Determinants of Obesity in Two Urban Communities: Perceptions and Community-Driven Solutions

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Objective: In the search of solutions to the rising rates of obesity, community perspectives are important because they highlight areas of need and help determine the level of community support for potential interventions. This study aimed to identify community perceptions of factors associated with obesity in two urban municipalities – one racially mixed and one predominantly African American – and to explore community-driven solutions to the problem of obesity.

Methods: The study used Photovoice methodology to understand what community members perceived as obesity-promoting factors in their residential environments.

Results: A total of 96 photographs of factors relevant to obesity were discussed. Most commonly depicted were restaurants, grocery stores, fast food, and fitness centers. In 10 race-stratified focus groups, participants made 592 comments on 12 themes, the most common being restaurants, physical activity, food stores, and proposed solutions. The top three themes – restaurants, physical activity, and food stores – accounted for 58% of all barriers to healthy weight. Proposed solutions ranged from personal efforts and peer support, to educating adults and children, to community action.

Conclusion: Interventions addressing the immediate food and physical activity environment – restaurants, grocery stores, and resources for physical activity – may have high likelihood of success as they align with community needs and understanding of priorities. Health education and promotion programs that increase food-related knowledge and skills are also needed and likely to receive strong community support.
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Introduction

The global rise of obesity has reached epidemic proportions in the United States, with 17% of children and 35% of adults considered obese.[1] Obesity disproportionately affects racial/ethnic minorities and socioeconomically disadvantaged individuals. For example, 48% of African American and 43% of Hispanic/Latino adults experience obesity, compared with 33% of Whites, with rates being the highest among African American women, at 57%.[1] Obesity rates are disproportionately higher among the poor as well: adults who earn <$15,000 have obesity rates of 33%, compared with 24.6% among those who earn >$50,000.[1]

The etiology of obesity is complex and involves interaction of genetic, physiologic, economic, psychosocial, and environmental factors.[2] There is a general consensus, however, that the rapid rise of obesity cannot be attributed to human genetic changes. As such, the social, behavioral, and environmental factors that lead to obesity have become the focus of a growing number of studies.[3-6] Nevertheless, the relative contributions of specific neighborhood contexts (eg, features of the built environment, crime, civic engagement) are not fully determined.[7-9]

Place-based factors related to obesity are important for the dietary behaviors and physical activity of residents. For example, residents of neighborhoods with more supermarkets, grocery stores, and specialty stores have healthier diets,[10-12] and residents of neighborhoods that are walkable and offer safe places for exercise are more physically active.[13-14] Because disparities in obesity may be driven by where people live,[15-17] this study examined two urban communities with varying levels of racial segregation to gain insight into what residents viewed as drivers of and solutions to the problem of obesity.

In the search of solutions, community perspectives are especially important as they highlight areas of

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need, which helps determine the focus of obesity interventions. One way to elicit community perspectives is Photovoice, a participatory research method that engages community members in the research process through visual storytelling.[18] By photographing relevant features of their community, residents reflect on community strengths and challenges, exchange experiences, and learn about issues in group discussions with fellow residents. Based on Freire's Empowerment Theory[19] and its adaptation for health education,[20] Photovoice methodology emphasizes the community perspective over the views of researchers. It enables people who may lack in social status but have insight into their community to represent the reality of their lives and bring their explanations into the research process. Photovoice allows investigators entry into settings that would be out of reach for traditional data collection methods. Additionally, it allows individuals to depict not only challenges but also strengths and assets of their communities and to stimulate local action.[21] As such, Photovoice has been used successfully in health disparities research,[22,23] including studies on obesity in racial/ethnic minority communities, both African American[24-26] and Latino.[27,28]

One way to elicit community perspectives is Photovoice, a participatory research method that engages community members in the research process through visual storytelling.[18]

The purpose of our study was twofold: 1) to identify community perceptions of factors associated with obesity in two urban municipalities in Alabama, one racially mixed (African American–White) and one predominantly African American; and 2) to explore community-driven solutions to the problem of obesity.

Methods

Study Population

The study was conducted in two municipalities within the Metropolitan Statistical Area (MSA) of Birmingham, Alabama. While similar in population size (10,509 vs 12,381), age (41 vs 37 years), and education (20% with a college degree in each group), the two communities differed by race: Municipality A was racially mixed (50% African American, 46% White), while Municipality B was predominantly African American (90% African American, 9% White). Additionally, there were substantial income disparities between Municipality A and B ($43,111 vs $27,845 annual household income).

In general, obesity is a major health issue in the targeted area. Alabama, with a 32.2% rate of obesity, ranks third in US adult obesity rates. In Jefferson County, where Birmingham is located, approximately 66% of adults and 22.1% of third-graders are overweight or obese. Convenience stores are the primary food source for many, and 31% of residents report no physical activity in the past 30 days.[29]

Recruitment and Eligibility

We disseminated study flyers in stores, churches, and community centers. Potential participants completed a screening survey by telephone to determine eligibility. To enroll in the study, participants had to be at least 21 years of age, willing to use a disposable camera, and participate in three face-to-face meetings: orientation, returning of study materials, and focus group. Participants provided written consent and received a $50 gift card. The study was approved by the Institutional Review Board at the University of Alabama at Birmingham.

Data Collection

Enrolled participants attended a group orientation session at a local community venue, where they completed a survey collecting demographic data, self-reported weight and height, and information about grocery shopping and physical activity. Study staff explained the purpose of Photovoice and distributed study materials: a journal and disposable camera.

We asked participants to take 3 to 4 pictures per day for 7 days, or up to 28 pictures in total. We instructed them to photograph "things about the place where you live, work, or play that influence the weight of people in your community." We also asked them to record in their journals why they took each photo. Due to privacy concerns, we instructed participants to avoid photographing other in-

dividuals. If including a person in a photograph was necessary to convey a message, we asked participants not to capture the person's face or other identifying information. After taking the photographs, participants returned the cameras and journals at a designated drop-off site. We stored photos from each camera on a computer disc and printed one set of prints.

Study Design

The study used Photovoice and focus group discussions to understand what community members perceived as obesity-promoting factors in their residential environments and what solutions they envisioned. Focus groups were stratified by municipality and race and were moderated by trained individuals racially congruent with the focus group participants. Each session lasted about 1½ hours. At the beginning of the session, each participant received a packet containing his or her journal and the prints of all photos he or she had taken. Participants selected and ranked the top three photos they believed captured best what influences the weight of people in their community. If any of the three photos were not to be shared with the group, participants placed a "No" sticker on the back. The moderator asked six questions for each photograph, using the SHOWED mnemonic[30] widely applied in Photovoice studies: 1) What do you **S**ee here? 2) What is really **H**appening here? 3) How does this influence **O**ur weight? 4) **W**hy does this exist? 5) What can we do to **E**ducate others about it? and 6) What can we **D**o about it? Photographs were discussed in order of ranking as time allowed.

Data Analysis

Focus group discussions were recorded and transcribed verbatim. The transcriptions were analyzed in two stages. First, two coders independently read the original transcript and identified themes that were central to the discussion both within and across groups. The coders then discussed their interpretations and jointly decided upon a final coding scheme of themes. To be considered relevant, themes had to be brought up by at least 50% of participants (n=3), as done in a previous study.[31] In the second stage of the analysis, we summarized the data within and across groups. We assessed how the themes were related, and whether the comments were positive, negative, or neutral.

Results

Study Participants

The study recruited 62 participants. All took photographs and returned their cameras and logs; 59 participated in focus groups.

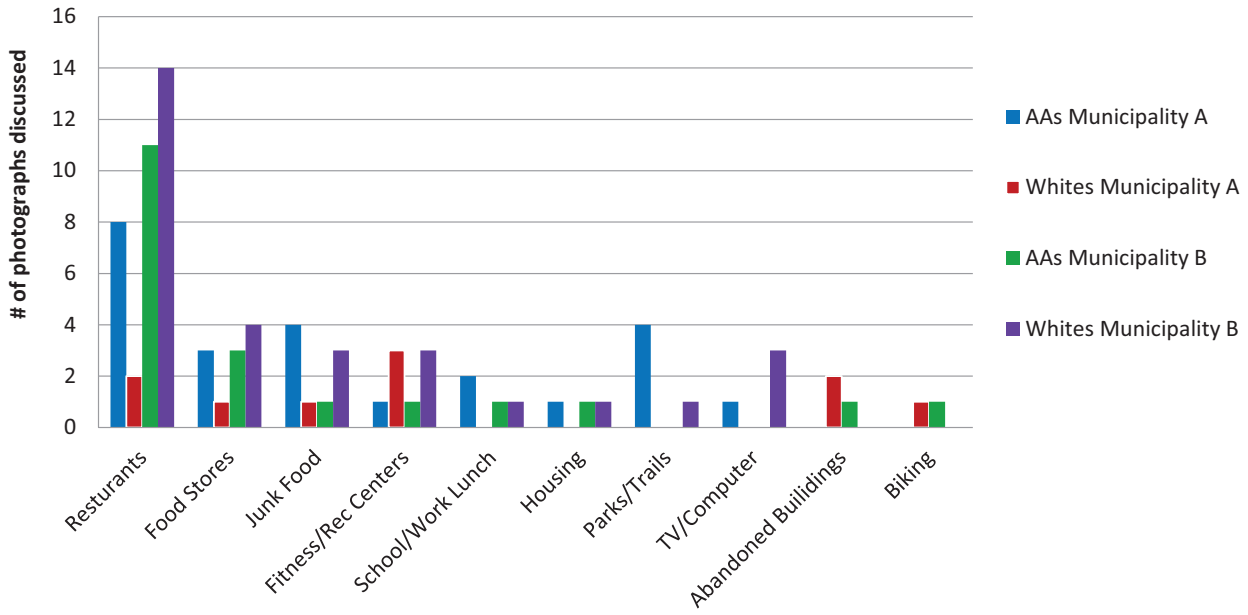

Figure 1. Obesity-related factors captured in photographs, by municipality and race

Photographs

Participants took nearly 1,600 photographs, of which 174 were selected for discussion and 96 were discussed in focus groups. Most commonly depicted themes were restaurants, grocery stores, unhealthy food, and fitness/recreation centers (Figure 1). Of the 174 photographs, 101 (58%) were related to food, including production, distribution, marketing, access, and availability. The built environment was featured in 17% of photographs, lifestyles in 8%, and neighborhood characteristics in 7% of photographs.

Focus Groups

During October and November 2010, 10 race-stratified focus groups were conducted: 6 in Municipality A (3 African American, 3 White) and 4 in Municipality B (3 African American, 1 White). Group size ranged from 5 to 7 persons. The characteristics of participants *(N*=59) are described in Table 1.

The majority of participants in both communities were female, with some distinct differences by municipality and race. In both communities, the African American participants were better educated than the White participants and exercised more frequently in the community. The prevalence of overweight and obesity was high in both communities. In Municipality A, fewer Whites than African Americans were overweight or obese; in Municipality B, the reverse was true. Whites shopped less frequently in Municipality A than African Americans did; in Municipality B, the reverse was true.

Table 1. Characteristics of focus group participants, by municipality and race, N=59

Variable	Municipality A		Municipality B	
	AA, n=17	White, n=18	AA, n=17	White, n=7
Female, %	70.6	66.7	76.5	71.4
Age, mean (SD)	48.8 (11.7)	53.3 (18.3)	55.2 (11.3)	56.9 (24.5)
Marital status, %				
Single	23.5	16.7	23.5	28.6
Married	41.2	55.6	47.1	28.6
Separated/divorced	35.3	22.2	23.5	14.2
Widowed	0.0	5.6	5.9	28.6
Education, %				
< High school	0.0	11.1	5.9	14.3
High school degree	47.1	83.3	41.1	57.1
College degree	47.1	0.0	29.4	28.6
Graduate/professional degree	5.9	5.6	23.5	0.0
BMI, %				
Normal weight	6.0	28.6	23.5	16.7
Overweight	29.0	42.8	17.6	16.7
Obese	65.0	28.6	58.9	66.6
Buys groceries in municipality	94.1	83.3	76.5	100.0
Exercises in municipality	70.6	66.7	88.2	71.4

Themes and Sub-Themes

When discussing the photographs, participants made 592 comments on 12 themes. The most common themes included restaurants, physical activity, food stores, and proposed solutions. Sub-themes under the restaurant theme included convenience, low price, enticement, and high prevalence of fast food and lack of healthy restaurant options. Sub-themes under physical activity included indoor and outdoor facilities and walking trails. Sub-themes under the food stores theme included low price, convenience, and marketing of unhealthy food.

Barriers to Healthy Weight

The top three themes – restaurants, physical activity, and food stores – accounted for 58% of all barriers to healthy weight. A detailed listing of all barriers, along with quotes, is provided in Table 2. Figure 2 is a photograph that illustrates one barrier, the abundance of fast food restaurants.

Proposed Solutions for Healthy Weight

Proposed solutions included individual behavioral changes, peer support, modeling healthy habits at home, teaching healthy habits at school and church, communicating with store management, voicing concerns with government representatives, and community development, among others. A detailed listing of solutions, along with quotes, is presented in Table 3. Figure 3 is a photograph that illustrates one solution, growing own food.

Theme Differences by Municipality

Focus groups in Municipality A identified the following bar-

Table 2. Barriers to healthy weight

Theme	Subtheme	Quote
Restaurants	Fast food cheap	It's cheap at $5 a pizza, and you can feed a crowd for $25.
	Fast food convenient	They have a Drive Thru and you don't even have to get out of the car.
	Fast food enticing	They are hot and ready now.
	Many fast food places	We call that section of Highway 78 'fast food row'.
	No healthy restaurants	Don't have any good restaurants out here. Fast food is all we have out here.
	Overeating at buffets	It's one price, and it's very reasonable… $5 at lunch… I eat more at a buffet.
	Large portions	That's how they make their money… Super Size Me. Everything is up-sized.
Physical activity	Lack of opportunities	I don't have sidewalks in my community; If they had a walking track…
	Gym expensive	Everybody can't afford a gym membership.
	Outdoor exercise unsafe	The unsavory people in the neighborhood… makes me stay in the house a lot; At night none of the walking tracks are lit up; People allow their dogs to run.
Food stores	Lack of quality stores	Don't have any shopping here…
	Wal-Mart monopoly	Wal-Mart ruined this neighborhood… killed this neighborhood.
	Limited healthy food	I went grocery shopping Sunday ….there was really nothing healthy.
	Unhealthy food cheap	You can buy $5 worth of potato chips and it will last you a few days.
	Healthy food expensive	If it's good for you, it's going to cost a lot more than the stuff that's not good for you; You can take $1.25 into a grocery store…you can't buy even an apple…
Economic development	No incentives	Who wants to come to this area and put a business in…?
	No community support	Community don't support them really.
	People moving away	People that have moved away because of the drugs and the violence…
Psychologic factors	Stressful life	We're not even willing to drive back 20 minutes to participate in something…
	Eating as coping	Food is a comfort thing; It's an emotional thing… ice cream makes everything better
	Food as addiction	I cut it out and I have had a headache for about four days…I'm a sugar-holic.
	Negative role models	Teach them the pyramid… get home, the pyramid is not there; No one ever sits down together to eat anymore.
Knowledge, attitudes	Lack of knowledge	We don't know how to cook… We've lost those skills… We've lost the ability to think.
	Using food as reward	Good in school, take them for ice cream; Don't pitch a fit in Wal-Mart, get a Happy Meal on the way home.
Technology	TV, Internet, videogames	We spend too much time sitting and watching television…; Other version of TV sets now is the Internet; One thing is videogames… stuck on videogames.
Built environment	Title/cash-loan venues	It's depressing… all we have is title loans, cars, fast food and nothing constructive.
	Abandoned buildings	Lived here all of my life in this general 10 mile area… just disgusting.
Marketing	Food commercials	Keep seeing something over and over again, it comes to mind like this is what we are supposed to do; They send all these ads and fast-food coupons.
	Store displays	They make it enticing and it's the first thing you see; They make them very colorful, very appealing; They exploit our weaknesses…
Financial resources	Poverty	You're broke. You've got to from payday to payday.
	Cost of living	So you want to eat after you finish trying to borrow money at 200% on $50.
	Food too expensive	You're supposed to eat…six fruits a day…can't afford to do that.…
Crime	Crime, gangs, drugs	You've got three gangs within four blocks of where I live; People… have moved away because of the drugs and the violence.
No time	Busy schedules	We're always in a hurry… We're in a microwave world; There's not enough time in the day to do your job, take care of the kids, and feed them a good meal.

riers to healthy weight: restaurants (limited choice, enticement, lack of informational signage), no exercise facilities, limited quality food stores, limited economic development, negative marketing, and title/cash loan venues. Municipality B groups focused on unhealthy food choices, financial resources, and no positive role models as main barriers. As for solutions, Municipality A participants proposed educating parents and voicing concerns with government representatives. Municipality B participants favored

Figure 2. Barriers to healthy weight: Restaurants
"Where's a sit-down restaurant where you can get good vegetables? Everything here is greasy, fast food, high carb, all of that. […] there was a McDonald's, a Burger King, a Wendy's […] right across the street from each other and that's temptation for me. So for a person that works all day, by the time you get home, even though you got in your mind what you want to cook, by the time you ride down the road and there's four fast-food restaurants, it's easy for me to pull over and pick up something to take to my family, versus going home and cooking."

Figure 3. Proposed solutions: Growing own food
"This is a picture of the local hardware and the garden center. They have young seedlings, plants, vegetables, herbs, and spices. I like to eat and I like my food to taste good. I like a lot of fresh vegetables and that, to me, was an inspiration to start my own garden. […] You can eat it as often as it's there; you don't have to go out to get it. […] I think it will make a big difference."

communicating with store management for healthier food options.

Theme Differences by Race

African American participants emphasized individual effort and personal responsibility (*"…since last Sunday two years ago, I've lost 48 lbs; it's a personal thing for me" "It depends on the individual…If we make the wrong choices…it can be a disaster… make the right choices…we could wind up with success"*). White participants focused on neighborhood safety as barrier to healthy weight (*"Before… I'd walk around Western Hills Mall… Now I do not feel safe… one, because of the traffic, and two… crime"*).

Discussion

The study identified determinants of obesity in two urban municipalities – one racially mixed, the other predominantly African American – according to perceptions of community residents. The Photovoice methodology enabled community members to show, through pictures and stories, what it is like to maintain a healthy weight in their community and provided insight into what they considered obesity-promoting and obesity-preventing factors. This approach allowed us to compare the residents' qualitative assessment with the quantitative perspectives of researchers who have associated obesity with neighborhood features such as walkability and proximity to grocery stores. The study also adds to the field by providing a head-to-head comparison of community perceptions about obesity factors in two

Table 3. Solutions to healthy weight

Solution	Quote
Individual changes through personal effort	Don't look at the TV much…get up and exercise more. Don't eat at buffets. Order one meal and split it…always make sure it has lettuce and tomatoes and more nutritional things on it…chicken instead of greasy beef. We have changed…We're now eating a healthier, more balanced meal at home, except for one day a week, which is our chaos day.
Peer support for healthy eating and physical exercise	Get co-workers and yourself to bring better food choices. If I had someone…to come over and help me, show me how to really get things going… Find somebody else that's interested in exercising… get people together and walk in a group.
Growing own food	I think a lot of people are getting the hint… it's cheaper to grow it…natural, organic.
Educating parents	Needs to be education when the mothers are pregnant… on how to raise a child food-wise. It could be something for mothers, a parenting group. You could have them at churches or different places in the community.
Modeling healthy habits at home	Schooling begins at home.
Teaching healthy habits at school and church	So education is the key, and starting early. If they really taught education in our schools… how to eat correctly If we could start in our churches at some of the church meetings and explaining the importance of healthy eating and give them some examples of the types of foods that are good for children as well as for the seniors.
Teaching cooking skills	Have cooking demonstrations to who this is healthy eating.
Informing residents about resources and opportunities in the community	Most people don't know the kinds of activities that are offered… with publicity they could learn of the kinds of activities offered… think about swimming pools that could be used year round If some of us who come here would share with others what's going on and how valuable… that could draw more people …word of mouth, person to person… churches in the community... schools… Wal-Mart and other stores… athletic events… maybe flyers could be passed out.
Having healthy outdoor events	Have music in the park. We have a teenage jazz group… will empower the city more…This is a way to get our kids started early and involved with culture…involved with older people. We can have some of the health fairs.
Opening farmers market	I would like to see…a farmer's market on this side of town…a farmer's market on Saturdays, just like other communities. Local farms, there are a lot of people got farms in the area… bring out little tables.
Communicating with store management	Talk to people at Wal-Mart to say we need fresher fruit for people to eat healthier. We're going to have to… have a change of attitude about our store… contact management and let them know what we want. We should get together…going down and telling them we want more fresh vegetables.
Voicing concerns with local, county, and state government and representatives	Go to City Council meetings, attend meetings and let your desires be known. It should be taken to our council to let them know that Wal-Mart has no competition… Our city planners need to listen to us and see what the problem is here and respond by making it attractive that other groceries will want to come to our city and stay. We just need to go to Montgomery and sit on the steps.
Community development	[Community B] does not have a resource center… I'm in the process of getting a grant written so that we can develop a resource center here. We need a huge civic center. There needs to be a walking trail. You build community development…by offering something that makes your community positive… getting our streets cleaned. Reducing the amount of crime.

demographically distinct municipalities. It illustrates differences in community needs and assets based on the community's demographic makeup.

In images and discussions, restaurants, food stores, and access to physical activity emerged as major influences of weight. Participants took photos that depicted an environment with limited access to healthy food, and in discussions expressed frustration with the lack of polices to address this

problem. Their observations are consistent with data showing that 39% of Birmingham's population lives in Census tracts designated as food deserts.[32] Second, participants identified the proliferation of fast-food establishments as a major obesity-promoting factor. Again, their perceptions are consistent with data showing that access to fast-food restaurants in Birmingham is 36% higher than the national average.[33] Further, the presence of fast-food restaurants has shown to create an increased risk for obesity at the community level.[12,34-36] Finally, the lack of quality grocery stores, highlighted as another contributor to overweight and obesity, is consistent with data showing lower number of grocery stores per 100,000 population in Birmingham compared with the national average.[37]

Some participants believed that healthy food in grocery stores was more expensive than unhealthy food. These concerns were especially prevalent in the African American community; White participants, regardless of residence, were split on this topic. Previous studies in the Birmingham, Alabama area did not support such pricing concerns and found that obesity is not related to the price of fruits and vegetables.[38,39] Such inaccurate perceptions are important because they highlight an opportunity to increase the consumption of healthy food by educating community residents about the availability of reasonably priced healthy alternatives.

Negative marketing was brought up as a barrier to healthy weight, consistent with previous evidence about disproportionate promotion of calorie-dense, low-nutrient foods in poorer[40] or predominantly African American neighborhoods regardless of income.[41] The solutions proposed by participants included voicing concerns with government representatives, communicating preferences with businesses and store managers, and conducting school and church education initiatives.

Lack of access to opportunities for physical activity was another identified driver of obesity. These perceptions align with previous work, which shows that community resources are an important determinant of physical activity.[42] Prior evidence suggests that built environment that does not lend itself to daily physical activity as a part of life is a major contributor to obesity.[43] Conventional zoning that promotes sprawl and requires the use of motorized vehicles, exacerbated by the lack of public transportation options, has been identified as a prominent health issue.[44] As participants noted, walking to work or school was not a viable option, and often was a safety hazard, especially in high-traffic environments.

Safety and security were main concerns in discussions about outdoor physical activity. A positive correlation between neighborhood living conditions and physical activity has been reported for populations of various ages and races/ethnicities,[45,46] and perceptions of neighborhood safety have been associated with physical activity in the neighborhood.[47] The safety concerns of residents in our study highlight an opportunity to increase the use of existing community resources, such as parks and trails, simply by ensuring that they are safe, secure, well lit, and properly maintained.

Finally, photos depicted neighborhood decline evidenced by abandoned properties, dilapidated houses, and vacant storefronts. Discussions pointed to economic conditions, specifically to the lack of economic development, as factors influencing weight. Such perceptions again are supported by previous evidence, which goes even further to suggest that economic deprivation on the neighborhood level explains a considerable part of the racial/ethnic disparities in overweight and obesity in the United States.[48,49]

Notably, participants were not able to offer solutions for barriers rooted in their social and economic environment, such as stagnant economic development, limited access to resources, widespread crime, proliferation of technology, and lack of time. The factors that community members identified as actionable were those they perceived as immediate influencers of weight – restaurants, retail food/grocery stores, and physical activity – along with knowledge, attitudes, and beliefs. These areas, therefore, may be ripe for interventions that target proximate causes for overweight and obesity in urban communities.

Limitations

In the predominantly African American municipality, only one focus group with White residents was conducted, resulting in fewer comments. This may have skewed the comparison between focus groups and communities. Second, the number of photographs discussed in each group ranged from 6 to 12, and the difference may have influenced the findings. Additionally,

photographs did not capture some themes, such as psychological factors and lack of time, which emerged as important during discussions.

Conclusion

Our study used a community-engaged approach, Photovoice, to elicit community perspectives about factors that influence weight in two urban municipalities. Study findings suggest that interventions addressing the immediate food and physical activity environment – restaurants, grocery stores, and resources for physical activity – align with community needs and understanding of priorities and may have high likelihood of success. Health education and promotion programs that increase food-related knowledge and skills are also likely to receive strong community support.

Study results can be used to inform public health interventions that address community-level barriers to healthy weight in urban communities. Potential target areas identified by this study include: 1) Limiting the number of fast-food restaurants concentrated in residential communities; 2) Improving access to safe spaces for physical activity by repairing or installing sidewalks, walking trails, and street lighting; providing adequate law enforcement; and collaborating with local churches, schools, and businesses to use their facilities for recreation and exercise; 3) Stimulating community development to prevent population decline, addresses crime and safety, invest in community resources, and offer incentives to new businesses, food stores, and restaurants; and 4) Introducing health education programs in schools, churches, and community centers to increase food-related knowledge and food-growing and cooking skills.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Baskin, Fouad, Scarinci; Acquisition of data: Phillips, Scarinci; Data analysis and interpretation: Oates, Phillips, Bateman, Baskin, Fouad, Scarinci; Manuscript draft: Oates, Bateman, Baskin, Scarinci; Acquisition of funding: Oates, Fouad, Scarinci; Administrative: Oates, Phillips, Bateman, Baskin, Scarinci; Supervision: Fouad, Scarinci

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