include food access among low-income and vulnerable families; influences of household food insecurity on diet, weight and health; and neighborhood economic, social and physical influences on health outcomes.

Supermarket Variation in the Eyes of Low-Income Southern Women

INTRODUCTION

Over the past decade there has been a renewed interest in neighborhood level effects on health (Sampson 2003, Diez-Roux 2001, Ross 2001). The role that the food environment, and in particular supermarkets (defined as large chain grocery stores with annual incomes in excess of \$1 million/year), plays in providing high diet quality foods to area residents has been recently studied. Although reports of eating trends showed an increase in the proportion of meals eaten away-from-home, from 17% to 27% between 1997 and 1999, families continue to purchase a majority of their food from supermarkets and grocery stores (Lin 1999). Since families who spend more of their food dollars on at-home-foods have been shown to have higher diet quality than families spending more money on away-from-home foods (i.e., food bought at restaurants), it is believed that supermarkets of today are providing a wide variety of healthy foods (Kaufman 1997, Lin 1999). Supermarkets continue to demonstrate the greatest variety of food at the lowest cost compared to restaurant food purchases (Hersey 2001).

Although the vast majority of families shop at large chain supermarkets, access, cost and quality of foods purchased at supermarkets might play a role in diet quality (Rose 2004, Dibsall 2003). The presence of grocery stores within a neighborhood has been shown to differ by race; fewer stores have been found in African-American neighborhoods, and in rural vs. urban neighborhoods (Morland 2002a, Hersey 2001). Morland (2002b) found that fruit and vegetable intake among African-Americans increased by 32% with each additional supermarket in the census tract. The distance to a supermarket, specifically a distance of greater than four miles,

was associated with low diet quality compared to a distance of two miles or less among pregnant women in North Carolina. A spatial representation of this relationship demonstrated that women who lived farther from the supermarket and who had poorer diet quality lived in the rural area of the county where the study was conducted (Laraia 2004). Recently, Rose and Richards (2004) conducted an analysis of the influence of food store access on fruit and vegetable use among US Food Stamp participants. Households greater than five miles from a food store consumed significantly less fruits than households within one mile. A supermarket access variable that took into account store shopped at, travel time, and car ownership showed that households categorized as having easy access to a supermarket consumed greater amounts of fruits and vegetables compared to those with limited access. Such associations have encouraged initiatives such as supermarket-sponsored shuttle services in low-income urban areas (Cassady 2004).

There are many factors that make it difficult to assess the hypothesis that supermarkets have an independent influence on diet quality of area residents. First, there are issues with endogeneity, or omitted variable bias, in that there may be a personal choice influencing both residence and distance to supermarket that is not being measured that might influence diet quality. If such variables could be identified they might strengthen statistical models. Second, although an independent relationship has been found between presence of supermarket and diet, the pathway by which the distance influences diet is not clearly understood. Third, the role that supermarkets play in the lives of individuals is also not understood.

One mechanism by which supermarkets might play a role is in the quality and variety of foods that are provided. Low-income families have been shown to pay more for food compared to

wealthier families (Drewnowski 2003, Kaufman 1997, Travers 1996). In the US, results of a telephone survey of over 500 people in each of 14 sites found that individuals living closer to grocery stores with healthier foods reported having healthier diets (e.g., low-fat, high-fiber) (Cheadle 1991). As one part of this investigation, researchers measured shelf space devoted to various perishable food types that differ by fat content, such as milk and meats. Supermarket inventories and audits have been one way to assess the supermarket environment, and the cost, quality and variety of foods sold. The thrifty food plan is an appropriate US tool based on national standards for a nutritious diet at a minimal cost, and is also used as the basis for food stamp allotments, that can help to guide assessment of supermarket cost, quality and variety (USDA 1999).

As part of an ongoing cohort study to investigate risk factors for postpartum weight retention, we undertook a qualitative investigation of the food and physical activity environments to understand the perceptions of postpartum women and community leaders in a three county area in central North Carolina. The purpose of this paper is to elucidate ways in which the supermarket environment might influence shopping behaviors among low-income women who participate in WIC; and to inform a supermarket survey that might identify variation in supermarket attributes.

BACKGROUND

The Pregnancy, Infection and Nutrition (PIN) Postpartum Study

Briefly, the qualitative study was inspired by the prospective cohort study of risk factors for postpartum weight retention. The PIN Postpartum study aims to identify the influences of diet,

physical activity and psychosocial characteristics of women that might influence postpartum weight retention. Women are recruited early in pregnancy at the University of North Carolina Hospitals, and are followed through pregnancy to one year postpartum. One aim is to understand the role of the food and physical activity environments on health behaviors and health outcomes of postpartum women. Data are collected on diet, food security, food assistance program participation, food coping behaviors, food shopping behaviors, and frequency of eating out. Over 1,700 women have been recruited during pregnancy. The cohort has a wide range of incomes, education levels, and racial diversity. For example, 49% have family incomes above 400%, 26% have incomes between 200% and 400% and 25% have incomes less than 200% of the income/poverty ratio. Twenty-five percent of PIN participants are enrolled in the WIC program.

During the PIN postpartum follow up a food shopping behavior survey is administered that asks women who have recently delivered about when and how often during the month they shop, what transportation they use, what influences where they shop and what they purchase, and in addition questions are asked about the places and frequency with which they eat out. To date, 355 women have been recruited and followed through the 3 month home visit.

Preliminary univariate analysis of the first 186 PIN Postpartum surveys available for data analysis showed that 98% of the women shopped at a supermarket on a regular basis, compared to small grocery store or dependence on a convenience store; 96% had access to a car, and 86% of the women were the household primary shoppers. Shopping close to home (70%) was one of the major influences on where women shop, and 57% shop once a week, 28% shop more than

once a week and 15% shop less than once a week. Supermarkets' having what the family eats (88%) and knowing where items are located (73%) were the most common supermarket characteristics that women reported to influence their shopping "a lot" (compared to some, little, or not at all). Food quality (67%), child friendliness (50%), price (43%), and helpful workers (39%) were characteristics women reported as influencing them "a lot". No matter the distance, the majority of participants shopped at a major chain supermarket at least once a week.

METHODS

Women, Infants and the Food Environment

The aims of the qualitative study were to understand the perceptions of low-income women, recruited through WIC clinics, of their food and physical activity environments. Since conventional wisdom and empirical evidence suggests that low-income families have more challenges and struggles with procuring an optimally nutritious diet balanced with physical activity, we sought to uncover specific perceptions among low-income women. We also interviewed community leaders who play a role in planning, providing and advocating for various aspects of the food environment, and who influence food policy, about their perceptions of the food and physical activity environment. This report focuses only on postpartum women's perceptions of the supermarket environment.

Overall Specific Aims

Aim 1: To conduct an ethnographic study of the food environment to identify environmental influences on shopping behaviors, dietary intake, meal patterns and physical activity among postpartum women, infant caregivers and infants.

Aim 2: To identify policies and social factors which influence food resource and recreation location, and to investigate the directionality of the food environment and dietary intake relationship.

Women were recruited within one year postpartum through Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) clinics, fliers posted at maternity and well child clinics, libraries, YMCA, and health departments, and through referrals. Focus group and individual interview participants were organized by race and BMI status. Participants were given \$20, a light meal, child care during the focus group and transportation if needed as incentives. A questionnaire on socio-demographic characteristics, food assistance program participation, the short form of the USDA food security scale, food coping behaviors, and food shopping and meals eaten away from home was completed by each participant. The purpose of the study and the voluntary nature of study participation were explained. Participants were given a fact sheet and asked again to participate before the interview. All written protocol and all study procedures were approved by the UNC School of Public Health Institutional Review Board.

Each focus group interview lasted about 90 minutes and each individual interview lasted 30-45 minutes. All interviews were audio-taped and transcribed verbatim. Transcripts were then reviewed while listening to interview audio tapes.

Analysis

The principal investigator and two research staff open coded all transcripts. Themes were generated based on the content of each passage. A codebook was created based on the a priori themes from the discussion questions and based on inductive themes that emerged from the

discussions. The codebook captures 47 themes categorized into eight headings—neighborhood social and physical characteristics, food environment, supermarket environment, physical activity environment, individual resources, individual considerations, individual physical activity issues, and perceived societal and programmatic influences. Transcripts and codes were managed in NVivo software (QRS NVivo version 2.0.161, QRS International Pty. Ltd.).

RESULTS

Study participants

Thirty-four women within one year postpartum participated in either one of six focus group discussions or ten individual interviews. A distribution of women by race and body mass was obtained (see Table 1). Only six women were identified through posted fliers. Recruiting women for the study was efficient through the WIC clinics; however, many women did not attend the scheduled focus group discussions (n=22, 56% of those who didn't participate), and an additional 44% were lost-to-follow-up and could not be contacted because their phone was disconnected, they didn't return a phone call, or moved.

Table 1: Number of postpartum women recruited and participated

	>25 BMI White	<24 BMI White	>25 BMI Black	<24 BMI Black	Total
Recruited	21	20	33	17	91
Participated	6	13	12	3	34
Active	4	2	11	1	18
Lost/No show	11	5	10	13	39

A slight change in the protocol toward the end of data collection that added screening and invitation to participate by the WIC nutritionist assisted with both recruitment and retention of study participants.

A tally of questionnaire items showed that among the 34 participants, 55% had greater than a high school education, 15% had a high school education and 30% had less than a high school education. Forty-two percent were married. The average household size was four people, range 2-10 people. Nine women (27%) responded in the affirmative to three or more of the six food security questions classifying their household as food insecure, an additional five women (15%) responded in the affirmative to one or two questions classifying their household as marginally food secure. Fourteen women (42%) answered in the affirmative to at least one of three food coping questions (e.g., using food from a food bank or borrowing money or food from family or friends). A majority of the participants (88%) were the primary household food shopper and only seven (21%) did not own or have access to a car on a regular basis. Most women (78%) reported shopping one or more times during a week, and 36% ate out between three and ten times per week.

Among the 47 themes categorized into eight headings—neighborhood social and physical characteristics, food environment, supermarket environment, physical activity environment, individual resources, individual considerations, individual physical activity issues, and perceived societal and programmatic influences, only eight themes specific to comments regarding supermarket environments are reported here—hierarchy of supermarkets, store quality, food cost, customer service, distance to supermarket, comfort, self-esteem, and convenience.

Hierarchy of Supermarkets

Participants discussed at length the differences among local supermarkets. Collectively, the passages related to these difference suggested a hierarchy in supermarkets among the seven large chain supermarkets discussed most frequently—Whole Foods, Harris Teeter, Kroger, Food Lion, Wal-Mart, Lowe's and Winn-Dixie. There are a few other supermarkets in the area, a new Target Superstore, Costco, Lowe's, Shop-N-Save, and Aldi's but they were infrequently mentioned. Several consecutive passages are presented that illustrate the overall discussion of supermarket hierarchy. At the top of the list, Whole Foods (that recently acquired Wellspring) is a growing organic, whole foods supermarket. Several women spoke of Whole Foods as having good quality foods but being very expensive. Several other women either didn't know of Whole Foods, or were curious about it but had not shopped there. The follow passage demonstrates the perception that Whole Foods has an overall appeal:

R1: I like the atmosphere. Like I've been to Wellspring once or twice, and I like the atmosphere. R2: Is that a grocery store? R1: Yeah. R2: I thought it was. R3: Use cloth bags. R2: I didn't know. R4: They have—their fruit is... R3: Fruit is a lot better. It's a lot better. R1: Yeah, you can tell a difference with their meats and their fruit and stuff. It's good. I'd go over there and just sample every day, because they have free samples, you can sample stuff and I go over there and get stuff, it's good. They're high [price], but like sometimes you catch a sale. [*African American, High BMI*]

Both Harris Teeter and Food Lion have several stores in the area. Harris Teeter is perceived as being more expensive, with slightly better quality produce and meats, and not necessarily an every week place to go. The next two passages illustrate how most women differentiate the two.

...like two days ago I went to Harris Teeter instead of Food Lion because I had a baby sitter ...it was kind of like treating myself, because Harris Teeter is a little nicer than Food Lion, and I wasn't feeling – we weren't feeling quite as poor, so it was kind of like...I was finally free from my baby, because I had a baby sitter, and so I was going to go do something fun, and going to the more expensive grocery store was what I did. [*Caucasian, Low BMI*]

I'll just focus on Harris Teeter, because that's where I spend the most time. I like it because it's...fairly reasonably priced, they have some organic produce...they have organic milk, which I've started drinking all the time. And...if we're going to eat meat, every now and then I would buy something there, although I guess I just really don't usually buy meat there, so...but they basically have what we need, you know, they have a deli... that's it, good at the basics... it's a little nicer than Food Lion. I guess that's the bottom line is that – I feel like they have a better selection and more...I have the option of buying organic stuff if I want to. And Food Lion doesn't have as nice produce.
[Caucasian , Low BMI]

Harris Teeter was consistently perceived as having better quality foods, and Food Lion was perceived as having better value for the money. Food Lion was also perceived as a better quality store overall than Winn Dixie and others in the area.

We've always been Food Lion people (laughs). We've always hit Food Lion. If it's like one or two things, we'll go to the mini mart but usually, like if we're going, actually going shopping, we'll go to Food Lion. I mean, you know, it's a little bit closer to the house than a lot of the other stores and their prices *are* better. And...we're just Food Lion type people (laughs). Everything you buy is store brand, Food Lion brand.
[Caucasian , Low BMI]

And we'd go to Food Lion. And I didn't like Winn Dixie because it was like dirty and stuff. I didn't like where it was dirty and stuff. And it was like, it would be something in the floor like you could trip and fall over. I didn't want to go there. [African American, High BMI]

Finally, Wal-Mart was mentioned often by participants as being particularly appealing because of its convenience. Women who reported shopping at Wal-Mart emphasized how much they liked shopping there.

I might go work at Wal-Mart because I stay at Wal-Mart. Everybody in Wal-Mart knows me. That's where I get everything, all my shopping, everything over there. I just love living near that store. I love my area. [African American, High BMI]

Quality and cost

When women spoke of quality and cost of foods, four aspects—meat, produce, canned goods, and deals/coupons—were referred to mostly. These four aspects together seemed to create the criteria for creating a preference of one store over another, in addition to customer service (next theme).

Yeah, I like shopping at Food Lion, but I like shopping at Food Lion because they got good quality meats and Lowe's for the cans and I go to Winn Dixie because they cook [says with emphasis on cook] crab legs there and I like crab legs and they cook them there. [*African American, Low BMI*]

...we're on one salary so I have a grocery budget. I attempt to shop within that budget...so Food Lion was the cheapest, is the cheapest grocery store of the three that are close to us. That's why I shopped there...They have cleaned it up and gotten more food selections. [*Caucasian, High BMI*]

I like clean things, especially the meat. When you purchase meat, you don't got bloody wrappings or that is so...so filled with blood that it's coming out. And mainly they do a great job [Food Lion]. There are some places I just will not buy there meat. I don't care what I have to do, if we have to have peanut butter and jelly sandwiches, I won't buy it. You don't see flies there. I've been to another store, a Wal-Mart store, and the meat be bloody and there were flies around, or it wasn't blood but there were flies around. So in my mind, the flies, it's not healthy, we'll not buy it. And whenever I go to this Food Lion here, it's always clean, it's very nice. [*African American, High BMI*]

Many other participants echoed this contrast between Food Lion and Wal-Mart, the two favored stores in the area. Food Lion was consistently perceived as a supermarket with good quality foods at low costs, good customer service and high quality meats. In other interviews the issue of poor quality meats at Wal-Mart was stated. Participants talked about the lack of a deli or meat counter in Wal-Mart that gave the appearance of an unauthentic place to buy meats. Further, with regards to Wal-Mart, participants spoke of meats covered with blue cellophane that gave the meat a funny color, many observed that the meats were bloody that made the meats unappealing or appear dirty, and they stated that it was inconvenient that no one was available to cut meats to order. Not buying meats at Wal-Mart was a consistent theme across many of the interviews.

Customer Service

Customer service was very important in terms of staff assisting and interacting with customers and in terms of creating a welcoming feeling. In several interviews the issue of customer service emerged and with regards to one store in particular, Winn Dixie, there were several dimensions of customer service that were perceived to be lacking—the store appeared understaffed, and the staff appeared idle, rude, and slow. The following passages demonstrate two contrasting store characteristics that were important to study participants—efficiency and courtesy.

...like a couple of times I went to Winn Dixie sometimes, I just couldn't stand it, because you have to stay in there so long and wait in line. I just can't stand waiting. [*African American, High BMI*]

And whenever I go to this Food Lion here, it's always clean, it's very nice. And if I have a problem, somebody will come help me. I had an opportunity to break a milk container, a gallon milk container. I was so embarrassed. And the manager came out. He was so nice. He apologized to me because he thought the milk fell on me. But he was very courteous and I like that. [*African American, High BMI*]

Distance to Supermarket

The theme distance to the supermarket came up several times but did not appear to be as important as the perception of the store having good prices and values, good quality, and good customer service. Participants did appreciate when the store they preferred was close to their home.

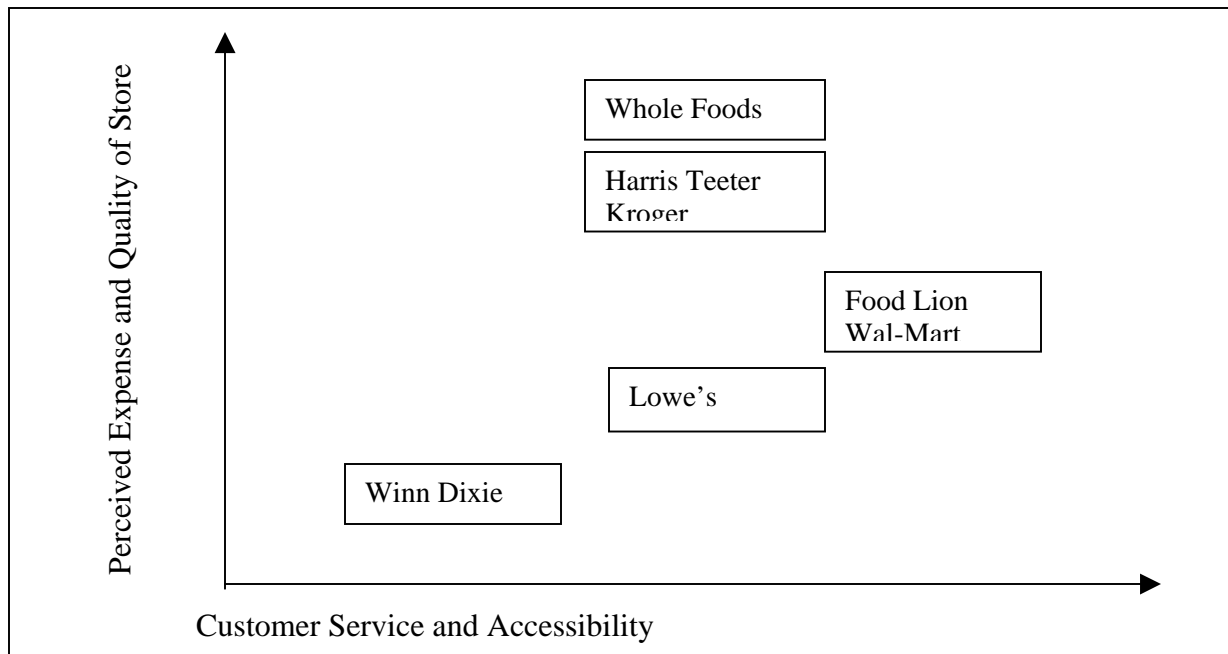
There are times I do shop at Food Lion close to my house. That's a little bit better than the Lowe's by my house. But I prefer to go maybe like to Kroger, which is nowhere near my house. Maybe Harris Teeter, which is nowhere near my house. [*African American, Low BMI*]

Overall, the seven chain supermarkets in the central NC area were not perceived equally.

Figure 2 below illustrates the expressed relationship between these dimensions for low-

income participants in this study. As articulated by low-income participants in this study, perceived food expense and quality seem to have a U-shaped relationship with customer service and accessibility.

Figure 2: Relation of perceived expense and quality of store with customer service and accessibility



Comfort level and self-esteem

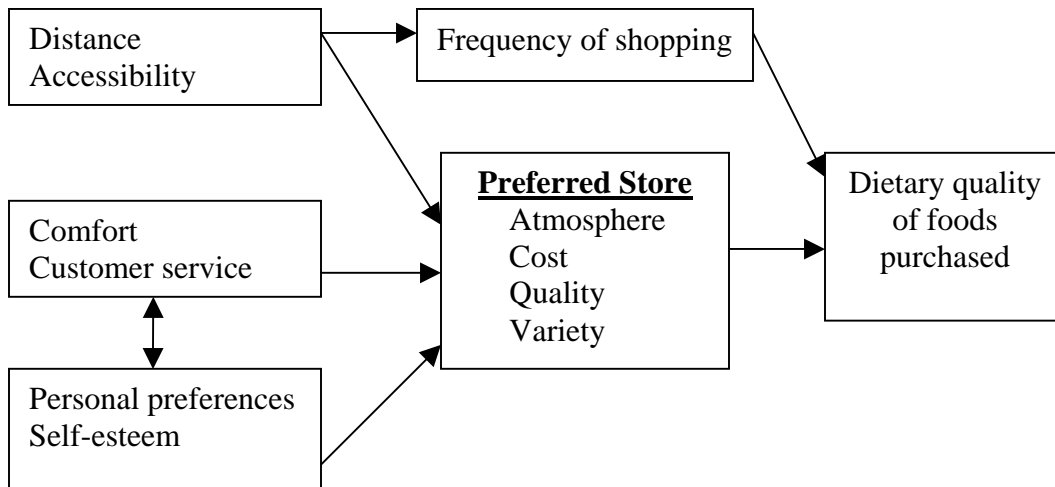
More than customer service, or as an extension of customer service, low-income women expressed how neighborhood resources, and particularly supermarkets, might influence individual comfort level with shopping in a particular store or might influence one's self-esteem. The notion of feeling welcome in a store, and that the store is an appealing place to shop where others in the community also shop, were very important to participants in this study. The following two passages try to illustrate the perception of being welcome and how neighborhood resources influence self-esteem.

Some other stores, Harris Teeter, you know, they sort of – it's not the – it's not really conducive to low income people, to me. I wasn't pleased with that store at all. So those are things that I look for, that make this Food Lion so good for me. [*High BMI, African American*]

I have a lot of self esteem issues and I think that plays into neighborhoods too. And you kind of feel like, okay, I'm a single mom, I have two kids, I can only go but so far in life, I can only get but so much out of certain things. And once I started changing my frame of mind and I felt more valuable as a person, I wanted to take more care of myself. I wanted to take more time to look into the things I ate, the time I took to exercise, what I wear, how I present myself. And I think that kind of goes into neighborhoods too. Because what you're around and what you live, that's kind of like what you are. And you may sometimes feel limited to just that, you know. And I've kind of gotten out of that... Even if you are on WIC or food stamps or whatever, you know, do you even desire to learn more about healthy eating? How do you view self image? Even though you may have gained postpartum weight, do you feel you're unattractive, or do you think that you have to be thin? You know, I think all of that is incorporated with your neighborhood and the way that you're taught in growing up. [*Low BMI, African American*]

Figure 1 illustrates how the themes thus far might relate in influencing dietary quality of foods purchased. Utilizing the supermarket related themes, a preliminary analysis of the qualitative data suggest a conceptual framework that has distance and accessibility, comfort and customer service, and personal preferences and self-esteem influencing the selection of a preferred supermarket. In addition, distance and accessibility influence the frequency of food shopping. These physical and personal attributes, along with store characteristics of atmosphere, cost, quality and variety potentially influence dietary quality of food purchased.

Figure 1: Food environment and supermarket related themes



Convenience

Finally, the concept of convenience was a constant underlying theme of food shopping frequency and was perceived to influence meal choice. All the women shop at large chain supermarkets, time and convenience was perceived to influence the use of fast food for convenient meals (opposed to planned eating out). Several participants made the observation that fast food restaurants were located in the parking area of the supermarkets. They also observed that there was an abundance of fast food restaurants in their neighborhoods. Women articulated that they perceived that everyone needs convenience options; the difference is the variety of options available to families based on wealth. The following passages suggest that although all the women shop at supermarkets, they might eat at fast food restaurants because of the convenience and proximity to supermarkets and their neighborhoods.

Well, me, I know everywhere I go, like I go to school, there's nothing but fast food restaurants, I go home, there's nothing but fast food restaurant. I can go shopping, I can buy about \$300 worth of food and I will still stop by McDonalds on my way home. (laughter) That's just how it is. Because I don't feel like cooking when I get home. [African American, High BMI]

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Once you pass a certain point, you stop seeing that stuff [fast food]. Or like in really upper class neighborhoods ...I know they don't spend their money like at Wendy's, Burger King...I know they don't stop there as often as we do...Like for us, it's right down the street so it's more convenient...They have money and they might go to like a real upscale restaurant versus going just anywhere every day of the week...They can pay somebody to come and cook their food and it's ready when they get home. [*African American, High BMI*]

DISCUSSION

This preliminary analysis of a qualitative study aimed to understand postpartum women's perception of their food environment, especially as it pertains to informing a supermarket survey, suggests that more than cost, quality and variety of foods are important in making food purchase decisions. The general atmosphere of supermarkets, specially the cleanliness and customer service, also influences where women shop. Participants in this small qualitative study articulated a strong preference for two of seven commonly mentioned supermarket chains in three central NC counties. Food Lion and Super Wal-Mart were mentioned again and again because of the perception of low-costs and good deals for high quality foods; because of convenience and accessibility to these stores; and because of women's comfort level in shopping at these stores, both in terms of customer service and knowledge of where items are located in the store. Women conveyed a vague sense of "fitting" with their preferred supermarkets. Stores that were perceived as having higher quality food were also perceived as being more expensive. The more expensive stores were places where women were not as comfortable shopping, because they didn't feel welcome or familiar with where items were located, which increased their shopping time.

Supermarkets may have an influence over what people buy and ultimately on their diet quality through access, availability of fruits and vegetables and in welcoming low-income customers. Neighborhood deprivation has been independently and significantly associated with lower intake of fruits and vegetables among adults (Shohaimi 2004). Qualitative studies have found that low-income neighborhoods with high levels of social capital have access to healthy foods through local grocery stores, ethnic grocers and community supported emergency food (Raphael 2001). Area level social capital might be an important omitted variable worth exploring and measuring when assessing the role of neighborhood food sources on diet quality and weight. Findings from the present study suggest that the characteristics of self-esteem at the individual level might confound the association of neighborhood food resources on diet and weight. Other psychosocial factors such as anxiety and discrimination might be important characteristics to measure, especially among low-income households, that have been previously omitted from models of the neighborhood food environment and diet. Travers' (1996) studied social organization of nutritional inequities and found that gender, class, and commercial pricing practices influenced low-income access to healthy food options. In the Travers' study the limited access to inexpensive stores forced families to implement innovative strategies to procure foods. For example, women in the study perceived that urban supermarkets cost more than suburban supermarkets—an observation confirmed by the investigator and participants with a small market basket survey. In another study, neighborhoods with few retail locations were underserved not because of the size of their market, but because businesses viewed low-income neighborhoods as economically unviable and unsafe places to conduct business

(Bingham 2001). In the present study, although women shopped at large chain supermarkets, they also spoke of the quality of the supermarkets being different by neighborhood wealth.

Since this is a small qualitative study it has limited generalizability. However, the purpose of the study was threefold, 1) to identify supermarkets characteristics to incorporated in a supermarket survey, 2) to develop a conceptual framework of how the food and physical activity environment might influence postpartum weight retention, and 3) inform statistical modeling of the influences of supermarkets and other retail food sources on diet, physical activity and weight retention. This study will inform and assist in tailoring a supermarket survey based on the Thrifty Food Plan for the central NC study area. The practical implications of how this study might inform a supermarket audit is to assist with devising an objective measure of the supermarket atmosphere taking into account cleanliness, customer service and overall appeal of the interior of the store.

In conclusion, supermarkets may influence shopping and dietary preferences in a variety of ways. Because most households do shop at supermarkets, and do not appear to be dependent on small grocery and convenience stores, the specific mechanisms of how supermarkets influence diet must be explored. Issues of accessibility, affordability, availability, quality, comfort, and frequency of food shopping are potential key elements that might explain how supermarkets influence diet quality and weight gain.

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