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Nutrition interventions addressing structural racism: a scoping review

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Abstract

African Americans experience high rates of obesity and food insecurity in part due to structural racism, or overlapping discriminatory systems and practices in housing, education, employment, health care and other settings. Nutrition education and nutrition-focused policy, systems and environmental changes may be able to address structural racism in the food environment. This scoping review aimed to summarise the available literature regarding nutrition interventions for African Americans that address structural racism in the food environment and compare them with the 'Getting to Equity in Obesity Prevention' framework of suggested interventions. An electronic literature search was conducted with the assistance of a research librarian encompassing six databases: MEDLINE, PyscINFO, Agricola, ERIC, SocINDEX and ProQuest Dissertations & Theses. A total of thirty sources were identified detailing interventions addressing structural barriers to healthy eating. The majority of nutrition interventions addressing structural racism consisted of policy, systems and/or environmental changes in combination with nutrition education, strategies focused on proximal causes of racial health disparities. Only two articles each targeted the 'reduce deterrents' and 'improve social and economic resources' aspects of the framework, interventions which may be better suited to addressing structural racism in the food environment. Because African Americans experience high rates of obesity and food insecurity and encounter structural barriers to healthy eating in the food environment, researchers and public health professionals should address this gap in the literature.

Keywords: **Structural racism: Health equity: Nutrition education: African American health**

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Introduction

African Americans have higher rates of obesity, food insecurity and poverty compared with white residents of the United States.[1–3] Public health professionals and nutrition educators have acknowledged the need to address institutional factors and structural racism that contribute to biases toward and health inequities among Americans of colour, although prior research related to racism has largely examined interpersonal discrimination.[4,5] One common definition of structural racism is 'the totality of ways in which societies foster discrimination, via mutually reinforcing [inequitable] systems like in housing, education, employment, earnings, benefits, credit, media, health care, and criminal justice, that in turn reinforce discriminatory beliefs, values, and distribution of resources.'[6] The disproportionate impact of the coronavirus disease 2019 (COVID-19) pandemic on both the health and economic livelihood of Americans of colour has brought renewed attention to the influence of structural racism on health.[7,8] These overlapping systems of discrimination have contributed to the difference in food insecurity rates between African Americans and white residents of the United States and restricted African Americans' ability to make healthful food choices.[9,10]

Nutrition education has the potential to alleviate some of these stresses, when paired with macro-system changes. Such education may provide African American participants with knowledge to help overcome barriers imposed by structural racism. For example, a recent review of participation outcomes in the SNAP-Ed programme found a beneficial effect on food insecurity, which is disproportionately experienced by African Americans compared with white Americans.[11] However, nutrition education alone is not enough to change behaviour in the face of institutional barriers to healthy eating.[12] Several studies have identified an increased density of fast food restaurants, areas termed 'food swamps', in majority African American neighbourhoods,[13–15] a contributing factor to racial disparities in obesity rates.[16,17] Nutrition educators and public health professionals must therefore also encourage broader policy, systems and environmental (PSE) changes to address and work towards dismantling these barriers. These PSE change interventions promote healthy eating and increased physical activity according to the social-ecological model of behaviour change,

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acknowledging influences on health behaviours beyond individual-level knowledge and motivation.[18] These types of changes, especially when paired with education, could play an important role in addressing barriers to healthful eating imposed on African Americans.

A framework titled the 'Equity-Oriented Obesity Prevention Framework' provides a basis from which to address structural barriers faced by marginalised populations through nutrition education and nutrition-focused PSE changes.[19] The framework uses a health equity lens and acknowledges influences beyond the primary pathway to obesity, including four groups of interventions to address obesity in marginalised populations: Increase Healthy Options, Reduce Deterrents, Improve Social and Economic Resources, and Build on Community Capacity. Interventions to increase healthy options include improving locations and marketing practices of supermarkets and improving standards for food provision in schools and worksites. Reducing deterrents to health behaviours could include decreasing targeted marketing of unhealthy foods and making unhealthy foods less affordable. The framework describes interventions to improve social and economic resources as strategies to increase food purchasing power, such as the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).[19] Finally, interventions described as building on community capacity include increasing community members' voice in decision-making and increasing awareness of and demand for more healthful food through educational efforts to increase food and nutrition literacy and promote behaviour change. Despite the potential applications of this framework and its proposed interventions to address structural racism through nutrition-focused PSE changes and nutrition education, little published literature has directly related the framework to nutrition education or nutrition-focused PSE change interventions targeted to African Americans.

Additionally, there is also a lack of literature reviews which have examined interventions addressing the impacts of structural racism in the food environment among African Americans. Previous reviews have examined nutrition education and weight loss interventions tailored to African American populations,[20–23] but these reviews have focused only on educational interventions alone, rather than interventions addressing structural barriers to healthy eating. Another review examined the built environment and its association with health behaviours among African Americans, but did not review interventions to improve it.[24]

The primary aim of this scoping review is therefore to summarise the available literature and identify gaps in the knowledge base regarding nutrition education and PSE interventions designed for African Americans to address structural barriers to healthful eating patterns.

Methods

This review proceeded according to guidance for scoping reviews provided by the Joanna Briggs Institute.[25] Findings are reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist for scoping reviews (PRISMA-ScR).[26] The protocol was registered *a priori* at Open Science Framework (osf.io/taj5c/).[27] The scoping review was guided by this research question: What nutrition education or nutrition-focused PSE change interventions have been conducted in an attempt to address structural racism faced by African Americans?

Search strategy

This scoping review began with an exploratory search of EBSCOhost's Agricola, ERIC, SocINDEX and Psychinfo to ensure no scoping or systematic reviews had been published on this topic. Following our initial exploration, we developed our search strategy in partnership with a research librarian (R.L.M.). The review protocol was registered 31 October 2020 at Open Science Framework, and the search was performed in November 2020. Searches were repeated in May 2021 to identify any additional sources published since the November 2020 search. The EBSCOhost Medline database was added to the planned search strategy following the initial search and consultation with R.L.M. The inclusion of databases from diverse subject areas reflects the complexity and interdisciplinary nature of this investigation. On 8 August 2020, following the initial search, we developed an exhaustive search strategy for the terms which were used in the scoping review protocol. The search terms were also translated into the appropriate subject terms used in the four different peer-reviewed literature databases, Agricola, ERIC, SocINDEX, Psychinfo and Medline. An example of the search for each question is available in Fig. 1.

The review of grey literature consisted of a search of the ProQuest Dissertations & Theses database, websites and online resources pertaining to nutrition education provided the Cooperative Extension Service, such as the Association of Family and Consumer Science agents (neafcs.org) and the Regional Nutrition Education and Obesity Prevention Centers of Excellence (psechange.org) using the same inclusion and exclusion criteria. Separate search terms were used for the grey literature search to narrow results to those most relevant to the inclusion criteria (Fig. 1). The reference lists of identified reports and articles were searched for additional sources, and the reference lists of additional articles identified in this manner were also searched for additional sources.

Eligibility criteria

Our research question and inclusion criteria were guided by the PCC (population, concept, context) mnemonic recommended by the JBI Reviewer's Manual for Scoping Reviews.[25] Studies were included only if the populations were majority (>50 %) African American and conducted in the context of the United States in the English language. This investigation is focused exclusively on African Americans in the United States because of their unique historical experience of enslavement, Jim Crow discrimination and the current discriminatory effects of ostensibly colour-blind policies in the food environment in the United States.[4] We included studies conducted both with adults and with children to identify as many as articles

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Research Question
What nutrition education or nutrition-focused public health interventions have been conducted in an attempt to address structural racism faced by African Americans?

Example Search Terms Used for Medline
"nutrition education" or "nutrition intervention" or SNAP-Ed or EFNEP or "food environment" or "nutrition environment" or "food policy" or "food sovereignty" or "food justice" or "nutrition policy" or "food system" OR "community nutritional resource" or "food services" (TX ALL TEXT)
AND
"Anti-raci*" or raci* or "structural racism" or "social justice" or "community based participatory" or "community driven" or equity or equality or inequality or inequalities or inequity or inequities or disparity or disparities or "social determinants of health" OR "health status disparities" OR "health equity" OR "health inequalit*" OR "health disparit*" OR "determinants of health" or "Cultural Competency" (TX ALL TEXT)
AND
Black or Blacks or "African American" or "African Americans" (TX ALL TEXT)

Example Search Terms used for Gray Literature Search in ProQuest Theses & Dissertations
ab("nutrition education" OR "nutrition policy" OR "nutrition environment" OR "food environment" OR "food system")
AND ("racism" OR "structural racism" OR "social justice" OR "equity")
AND ("black" OR "blacks" OR "african american" OR "african americans")
Restricted to full text, after 1991.

Fig. 1. Search strategies for the scoping review of nutrition interventions addressing structural racism among African Americans.

as possible. The concept portion of our research question aimed to include publications detailing nutrition-focused interventions conducted specifically to the benefit of African Americans, including nutrition education and nutrition-focused PSE changes.

Only studies published between 1991 and the search date were included. This date was selected based on the 1991 'Pathway to Diversity' document released by the Extension Committee on Organization and Policy (ECOP) which focused Cooperative Extension Service efforts on increasing diversity in staff and including more minority audiences in educational programming.[28] The Cooperative Extension Service operates through Land Grant Universities in the United States and implements federally funded nutrition education programmes such as SNAP-Ed. This document signalled a shift in the delivery of services by an organisation with a large reach which implements nutrition education and PSE interventions.

Data extraction and evidence mapping

Searches were conducted according to the strategy outlined above. The grey literature search was conducted by the first author (M.G.). All search results were exported to Zotero software and saved. Duplicates were removed, and the results were then exported to Excel (Office 365, v16·0; Microsoft Inc. Redmond, Washington). M.G. and D.H independently reviewed titles and abstracts, then independently reviewed articles for inclusion. Any disagreement regarding which articles to include was resolved through consensus or a third reviewer (B.H.) if needed.

Standardised data extraction tools were designed by M.G. using Excel to address the relevant data for each research question. Descriptive information extracted from all articles included authors, publication year, study design, study objectives, setting, population and an intervention description. Additional information extracted from articles included how the intervention addressed structural barriers to healthy eating among African Americans, evaluation design and evaluation results. Intervention descriptions from all articles were compared with constructs of the Equity-Oriented Obesity Prevention Framework proposed by Kumanyika to determine which constructs were targeted.[19]

M.G. extracted data from all articles and distributed an equal number of articles selected for inclusion to B.H., D.B., M.D. and C.S. for data extraction, such that data were extracted from all articles by the first author and one co-author. Any disagreement in data extraction was resolved through consensus, and by a third reviewer (D.H.) if necessary.

Results

The literature search resulted in 1513 title and abstract records pertaining to our review question (Fig. 2). Titles and abstracts were largely excluded from full text review because they were not conducted in the United States, were not conducted in a majority African American population or described an observational study in which authors did not conduct an intervention. Of the 101 full-text articles screened, 30 articles met the inclusion criteria.[29–47,47–58] Of the full-text articles that were excluded, the majority (54 %) were rejected because the interventions studied did not directly address structural or institutional barriers to healthy eating in African Americans' food environments. Following our initial search which resulted in twenty-four articles, an additional five articles were identified through searching of reference lists,[53–57] and one additional article was identified in the repeated search in May 2021.[58] The article included in the repeated search was published in May 2020 and detailed a meal delivery programme designed to supplement WIC among African American mothers in Michigan.[58]

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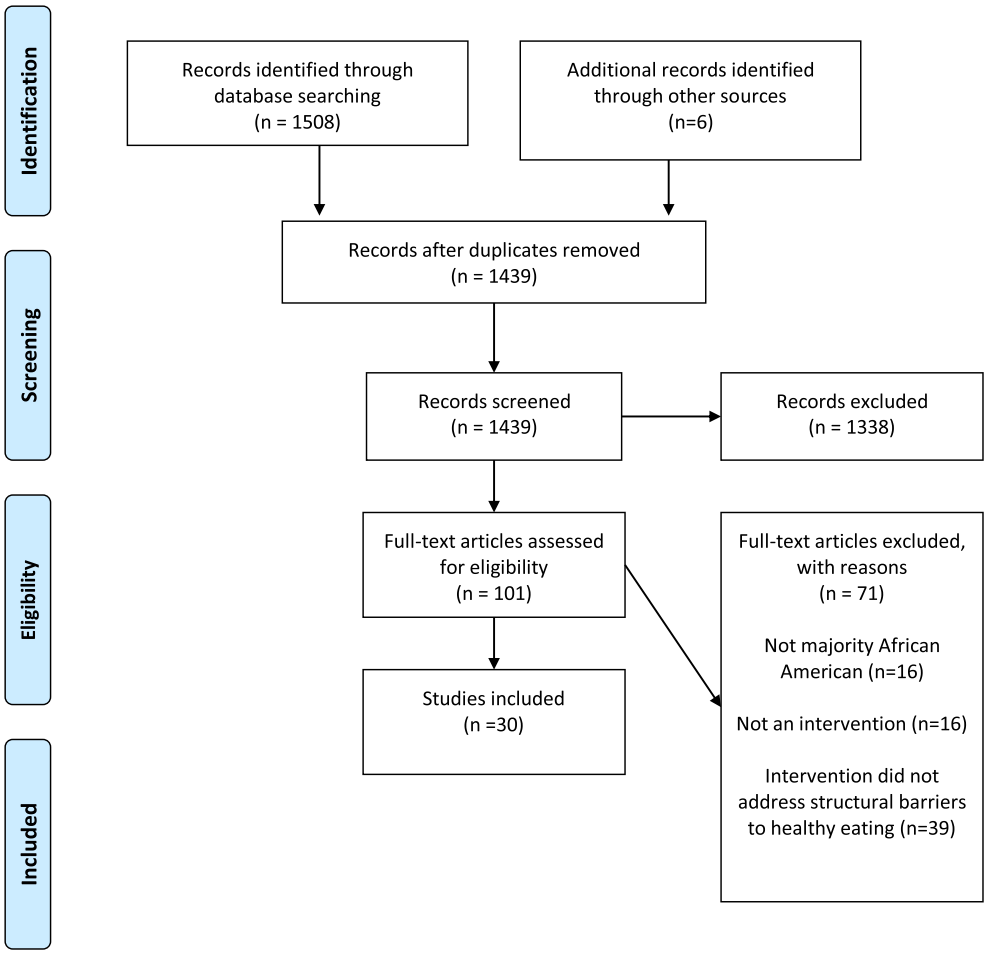


Fig. 2. PRISMA 2009 flow diagram.

Of the thirty articles which met our inclusion criteria (Table 1), most were conducted in urban settings ($n = 21$, 70 %), and a small number were conducted in rural settings ($n = 5$, 17 %) or conducted interventions that covered both settings or were not classified as rural or urban ($n = 4$, 13 %). The majority of included studies were conducted to benefit adults ($n = 18$, 60 %), and a smaller number benefitted children ($n = 6$, 20 %) or both adults and children ($n = 6$, 20 %). Nearly all sources included in the review ($n = 28$, 93 %) were peer-reviewed journal articles, though a small number ($n = 2$, 7 %) were doctoral dissertations or master's theses. No results from the search of web pages met the inclusion criteria.

Many interventions described in the included studies consisted of nutrition education in combination with a PSE intervention ($n = 12$, 40 %) (Table 2). For example, Trude *et al.* led two studies (2018 and 2019) which evaluated the effect of a multicomponent intervention to increase access to and promotion of healthier foods in corner stores in African American neighbourhoods which also included nutrition education.[29,44] Campbell (1999), Allicock (2012), Baruth (2013) and Wang (2013) implemented church-based interventions which provided nutrition education and also changed church environments to support healthy eating.[37–39,51] Other articles described combined environmental and systems interventions ($n = 7$, 23 %), such as changes to stocking habits and the retail environment in corner stores,[30] or the addition of a community garden at a medical clinic which also provided produce to patients and local community members.[49] Articles including environmental interventions alone ($n = 4$, 13 %) included diverse strategies, such as the placement of new grocery stores, community gardens and calorie information in retail settings.[40] Three studies (10 %) consisted of direct education alone, which empowered and taught African Americans to advocate for healthy options in their community,[48,55] or taught participants about racially targeted junk food advertisements.[41] Two studies which examined policy interventions alone (7 %) focused on changes to WIC package revisions and how they affected availability of healthy food in stores.[31,46] One study (3 %) examined a combined policy and system intervention to provide Farmers' Market Nutrition Program (FMNP) coupons,[43] and one study examined a systems intervention alone, which provided biweekly grocery deliveries to low-income pregnant women.[58]

Interventions addressed structural racism in African Americans' food environment through interventions targeted to retail settings and/or corner stores ($n = 7$, 23 %), farmers' markets and/or produce distribution ($n = 7$, 23 %), community gardens ($n = 5$, 17 %), church settings ($n = 5$, 17 %), school and/or early care settings ($n = 3$, 10 %), or consisted of direct education alone

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Table 1. Descriptive characteristics of studies detailing nutrition-focused interventions that address structural barriers in African Americans' food environments ($n = 35$)

Author, year, reference	Article type	Study design	Study objective	Study location (urban/rural)	Participant number and characteristics or setting	Intervention characteristics
Trude, 2018[29]	Journal article	Quantitative. A group-randomised controlled trial using pre- and post-intervention assessments with an intervention and comparison group.	To determine the impact of the intervention on the purchase and consumption of sugar-sweetened beverages (SSBs), unhealthy foods and healthier foods.	Baltimore, MD (urban)	509 children aged 9–15, including 339 aged 9–12 and 170 aged 13–15. 96·6 % African American.	Direct education, environmental and systems intervention. Promotion of healthier foods at retailers and restaurants, nutrition education provided at recreation centres, and a social media/texting programme providing caregivers healthy eating messages.
Gittelsohn, 2010[30]	Journal article	Quantitative. The Baltimore Healthy Stores Intervention was assessed by a quasi-experimental design comparing intervention to comparison respondents using the Customer Impact Questionnaire (CIQ) and a Quantitative Food Frequency Questionnaire.	To determine (1) whether there was a difference in programme impact between respondents of intervention versus comparison areas, and (2) the effect of the level of exposure to the intervention on study outcomes.	Baltimore, MD (urban)	84 respondents: 45 intervention, 39 comparison. Residents of majority African American, low socio-economic status neighbourhoods in Baltimore.	Environmental and systems intervention. Baltimore Healthy Stores (BHS) consisted of an environmental component to increase stocks of more nutritious foods, point-of-purchase promotions for healthy choices, and interactive nutrition education sessions in stores.
Cobb, 2015[31]	Journal article	Quantitative. 118 food stores in Baltimore were audited in 2006 and 2012 using the Nutrition Environment Measures Survey to examine the changes in availability of healthy food after a revision to WIC policy requiring stores to stock healthier foods.	To determine (1) whether healthy food availability within food stores changed between 2006 and 2012, (2) if store-level changes in healthy food availability are associated with neighbourhood income or racial composition, and (3) the association between the 2009 WIC policy and healthy food availability.	Baltimore, MD (urban)	118 stores across Baltimore City: 16 supermarkets, 71 corner stores, 17 behind-glass stores and 14 convenience stores.	Policy intervention. A 2009 revision to WIC policy required WIC-authorised stores to stock additional varieties of healthy foods.
Alkon, 2009[32]	Journal article	Qualitative. A case study of two food movements, including West Oakland Food Collaborative and the Karuk Tribe. This article focuses on the farmers' market that the coalition runs.	To provide an in-depth understanding of the concept of food justice and two food justice movements through comparative ethnographic case studies of two racially distinct communities.	West Oakland, CA (urban)	18 in-depth interviews with coalition participants and vendors, 100 quantitative surveys of customers.	Environmental intervention. The West Oakland Farmers Market (WOFM) provided food access in a majority African American neighbourhood that otherwise lacked access to healthy food.
Smith, 2019[33]	Dissertation	Qualitative. A qualitative collective case study using Stake's methodology (instrumental case study) of two movements including the Rocky Acres Community Farm.	To explore the dual process of food justice by examining how it is navigated by black communities in historical and contemporary contexts.	Jackson, MS, and Ithaca, NY (urban)	Majority African American community.	Environmental and systems intervention. A Community Supported Agriculture (CSA)-like programme in which the targeted community decides which foods will be included in weekly produce distributions.
Sadler, 2013[34]	Journal article	Quantitative. An assessment of food price and availability in a food desert before and after the opening of two grocery stores.	To demonstrate the effect of two new grocery stores on the price and availability of nutritious foods in a former food desert.	Flint, Michigan (urban)	Majority African American community.	Environmental intervention. The opening of two new grocery stores in majority African American neighbourhoods.
Silver, 2017[35]	Journal article	Qualitative. A case study of the Bedford Stuyvesant Restoration Corporation (Restoration) and its farm to early care and food hub initiatives.	To describe how Restoration launched multiple coordinated food initiatives to reduce food-related health problems and promote community development.	Bedford-Stuybvesan, NY (urban)	Farm to early care was implemented at 30 sites with 1500 children.	Systems and environmental intervention. A 5-year effort to bring farm fresh produce to early care sites, increasing access to fresh produce.

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Table 1. (*Continued*)

Author, year, reference	Article type	Study design	Study objective	Study location (urban/rural)	Participant number and characteristics or setting	Intervention characteristics
Yeh, 2018[36]	Journal article	Quantitative. A randomised trial with 3 groups: standard care, nutrition education for pre-schoolers, and nutrition education for both pre-schoolers and caregivers.	To explore the effect of nutrition education on African American pre-schoolers' health and biometric measures.	Midwestern metropolitan area (urban)	164 pre-schoolers at 6 Head Start centres (95 % African American, 44 % female).	Direct education and systems intervention. Provided nutrition education to pre-schoolers, whole-grain foods substituted for white carbs at Head Start centres, and one group provided education to Head Start providers.
Allicock, 2012[37]	Journal article	Quantitative. A prospective group randomised trial assessing fruit and vegetable intake at pre- and post-test.	To evaluate whether the Body & Soul programme, disseminated and implemented without researcher or agency support, would achieve similar results to earlier efficacy and effectiveness trials.	Urban areas of CA, FL, LA, MI, NJ, NY, NC, TX, VA and Washington DC (urban)	1033 members from 15 churches completed baseline surveys. 562 (54·4 %) completed a follow-up survey 6 months later.	Direct education and environmental, policy and systems intervention. Nutrition education at churches combined with health messages in sermons, policies about serving healthy foods, and peer counselling among church members.
Baruth, 2013[38]	Journal article	Quantitative. A secondary analysis of intervention group behaviours after involvement in a group randomised trial.	To examine extent to which participants in a combined physical activity and dietary intervention achieved changes in self-reported physical activity, fruit and vegetable consumption and fat- and fibre-related behaviours.	36 African Methodist Episcopal (AME) churches in South Carolina (unknown)	360 participants from 36 churches with complete pre- and post-study data (76 % female, 100 % African American).	Direct education, policy and environmental intervention. Churches provided appropriate and fun opportunities for physical activity and healthy eating, set organisational guidelines, suggested policies and practices for pastors, and communicated physical activity and healthy eating through bulletin inserts, sermons and nutrition bulletin boards.
Wang, 2013[39]	Journal article	Quantitative. A three-part process evaluation to assess the reach, dose and fidelity of intervention sessions; a post-intervention exposure survey, and an evaluation form to assess the church food environment.	To conduct a process evaluation of Healthy Bodies, Healthy Souls (HBHS), a church-based, cluster-randomised health intervention trial, to understand how well HBHS was implemented in terms of reach, dose delivered and fidelity, and the dose received by participants.	Baltimore, MD (urban)	N/A – does not report individual participant characteristics. Participating churches must serve predominately African American populations.	Direct education and environmental intervention. Curriculum included information about healthy food and beverage selection and physical activity. The church environment was altered with posters and educational information, water pitcher provision and CSA distribution of fruit and vegetables.
Bleich, 2012[40]	Journal article	Quantitative. A case-crossover design testing three interventions with a washout period between intervention conditions.	To examine the effect of interventions providing caloric information about SSBs on the volume of SSB purchases among black adolescents.	Baltimore, MD (urban)	4 corner stores in African American neighbourhoods, providing data for 1600 beverages purchased.	Environmental intervention. The study tested 3 types of signs with calorie information: (1) absolute caloric count, (2) percentage of total recommended daily intake and (3) physical activity equivalent.
Isselmann, 2017[41]	Journal article	Qualitative. Four sets of focus groups to assess African Americans' responses to targeted marketing before and after a 'sensitisation' intervention.	To assess African Americans' responses to targeted marketing practices before and after a 'sensitisation' intervention.	Durham, NC and Prince George's County, MD (urban)	30 adults and 35 youth. 100 % African American.	Educational intervention. A 'sensitisation' booklet about targeted marketing to black Americans. The booklet described the intent of food and beverage marketing tactics, organised according to the four marketing Ps (product, price, placement, promotion). Designed to improve marketing literacy and raise awareness of ethnic targeting of ads.

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Table 1. (*Continued*)

Author, year, reference	Article type	Study design	Study objective	Study location (urban/rural)	Participant number and characteristics or setting	Intervention characteristics
Barnidge, 2015[42]	Journal article	Quantitative. A quasi-experimental study using a cross-sectional design to compare intervention group with a comparison group at mid intervention.	To present the mid-intervention results of Men on the Move Growing Communities (MOTMGC) an intervention with African Americans in rural Missouri that incorporates nutrition education plus food access.	Pemiscot and Dunklin Counties, MO (rural)	Quasi-experimental study among African Americans with a comparison group.	Direct education and environmental intervention. Developed with community-based participatory research. Educational activities included cooking demonstrations, goal setting, family dinner nights, taste tests and bulletin boards. The environmental intervention increased food access by expanding a community garden and developing 3 new production gardens.
Stallings, 2016[43]	Journal article	Quantitative. A prospective cohort study comparing families receiving Farmers' Market Nutrition Program (FMNP) vouchers with those not receiving vouchers.	To evaluate the impact of FMNP among Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) participants.	Atlanta, GA (urban)	149 participants: 69 in comparison group and 80 in the intervention group, 98·8 % African American.	Systems and policy intervention. Provided Farmers' Market Nutrition Program (FMNP) coupons for fruits and vegetables; some variations in delivery between WIC clinics.
Trude, 2019[44]	Journal article	Quantitative. A group-randomised controlled trial design using pre-test–post-tests with two intervention arms.	To determine the impact of the intervention on food-related behaviours among adult caregivers, whether the change in food-related behaviours was associated with caregivers' exposure level to the intervention, and what component of the intervention was correlated with changes in food behaviours among caregivers.	Baltimore, MD (urban)	516 caregivers reporting food acquisition behaviours including a subset of 226 who completed usual household food consumption. 91 % female mean age 39. 97 % African American.	Direct education, systems and environmental intervention. A multi-level, multi-component intervention to modify the food environment outside of school for 9–15-year-olds. Wholesalers were engaged to ensure healthy products were available, small stores were incentivised to improve the food environment, youth leaders delivered education, and policy engagement facilitated healthy food environments. Also used social media and texting to deliver education.
Radvanyi, 2015[45]	Dissertation	Quantitative. A pre-test–post-test assessing youth and family food preferences, willingness to try new foods, food consumption and changes to the home food environment.	To determine the impact of Healthy Access Plus Information (HAPI) on intra-personal, inter-personal and environmental factors affecting food consumption, and determine the association between degree of family support and home availability and consumption of healthy foods.	St. Louis, MO (urban)	21 enrolled youth and 12 at follow-up; 21 enrolled families and 11 at follow-up. 95 % African American.	Direct education and environmental intervention. HAPI aimed to build interpersonal level family support for healthy choices. By changing intra-personal- and inter-personal-level factors, HAPI hoped to indirectly affect the home availability of healthy foods.
Hillier, 2012[46]	Journal article	Quantitative. A natural experiment using a pre–post comparison of Nutrition Environment Measurement Survey (NEMS) scores at WIC retailers before and after WIC food package changes.	To evaluate the impact of the 2009 WIC food package changes on the availability of healthful food and test the hypothesis that changes to WIC packages would increase availability of healthful food at WIC-participating retailers.	Philadelphia, PA (urban)	122 WIC stores in 2 low-income neighbourhoods in North Philadelphia with a predominantly African American (97 %) population.	Policy intervention. Updates to the WIC packages in 2009 included the addition of fruit, vegetables and whole grains and a switch from whole milk to 2 % milk for children over 2 years of age resulted in changes to WIC-authorised store stocking standards.

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Table 1. (*Continued*)

Author, year, reference	Article type	Study design	Study objective	Study location (urban/rural)	Participant number and characteristics or setting	Intervention characteristics
Suarez-Balcazar, 2006[47]	Journal article	Qualitative. A case study of work done by the Chicago Food System Collaborative (CFSC).	To analyse the principles that made a successful interdisciplinary partnership called the Chicago Food System Collaborative (CFSC).	Chicago, IL (urban)	Majority African American community.	Environmental and systems interventions. A partnership among 3 community organisations, 1 faith-based organisation and 4 academic institutions to address access to healthy food in an African American neighbourhood in Chicago. Projects included a farmers' market and a project to improve food offered in school cafeterias and add salad bars to 10 schools.
Backman, 2011[48]	Journal article	Quantitative. A prospective, quasi-experimental study using pre-test–post-tests with treatment and control groups.	To evaluate the effectiveness of the Fruit, Vegetable, and Physical Activity Toolbox for Community Educators (Toolbox), in changing knowledge, attitudes and behaviours among low-income African American women.	4 urban and suburban sites in CA.	327 African American women ages 18–54 (156 treatment, 171 control), 75 % low-income (eligible for SNAP-Ed).	Direct education. 6, 1-hour nutrition education sessions. Lessons focused on healthy eating and navigating barriers but also how to advocate for more fruit and vegetable (FV) and physical activity in one's community. Lessons encouraged participants to articulate concerns and problem solve issues in their environment.
Milliron, 2017[49]	Journal article	Mixed methods. Process evaluation using a cross-sectional survey; all patients screened for exposure to community garden and randomly selected for a longer qualitative survey.	To conduct a process evaluation of a community garden initiative at a medical facility.	A historically black area in NC (unknown)	152 patients at the clinic once (68·8 % black); 71 community garden volunteers; 20 staff of the clinic.	Environmental and system intervention. A community garden added to a medical clinic provided fresh produce to patients and residents.
Ard, 2017[50]	Journal article	Quantitative. A randomised controlled trial testing a weight loss intervention; weight loss programme alone compared with a weight loss programme with community support.	To test the effectiveness of a behavioural weight loss intervention delivered by community health advisors to African American women in the rural south.	Eight rural counties in Alabama and Mississippi (rural)	409 African American women, overweight or obese, aged 30–70.	Direct education and environmental and/or systems intervention. One group received weight loss counselling and education alone, and another received counselling plus community support for healthy eating and physical activity, including a community garden, walking trail enhancements and incentives for produce purchases at a farmers' market.
Campbell, 1999[51]	Journal article	Quantitative. A randomised controlled trial of a multi-component intervention in churches which assessed fruit and vegetable consumption at baseline and 2-year follow-up.	To assess the effects of the Black Churches United for Better Health project on fruit and vegetable consumption among rural African American church members in North Carolina.	50 African American churches in 10 rural counties in Eastern NC (rural)	2519 participants across 50 churches, 98 % African American, 73 % female, average age 54.	Direct education, systems and environmental intervention. Church members were trained to teach nutrition education programmes, church gardens were started to increase access to produce, pastors and church bulletins shared health messages, materials promoting local produce were distributed and churches served more fruits and vegetables.

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Table 1. (*Continued*)

Author, year, reference	Article type	Study design	Study objective	Study location (urban/rural)	Participant number and characteristics or setting	Intervention characteristics
Choudhry, 2011[52]	Journal article	Quantitative. A quasi-experimental pre-test–post-test design tested the effect of the intervention on BMI. No control group.	To assess the feasibility of Power-Up, an after-school programme to decrease obesity risk among African American children, using community-based participatory research (CBPR).	Chicago, IL (urban)	40 African American children ages 5–12 and 28 African American parents.	Direct education, systems and environmental intervention. 14 weekly hour-long nutrition and physical activity education sessions and a weekly 30-min session with parents. Environmental changes included healthier foods served at afterschool programmes, bulletin boards and school-wide events.
Wilcox, 2013[53]	Journal article	Quantitative. A randomised controlled trial.	To report the results of a group randomised community-based participatory research (CBPR) intervention targeting physical activity and healthy eating in African American churches.	74 AME churches in South Carolina (unknown)	1257 church members, 99 % African American. 749 participants in the intervention group and 508 in the control group.	Environmental and systems intervention. Churches promoted healthy eating and physical activity by sending church cooks to a healthy cooking training, including bulletin inserts about health eating, and suggesting healthy eating and physical activity policies for pastors to set.
Grier, 2015[54]	Journal article	Mixed methods. Pre-test–post-tests and qualitative interviews.	To determine the feasibility (demand, acceptability, implementation) of a 10-week gardening and nutrition education intervention for youth living in public housing.	Dan River Region, VA (rural)	43 youth, 97 % African American, aged 9–17, living in low-income housing. Also included 25 parents and 2 site leaders.	Direct education and environmental intervention. A community garden and nutrition education programme for youth living in public housing.
Conlon, 2015[55]	Journal article	Quantitative. A pre-test–post-test design.	To investigate differences in health-care-related Quality of Life (HRQoL), anthropometrics and intention to change eating behaviours in participants in Bronx Oncology Living Daily (BOLD).	Bronx County, NY (urban)	83, 95 % female, 55 % African American, 76 % breast cancer survivors. 50 % obese, 30 % diabetic.	Direct education. A 12-session programme that addressed various aspects of healthy eating and also spent one session specifically addressing resources and barriers in their local community.
Cyzman, 2009[56]	Journal article	Qualitative. The article describes a case study.	The case study describes the impact of the Activate West Michigan Coalition on the local food environment.	Grand Rapids, MI (urban)	Majority African American community.	Environmental and systems intervention. Nine gardens were planted, providing produce and educational programmes to 2000 students and established five farmers' markets in low-income areas.
Baker, 2013[57]	Journal article	Mixed methods. A process and outcome evaluation.	To describe the process and lessons learned from creating rural community gardens and the benefits and challenges of moving from individual and social strategies to an environmental intervention.	4 majority African American communities in Southeastern MO (rural)	50 participants responded to quantitative survey (86 % African American), and 4 focus groups were held with 6–10 individuals each.	Environmental intervention. Researchers partnered with existing health coalitions to build community gardens in rural, majority African American communities to increase access to fresh produce.
Locher, 2020[58]	Journal article	Mixed methods. Quantitative process measures of delivery placement and receipt and qualitative interviews to collect feedback and assess acceptability.	To describe the feasibility and acceptability of Special Delivery, a longitudinal nutrition intervention that delivers healthy foods to pregnant youth.	Ann Arbor, Detroit, and Flint, MI (urban)	27 participants, 59 % African American, aged 14–24, average age 20 years.	Systems intervention. The Special Delivery programme is an intervention to deliver $35 USD of healthy food, fruits and vegetables to pregnant low-income young women enrolled in WIC twice a month until the end of their pregnancy.

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Table 2. Details of sources describing nutrition-focused interventions addressing structural barriers to healthy eating in African Americans' food environments

Author, year, reference	Equity Considerations: How did the intervention address structural barriers to healthy eating among African Americans?	Evaluation Methods: If an evaluation was conducted, how was the intervention evaluated?	Evaluation Results: What were the qualitative and/or quantitative evaluation results?
Trude, 2018[29]	Environmental and systems interventions at increased access, procurement and consumption of healthier food for African-American youth (9–15 years) and their caregivers in 30 low-income areas of Baltimore.	Quantitative. Community randomised trial with an intervention group and a comparison group: Block Kids 2004 Food Frequency questionnaires were used to assess consumption of unhealthy and healthier food choices, and food purchasing behaviour was assessed with the Child Impact Questionnaire.	Intervention youth increased healthier foods and beverages purchases by 1·4 more items per week than comparison youth ($\beta = 1{\cdot}4$) After the intervention, there was a 3·5 % decrease in kcal from sweets for older intervention youth, compared with the control group ($\beta = -3{\cdot}5$). No impact was seen on SSB consumption.
Gittelsohn, 2010[30]	The environmental and systems intervention at target stores promoted and increased access to healthier options at those locations in African American neighbourhoods. In-store education also helped residents better navigate their local food environment.	Quantitative. Quasi-experimental design used to compare intervention residents using a pre- and post-test of both the Customer Impact Questionnaire (CIQ) asking about food purchasing and cooking and a Quantitative Food Frequency Questionnaire. Intervention exposure was also assessed at post-test.	Exposure to intervention materials was modest in the intervention area, and overall healthy food purchasing scores, food knowledge and self-efficacy did not show significant improvements associated with intervention status. The BHS programme had a positive impact on healthfulness of food preparation methods and showed a trend toward improved intentions to make healthy food choices.
Cobb, 2015[31]	The policy intervention resulted in WIC-authorised stores carrying additional healthy foods, increasing healthy food availability, particularly in majority African American neighbourhoods.	Quantitative. 118 food stores assessed for healthy food availability scores with the Nutrition Environment Measures Survey (NEMS) in 2006 and 2012. Outcome measures were absolute change in WIC-relevant healthy food availability scores for each food type.	The change in WIC policy was associated with significant but modest (0·73 point) increases in WIC-relevant healthy food availability scores. Stores in African American neighbourhoods saw greater increases in healthy food availability compared with stores in neighbourhoods with >60 % white residents.
Alkon, 2009[32]	The West Oakland Food Collaborative (WOFC) provided culturally appropriate foods from African American farmers to a majority African American community, improving food access. Described by one vendor as 'empowering black people'.	Qualitative. An evaluation using three primary sources: participant observation, semi-structured interviews and a survey of customers at the West Oakland Farmers Market.	Qualitative observations are described in the article. The goal of the WOFC is, in the words of one member, 'to connect black farmers to the black community'. 52 % of the market's customers surveyed claimed that support for black farmers was their most important reason for market attendance.
Smith, 2019[33]	The intervention changed the Community Supported Agriculture (CSA) model to provide African Americans access to healthy foods chosen by them and that they could pay for weekly at a reasonable cost.	Qualitative. A case study evaluation using archival research, content analysis, participant observation and semi-structured interviews. Data for two case studies were collected and analysed in three phases.	Interventions studied designed their farm spaces as a way to use land as a form of empowerment. Within this farm space design, issues of race, self-determination and economic power took centre stage in the development of educational and food programmes.
Sadler, 2013[34]	The addition of new grocery stores in a majority African American food desert resulted in increased access to food and lower food prices.	Quantitative. Pre- and post-measures of food pricing using the Ontario Nutritious Food Basket (ONFB) survey to determine variations in the cheapest available price of groceries at various grocers.	In 2009, the cost of a nutritious basket of food in the food desert was $183 USD (in 2011 dollars). In 2011, prices ranged from $144 USD to $169 USD. No significant difference between prices at average grocery stores and the new stores.
Silver, 2017[35]	Farm to early care implemented in majority African American child care centres increased access to produce for children in those programmes.	Qualitative. A case study including document analysis, a timeline of project events, and recursive discussions among investigators to refine insights in order to summarise lessons learned.	'Restoration now has the opportunity to promote policies that explicitly incentivize the use of local produce in institutional settings, support the development of Black, Latino and women farmers, and nurture local food hubs and other local food retail'
Yeh, 2018[36]	Changing foods offered made healthy foods more available to African Americans at the Head Start site, education for caregivers changed the Head Start environment. Education did not address structural barriers.	Quantitative. Pre- and post-test BMI, blood lipids, food preference and knowledge compared across 3 groups: (1) standard curriculum plus nutrition education for pre-schoolers; (2) standard curriculum plus nutrition education for pre-schoolers and their caregivers; and (3) control group.	No significant changes were found in BMI, healthy eating behaviour or knowledge in each of the three groups between baseline and post-intervention. No significant differences among the three groups were found.

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Table 2. (*Continued*)

Author, year, reference	Equity Considerations: How did the intervention address structural barriers to healthy eating among African Americans?	Evaluation Methods: If an evaluation was conducted, how was the intervention evaluated?	Evaluation Results: What were the qualitative and/or quantitative evaluation results?
Allicock, 2012[37]	The intervention increased access to healthy choices at African American churches and provided social support for healthy eating in the church environment.	Quantitative. Pre-test–post-test assessment of daily fruit and vegetable (FV) intake in intervention and comparison churches. Motivation for FV intake was assessed using an adapted version of the Treatment Self-Regulation Questionnaire.	No statistically different difference in daily FV servings in intervention group compared with control group. Process evaluation results suggested that added resources such as technical assistance could improve programme implementation.
Baruth, 2013[38]	Changed the structure, environments and policies of African American church to facilitate healthy behaviours for food and PA. Utilised a community-based approach and allowed implementation to be tailored to population needs.	Quantitative. Pre-test–post-test assessment of self-reported BMI and validated questionnaires (National Cancer Institute Fruit and Vegetable all-day screener; modified Community Health Activities Model Program for Seniors questionnaire; Fat and Fiber-Related Behavior Questionnaire).	The most common behaviour change was decreasing fat-related behaviours (43 %), followed by improving fibre-related behaviours (42 %), increasing physical activity (36 %) and increasing FV consumption (33 %). Physical activity increased by a mean of 0·42 ± 5·2 h/week. (adjusted $P = 0·10$), FV consumption increased by 0·02 ± 4·1 cups/d (adjusted $P = 0·84$). Of the 360 participants, 69 changed no behaviours (19 %), 113 changed 1 behaviour (31 %), 111 changed 2 behaviours (31 %), 48 changed 3 behaviours (13 %) and 19 changed all 4 behaviours (5 %).
Wang, 2013[39]	The environmental intervention affected African American church environments to make them more supportive of healthy eating and physical activity through things like Community Supported Agriculture (CSA) shares of fruit and vegetables and environmental changes to improve water consumption.	Quantitative. Process evaluation in three parts: (1) an in-church interactive session form completed by a trained process evaluator (for reach, dose and fidelity); (2) post-intervention exposure assessment for an estimation of reach at the individual level; (3) in-church food environment evaluation form to measure healthy food availability and promotions in the church environment.	Print materials implemented with moderate to high fidelity and high dose. Programme reach was low, which may reflect inaccuracies in church attendance rather than study implementation issues. Intervention components with the greatest dose received were giveaways (42·0–61·7 %), followed by taste tests (48·7–53·7 %) and posters (34·3–65·0 %). The dose received of general programme information was moderate to high.
Bleich, 2012[40]	The environmental intervention was specific to stores in African American neighbourhoods and helped customers better navigate their local food environment.	Quantitative. Pre-test–post-test design. For the baseline period and each period when a caloric condition sign was posted, we collected a random sample of 25 adolescent beverage purchases per store per week. When adolescents purchased more than 1 beverage, we recorded the drink touching the counter first. For each beverage sale, we collected the buyer's gender; the date, time and store location of purchase; and which of 8 types of beverage was purchased.	Providing any calorie information reduced the odds of an SSB purchase by 40 % (odds ratio (OR) = 0·56; 95 % confidence interval (CI) = 0·36, 0·89). providing caloric information in the form of a physical activity equivalent compared with no information reduced the odds of an SSB purchase by half (OR = 0·51; 95 % CI = 0·31, 0·85). Calorie information in the form of percentage daily value had a marginally significant ($0·05 < P < 0·1$) reduction in the odds of an SSB purchase of about 40 % (OR = 0·59; 95 % CI = 0·34, 1·02).
Isselmann, 2017[41]	The 'sensitisation' intervention provided participants information to help them identify targeted marketing practices, which may help them to better navigate their food environment/marketing environment.	Qualitative. Focus groups were held with the same groups before and after 'sensitisation' with a booklet about marketing companies tactics targeting Black Americans.	Themes included: (1) seeing the marketer's perspective, (2) 'consumers choose', (3) respect for community and (4) food environments as a social justice. In post-sensitisation sessions, participants found the booklet informative because it had details on food marketing strategies. Participants said they felt the booklet made them more aware of marketing strategies and their potential impact on health. Effects of sensitisation were reflected in relative occurrence of marketer-oriented themes and social justice-oriented themes, respectively, less and more after sensitisation.

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Table 2. (*Continued*)

Author, year, reference	Equity Considerations: How did the intervention address structural barriers to healthy eating among African Americans?	Evaluation Methods: If an evaluation was conducted, how was the intervention evaluated?	Evaluation Results: What were the qualitative and/or quantitative evaluation results?
Barnidge, 2015[42]	Used a community-based approach in design and delivery. Improved the food environment by adding more community gardens.	Quantitative. Cross-sectional (baseline and mid-intervention) surveys in both counties measured the effect of Men on the Move Growing Communities (MOTMGC) on blood pressure, self-reported BMI, perceived fruit and vegetable consumption, and exposure to the individual-level and environmental-level components of the intervention.	Hypertension (OR 0·52) and BMI (OR 0·73) were lower in the intervention county at mid-intervention. Participation in nutrition education (OR 2·67) and access to FV from a community garden (OR 1·95) were independently associated with perceived FV consumption. The strongest effect on perceived FV consumption occurred with high participation in nutrition education and access to community gardens (OR 2·18). Those with access but without education had a reduced likelihood of consuming recommended FV servings (OR 0·5).
Stallings, 2016[43]	The additional funds above and beyond the WIC package that could be spent on FV at farmers' markets improved the affordability of produce and increased access to FV in this majority African American population.	Quantitative. Baseline and 4-week surveys. Self-reported mother and child fruit and vegetable intake based on the Behavioral Risk Factor Surveillance System (BRFSS). Maternal nutrition knowledge regarding fruits and vegetables from 2009 California Dietary Practices Survey.	Among participants using all coupons upon issuance, FV intake significantly increased. However, the percentage of women consuming 5 or more FV daily increased over time among FMNP mothers at clinic A (baseline: 21·7 %, 1 week: 26·1 %, 4 weeks: 34·8 %; $P = 0·41$) but decreased at clinic B (baseline: 23·1 %, 1 week: 19·2 %, 4 weeks: 7·7 %; $P = 0·20$).
Trude, 2019[44]	The multi-level, multi-component intervention was aimed at African American neighbourhoods and used a community-based approach with peer modelling for intervention delivery. The intervention changed the food environment in corner stores, provided environmental support for healthy eating through social media and texting, and provided nutrition education in schools and at community sites.	Quantitative. Pre-test–post-test measures (2 waves at each timepoint). U.S. National Cancer Institute fruit and vegetable screener used to estimate cups or servings consumed per day. Healthful cooking scores and frequency of food acquisition based on prior interview data. Dose received was measured using the Intervention Exposure Questionnaire (IEQ), which measured participants' self-reported viewing of Baltimore Healthy Communities for Kids (BHCK) communication materials (participation in food environment intervention activities, enrolment in social media/viewing of media posts and receiving the text messaging programmes).	No significant effect of the intervention on the food acquisition, home food preparation and daily consumption of FV among intervention adult caregivers compared with their counterparts. For each one-point increase in exposure score, there was a 0·24 increase in mean daily fruit serving intake over time (0·24 (SE 0·11)). For each one-point increase in social media exposure score, there was an increased three servings of daily fruit intake (3·16 (SE 0·92); 95 % CI 1·33, 4·99) and daily FV intake (2·94 (SE 1·01); 95 % CI 0·96, 4·93). A higher social media exposure score was also associated with increased unhealthful daily food acquisition score (0·47 (SE 0·23); 95 % CI 0·02, 0·93).
Radvanyi, 2015[45]	Intervention approach tailored with formative evaluations to an at-risk community area and consumer group. Community-based partnerships were used.	Quantitative. Pre-test–post-test measures of youth nutrition knowledge, self-efficacy, willingness to try new foods, food preferences, interpersonal support, home availability, food consumption and biometric measures. Adults reported BMI, food security and questions related to barriers to HAPI recipe use.	Preference for low-fat foods and fruits increased. No change in knowledge from pre to post; improved willingness to try new items. No improvements to self-efficacy or youth consumption of healthy foods. No changes to BMI. Family support for healthy items decreased, which qualitative data attributed to associated costs. The home food environment showed reductions in foods with added sugars. No other changes identified regarding home food availability.
Hillier, 2012[46]	The policy intervention changed the availability of healthy foods at WIC-authorised stores in a low-income, majority African American neighbourhood, increasing food access there. The intervention was not specifically aimed at African Americans.	Quantitative. Pre-test–post-test design was used to examine product availability in WIC and non-WIC stores. Nutrition Environment Measures Survey in Stores (NEMS-S) was used to measure the availability, affordability and quality of health items relative to less healthy alternatives.	Following the WIC policy change, availability of healthful food increased significantly in stores overall, with more substantial increases in WIC-authorised stores. Results indicate that all stores were stocking more healthful food by the second year (change in NEMS-S score from 11·9 to 16·0, $P < 0·01$), but WIC-approved stores had more healthful food at baseline and saw a greater increase in the availability of healthy food.

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Table 2. (*Continued*)

Author, year, reference	Equity Considerations: How did the intervention address structural barriers to healthy eating among African Americans?	Evaluation Methods: If an evaluation was conducted, how was the intervention evaluated?	Evaluation Results: What were the qualitative and/or quantitative evaluation results?
Suarez-Balcazar, 2006[47]	Community-oriented and diverse disciplines to improve the food environment and access in multiple settings to the benefit of a majority African American neighbourhood (farmers markets, schools, retail settings, transportation, social justice).	Qualitative. An adapted version of Senge and Sharmer's knowledge generating system was utilised to analyse the impact of the Chicago Food System Collaborative (CFSC) interdisciplinary partnership across the three dimensions of (a) enhanced understanding, (b) capacity building and (c) changes in practices, policies and innovation.	Overall, the authors noted, 'In these partnership endeavors, individuals from different disciplinary backgrounds come together to work on common goals, potentially resulting in benefits to all those involved. In the case of the CFSC, the interdisciplinary research partnership produced knowledge, capacity-building and innovations to address an important social issue faced by a working-class minority community.'
Backman, 2011[48]	The intervention included culturally tailored take-home materials to complement lessons, a section that discussed barriers to healthy eating and PA and how to overcome them, and also a lesson on advocating for better options in the local community.	Quantitative. Pre-test–post-test surveys among intervention and control groups with variables including fruit, vegetable and physical activity-related knowledge, attitudes and beliefs, self-efficacy and empowerment, and behaviour change.	Knowledge about FV amounts significantly increased (from 22·4 % to 41 % answering correctly in the treatment group) ($P < 0·001$). All measured knowledge and attitude about FV consumption and physical activity significant increased from pre to post in treatment group. Treatment groups were significantly more likely than control to report positive changes in food purchasing, preparation and consumption.
Milliron, 2017[49]	The intervention garden increased access to fresh fruit and vegetables for this majority African American community.	Quantitative. A process evaluation which assessed patient and staff participation in, and patient and volunteer satisfaction with, the garden.	Only 19·7 % of patients had received produce from the garden, 50 % of patients had heard of the garden and 9·9 % of patients had visited the garden; 72 % of patients were interested in learning more.
Ard, 2017[50]	Environmental or systems interventions selected by community members in African American communities enhanced access to fresh produce and/or opportunities for physical activity.	Quantitative. A randomised controlled trial comparing weight loss counselling alone with counselling plus community strategies. Pre-test–post-test design evaluated measures of weight change, waist circumference, blood pressure, lipids and fasting blood glucose.	Weight Loss Only participants lost an average of 2·2 kg ($P < 0·001$). Weight Loss Plus participants lost an average of 3·2 kg ($P < 0·001$). The proportion of the total sample that lost at least 5 % of their body weight was 27·1 %, with no difference between treatment groups. Statistically significant reductions were observed in blood pressure, waist circumference and triacylglycerols in each treatment group, with no statistical differences between groups.
Campbell, 1999[51]	The structural changes to African American church environments increased access to fresh produce at church meals and through church gardens.	Quantitative. A randomised controlled trial comparing intervention churches to control churches who received delayed intervention. Surveys were conducted at baseline and at a 2-year follow-up and included questions related to fruit and vegetable consumption as well as stage-of-change, self-efficacy and knowledge measures.	At the 2-year follow-up, the intervention group consumed 0·85 more servings of fruit and vegetables than the delayed intervention group. Largest increases were observed among those 66 or older (1 serving), those with education beyond high school (0·92 servings), those widowed or divorced (0·96 servings) and those attending church frequently (1·3 servings). The least improvement occurred among those aged 18–37 and single people.
Choudhry, 2011[52]	Changes to the school environment increased access to healthy food for African American students and promoted healthy eating and physical activity.	Quantitative. A quasi-experimental study using pre-test–post-test measures of anthropometrics, blood pressure, dietary measures, and health knowledge and beliefs for children and parents compared in univariate analysis.	Post-intervention, mean BMI *Z*-scores decreased from 1·05 to 0·81 ($P < 0·0001$). Changes were more pronounced for overweight (−0·206 *Z*-score units) than for obese children (−0·062 *Z*-score units; $P = 0·01$). The prevalence of healthful attitudes rose, including plans to 'eat more foods that are good for you' (77 % to 90 %; $P = 0·027$).

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Table 2. (*Continued*)

Author, year, reference	Equity Considerations: How did the intervention address structural barriers to healthy eating among African Americans?	Evaluation Methods: If an evaluation was conducted, how was the intervention evaluated?	Evaluation Results: What were the qualitative and/or quantitative evaluation results?
Wilcox, 2013[53]	Structural changes to African American church environments increased access to healthy foods there and promoted physical activity.	Quantitative. A randomised controlled trial comparing intervention to control (delayed intervention). Assessed self-reported moderate-to-vigorous intensity physical activity (MVPA), fruit and vegetable consumption, blood pressure, and self-reported fat- and fibre-related behaviours at baseline and 15 months.	There was a significant effect favouring the intervention group in self-reported leisure time MVPA ($d = 0{\cdot}18$, $P = 0{\cdot}02$), but no effect for other outcomes. ANCOVA analyses showed an intervention effect for self-reported leisure-time MVPA ($d = 0{\cdot}17$, $P = 0{\cdot}03$) and self-reported fruit and vegetable consumption ($d = 0{\cdot}17$, $P = 0{\cdot}03$).
Grier, 2015[54]	Gardens acted as environmental interventions in majority African American public housing to increase access to healthy food.	Mixed methods. A feasibility study in which demand and acceptability were measured using pre-test–post-test programme surveys and interviews. Limited effectiveness was measured using pre–post surveys of attitudes towards and knowledge of fruit and vegetables (FV) and gardening, analysed using repeated-measures ANOVA.	Effectiveness testing found significant improvements in self-efficacy for asking for FV, overall gardening knowledge, knowledge of plant parts and knowledge of MyPlate. Knowledge of food safety decreased significantly at follow-up. There were no significant effects on willingness to try FV or self-efficacy for eating FV.
Conlon, 2015[55]	The direct education provided information about specific resources in the community (free exercise classes, farmers' markets, community gardens) and created walking groups for participants.	Quantitative. A pre-test–post-test evaluation of healthcare-related quality of life, weight, waist circumference and readiness to make changes to one's diet.	No statistically significant changes in BMI; mean waist circumference significantly improved among participants who completed a 12-week programme, but not in a 4-week programme. More than 90 % of participants reported that the programme helped them achieve their short-term goals.
Cyzman, 2009[56]	Environmental changes increased access to fresh fruits and vegetables for African Americans in Grand Rapids.	Mixed methods. Garden educational programmes were evaluated for participant satisfaction and knowledge change, and farmers' markets conducted an informal qualitative evaluation of knowledge change and satisfaction.	100 % of market attendees would come again and appreciated access to fresh vegetables, 98 % learned about community resources and 85 % increased knowledge about healthy eating. 97 % of students participating in gardening education said they enjoyed it.
Baker, 2013[57]	Gardens acted as environmental interventions in majority African American communities to increase access to healthy food.	Mixed methods. Quantitative portion consisted of a post-only survey with garden coalition members and their contacts via snowball sampling and asked about attitudes and behaviours related to consumption of healthy food Qualitative portion consisted of 4 focus groups conducted with 4 coalitions with 6–10 participant per focus group.	Quantitative survey respondents noted that they ate more vegetables and fruit (88 %), ate less fast food (72 %) and spent less money on food (76 %). Almost 50 % of those who self-identified as being food insecure indicated that they were better able to feed themselves and their families as a result of the garden. Focus groups identified themes related to the partnerships enhancing gardens, the benefits and challenges of gardens, and the opportunity gardens provided for getting to know community members.
Locher, 2020[58]	Special Delivery provided $35 USD of healthy groceries and produce to majority African American participants 2×/month, providing additional access to fruits, vegetables and healthy food.	Mixed methods. A feasibility and acceptability study. Quantitative feasibility measures included number of delivery orders placed, delivered and confirmed by recipients. Qualitative feedback and acceptability were collected through semi-structured telephone interviews with participants.	259 of 263 orders placed were successfully delivered (98·5 %). Only one order was reported as missing by a recipient, and 3 arrived late. Nearly all participants who completed an end-of-study interview (19/21) reported that home delivery of groceries was convenient. 20 reported that delivered foods, including fruits and vegetables, were high quality, and 8 participants specifically described the freshness of fruits and vegetables as a positive aspect. Nearly all participants (20/21) reported the programme helped them to have a healthy diet, and many (15/21) reported improved access to healthy foods as a result of the Special Delivery programme.

Table 3. Comparison of included study interventions to interventions suggested by the 'Getting to Equity in Obesity Prevention' framework

Author, year, reference	Increase Healthy Options	Reduce Deterrents	Improve Social and Economic Resources	Build on Community Capacity
Trude, 2018[29]	X			X
Gittelsohn, 2010[30]	X			X
Cobb, 2015[31]	X			
Alkon, 2009[32]	X			
Smith, 2019[33]	X			X
Sadler, 2013[34]	X			
Silver, 2017[35]	X			
Yeh, 2018[36]	X			X
Allicock, 2012[37]	X			X
Baruth, 2013[38]	X			X
Wang, 2013[39]	X			X
Bleich, 2012[40]	X	X		
Isselmann, 2017[41]		X		
Barnidge, 2015[42]	X			
Stallings, 2016[43]			X	
Trude, 2019[44]	X			X
Radvanyi, 2015[45]				X
Hillier, 2012[46]	X			
Suarez-Balcazar, 2006[47]	X			X
Backman, 2011[48]				X
Milliron, 2017[49]	X			
Ard, 2017[50]	X			X
Campbell, 1999[51]	X			X
Choudhry, 2011[52]	X			X
Wilcox, 2013[53]	X			X
Grier, 2015[54]	X			X
Conlon, 2015[55]				X
Cyzman, 2009[56]	X			
Baker, 2013[57]	X			X
Locher, 2020[58]	X		X	

($n = 4$, 13 %). Several studies targeted more than one of these settings simultaneously. One such example is the Chicago Food System Collaborative, which worked to add a farmers' market to a low-income African American neighbourhood, change the types of food offered in neighbourhood schools and add salad bars to ten of those schools.[47]

Evaluation designs of the included articles were majority quasi-experimental pre-test–post-test designs ($n = 16$, 53 %). Other designs included qualitative methods alone ($n = 5$, 17 %), randomised controlled trials ($n = 4$, 13 %), post-only measures ($n = 2$, 7 %) and process evaluations alone ($n = 3$, 10 %). All five of the articles using qualitative methods alone evaluated perceptions of systems and/or environmental changes, four of which related to farmers' markets and/or produce distribution efforts. Among the twenty-two articles which used quantitative evaluation methods, twenty found some positive evaluation result and two did not find any impact of the studied intervention. Notable intervention outcomes included weight loss or decreased BMI or BMI *Z*-score,[42,50,52] increased fruit and/or vegetable consumption,[43,51,53,57] and changes in purchasing behaviours.[29,40]

Comparison of results to the 'Getting to Equity in Obesity Prevention' framework

Of the thirty included articles which studied interventions addressing structural racism in African Americans' food environments, many targeted more than one aspect of the Getting to Equity in Obesity Prevention Framework (Table 3). Nearly all ($n = 25$, 83 %) targeted the 'Increase Healthy Options' construct of the framework, largely by providing additional sources of fresh fruits and vegetables in African American communities. These types of interventions included things like the addition of new community gardens[42,49,54,57] or farmers' markets,[32,47,56] or including more fresh produce in existing retail environments.[29–31,44,46] A majority of the included articles ($n = 18$, 60 %) targeted the 'Build on Community Capacity' construct, mostly through nutrition education to provide behaviour change knowledge and skills and promote healthier behaviours. A small number of studies targeted the 'Improve Social and Economic Resources' ($n = 2$, 7 %) and the 'Reduce Deterrents' ($n = 2$, 7 %) constructs. Those studies targeting 'Improve Social and Economic Resources' described interventions which provided additional funding for food targeted to African American families, through additional funds to be spent at farmers' markets,[43] or funds to be spent on grocery delivery services.[58] Studies targeting 'Reduce Deterrents' included an intervention to make consumers aware of marketing tactics used by vendors of unhealthy food to target African Americans,[41] and an intervention to make consumers aware of the calorie content of sugar-sweetened beverages.[40]

Discussion

The purpose of this review was to identify and describe the available literature describing nutrition interventions that address structural racism in the food environment that impacts African Americans. This review is the first to describe available literature

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regarding nutrition interventions which specifically addressed structural barriers to healthy eating in this population. Despite the recent recognition of structural racism as a threat to public health and food security among African Americans,[7,8] none of the studies meeting our inclusion criteria specifically named structural racism as a factor in the development or implementation in the studied interventions. This finding underscores the need for academic institutions and public health nutrition practitioners to acknowledge and address structural racism affecting African Americans through nutrition education and PSE change interventions.

The 'Equity-Oriented Obesity Prevention Framework' provides a basis from which to refocus nutrition interventions and PSE changes to address health equity issues and the impact of structural racism on marginalised populations.[19] Many studies included in this review addressed the 'Increase Healthy Options' and 'Build on Community Capacity' constructs of this framework, by providing additional fresh produce in African Americans' communities and direct nutrition education programmes targeted to African Americans, respectively. Though these strategies may be well intentioned, charity-focused strategies such as these are not adequate to address structural barriers to healthy eating.[59] Further, nutrition education programmes that focus on individual responsibility in the context of these barriers may be seen as patronising and unhelpful.[60] This may be related to an ideology of 'cultural racism' described by the sociologist Eduardo Bonilla-Silva which asserts that the standing of marginalised populations in society is due to a cultural deficit in those populations.[61] In public health practice and research, this ideology manifests itself as a 'lifestyle hypothesis' in which marginalised populations are blamed for health disparities owing to supposed lack of knowledge and flawed decision-making.[62] Charity-focused strategies to educate and provide additional healthy options to marginalised populations may be perpetuating these ideologies if they do not acknowledge and address structural racism. To best support health equity, it will be vital to implement strategies featured in other portions of the Getting to Equity in Obesity Prevention framework alongside those focused on increasing healthy options and providing education.

Unfortunately, our results found very few studies which addressed the 'Reduce Deterrents' and 'Improve Social and Economic Resources' constructs of the framework, strategies which might better address disparities in nutritional status and structural racism experienced by African Americans. Several ways in which structural racism manifests in the food environment, such as an increased prevalence of unhealthy food outlets ('food swamps') in African American neighbourhoods and targeted marketing of unhealthy foods to African Americans,[16,17,63–65] cannot be addressed by increasing healthy options alone. The most robust strategies to address structural racism would address the 'Improve Social and Economic Resources' aspect of the framework, because racial health disparities will persist as long as there are disparities in socioeconomic status. Sociologists have argued that socioeconomic status is a 'fundamental cause' of health disparities, because as new treatments and methods of disease prevention arise, they will be available to those with the economic resources to take advantage of them.[66] These differences in socioeconomic status have been proposed to be one mechanism through which racism leads to health disparities.[67] In the face of these underlying racial disparities in wealth, income, education and occupational status, interventions focused on proximate causes of health disparities (such as food choice) will not eliminate these disparities.[68] Our results demonstrate that few nutrition-focused interventions have attempted to address disparities in social and economic resources or remove deterrents to healthful eating patterns that disproportionately affect African Americans. Future work should work to fill this gap in the literature and investigate interventions conducted with African Americans which address these aspects of the framework.

Structural racism also affects other marginalised populations' ability to access enough healthful, culturally appropriate food, including Hispanic Americans and Indigenous populations. Researchers have acknowledged and studied the effects of structural racism on food insecurity, obesity and nutritional status in these populations and have called for efforts to address these disparities.[7,10,69] Despite this, no other scoping reviews have been published to date which examine interventions to address structural racism in the food environment among these populations in the United States. Reviews have examined 'culturally adapted' or 'culturally tailored' nutrition education and health promotion interventions in Hispanic and Indigenous populations.[70–72] A recent scoping review of family-based obesity prevention programmes conducted with Hispanic audiences found that only half of the interventions acknowledged the role of social determinants of health in obesity.[73] It will be particularly important for future work to address structural barriers to healthful eating among Native Americans in the United States. Despite similar rates of food insecurity and poverty among Native Americans compared with African Americans, a 2020 review of dietary policies and programmes in the United States found that only a small percentage of included studies aimed to benefit Native Americans, while African American populations were well studied.[74]

Despite the limitations of interventions which focus on proximal causes of disparities in nutritional status, our results have implications for federally funded nutrition programmes and other implementers of programmes that are required to focus on these proximal causes through nutrition education and nutrition-focused PSE changes. Our results map out existing strategies that have been implemented in an attempt to address structural barriers to healthful eating among African Americans, and these strategies may serve as examples that federally funded nutrition education programmes may wish to implement or build upon. Studies which met our inclusion criteria implemented diverse strategies to address structural racism, and very few of these studies attempted to do so through direct education alone. For example, the interventions which resulted in positive changes to fruit and vegetable consumption included PSE interventions at majority African American churches,[38,51] community gardens[57] and farmers' market vouchers.[43] All three of the interventions in this review which resulted in weight loss consisted of combined nutrition education and environmental changes, either through community gardens,[42] changes to the school environment[52] or changes at multiple locations in a community.[50] These combinations of education and PSE interventions and/or multi-level, multi-component interventions may be more effective in supporting

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healthful eating choices than approaches using direct education alone.[29,75] Guidance provided for obesity prevention programmes such as SNAP-Ed has also encouraged the use of direct education in combination with multi-level, multi-component interventions.[76] Our results indicate that the majority of the approaches to address structural racism in African Americans' food environment which implemented direct education did so in combination with a PSE change intervention. Those public health practitioners implementing nutrition education and/or PSE change interventions who wish to refocus their efforts to better address structural racism should therefore consider implementing interventions which combine PSE changes and nutrition education.

Nutrition researchers and public health professionals have recently renewed calls for efforts to address structural racism and its effects on the nutritional status of marginalised groups.[7,8,77] Our results demonstrate that, despite these calls to action, few studies have been published that have addressed the issue, and even fewer have addressed aspects of the 'Getting to Equity in Obesity Prevention' framework that may be best suited to addressing the problem, improving social and economic resources of African Americans and reducing deterrents to healthy behaviours. Future work will need to address this gap in the literature, by linking programmes which provide targeted economic assistance to African Americans to nutritional outcomes, or by examining the effects of interventions which reduce deterrents, such as providing point-of-choice nutritional information targeted to African Americans. Researchers will also need to address the lack of literature describing nutrition interventions in other marginalised populations to address structural racism, and may wish to use methods similar to ours to describe the available literature concerning those populations.

In addition to these implications for research, our results may help inform public health nutrition practice. Those practitioners whose funding sources specify that they may only implement nutrition education and PSE changes but wish to address structural barriers too may consider implementing combined PSE change and nutrition education interventions like those described in our results, such as in church or school settings. Although nutrition education and PSE changes will not sufficiently address underlying causes of health disparities, our results demonstrated that several interventions had positive outcomes such as weight loss and increased fruit and vegetable intake. Those practitioners without those restrictions or who are already implementing interventions to address structural racism faced by African Americans should work to implement interventions which work to address underlying causes of racial health disparities and the other aspects of the 'Getting to Equity in Obesity Prevention framework'.

Limitations

While our search was guided by a research librarian (R.L.M.), it was limited to five databases of peer-reviewed literature. These databases were selected based on the interdisciplinary nature of this investigation, but there may have been additional articles available in other databases that were not included in this review. Additionally, the grey literature search was limited to a search of one database of dissertation and theses. There may be additional dissertations and theses related to the subject that were not available in this database.

Our investigation only addressed nutrition education and PSE interventions benefitting African Americans. Other marginalised populations in the United States experience structural racism in their food environments, and further reviews should address interventions conducted with these populations. There may be interventions which have addressed structural barriers to healthy eating conducted with other marginalised populations that could also be beneficial for African Americans.

Possibly the most serious limitation of our review is the lack of evidence produced by academic institutions and public health nutrition practitioners that directly addressed our research question. Academic institutions are not immune to the effects of 'colour-blind' racism and ideologies of white supremacy.[78,79] It may therefore have been misguided to search for solutions to address structural racism in the food environment which originated from these institutions. Although we hope that this investigation will serve as a starting point for future work and illustrate gaps in the literature, future work may need to look for answers in spaces beyond the peer-reviewed and grey literature and examine efforts that have not been described in these publications.

Conclusion

Public health professionals are increasingly developing an understanding of how structural racism produces racial health and obesity disparities in the United States.[4,77] Nutrition educators have also acknowledged that providing education alone is not enough to change nutrition behaviours, and that influences on nutrition behaviour exist beyond the control of individuals.[12,80] This scoping review has described the available literature reporting interventions addressing structural racism affecting African Americans through nutrition education or other nutrition-focused PSE changes and compared those results with the 'Getting to Equity in Obesity Prevention' framework. Results demonstrated that nearly all articles addressed the issue by providing additional healthy options or nutrition education, charitable strategies which do not address underlying causes of racial disparities in nutritional status. More work will need to be done to address other aspects of the framework, including reducing deterrents to healthy eating and improving social and economic resources of African Americans. Because African Americans experience high rates of obesity and food insecurity and encounter structural barriers to healthy eating in their food environment, researchers should address these gaps in the literature if they seek to serve this population adequately.

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Conflict of interest

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Authorship

M.G., D.H. and R.M. conceptualised the review. M.G. and R.M. designed the search strategy. M.G. and D.H. independently performed the initial title and abstract screen and the full-text screen for inclusion. M.G., B.H., C.S., M.D.M. and D.B. performed data extraction. M.G. wrote the first draft of the manuscript with contributions from R.M. All authors contributed to, reviewed, edited and commented on subsequent drafts of the manuscript.

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