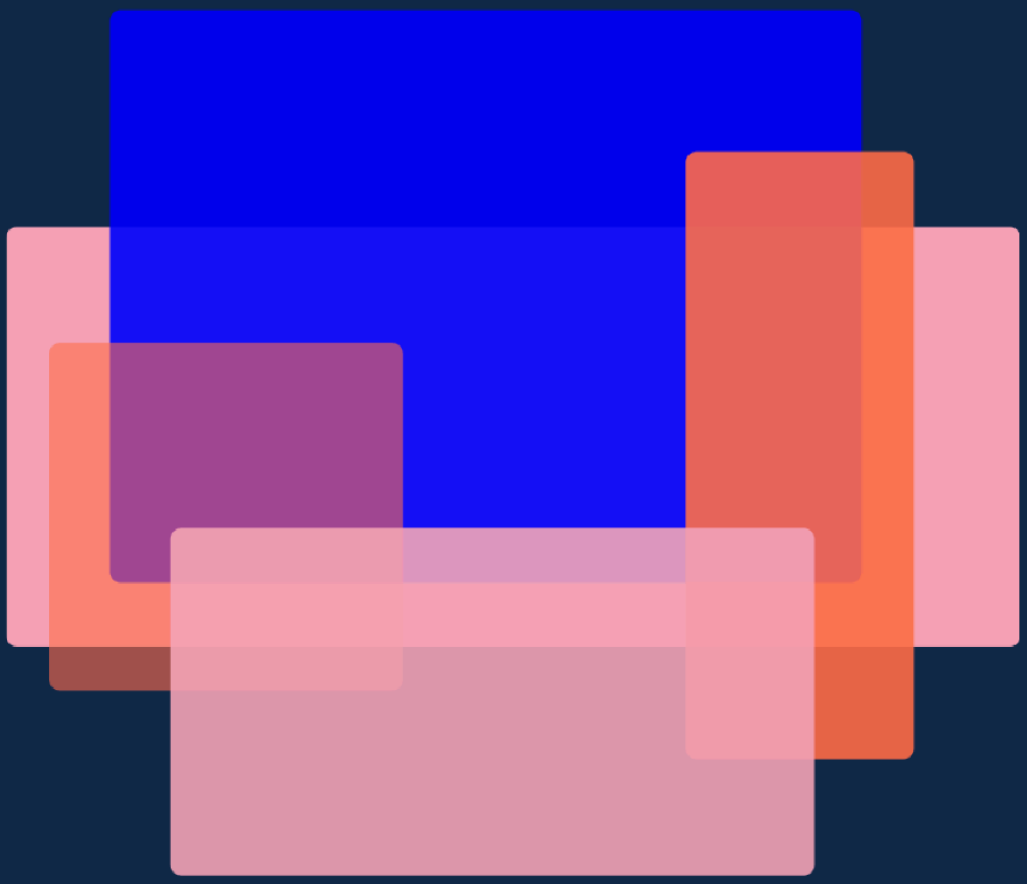
Blueprint
by nesta

Blueprint for halving obesity: rapid review

Increasing access to supermarkets



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Summary table

Title	Changes in diet after introduction of a full service supermarket in a food desert	New neighbourhood grocery store increased awareness of food access but did not alter dietary habits or obesity
Authors and year	Dubowitz et al. (2015)	Cummins et al. (2014)
Type of study	Quasi-experimental longitudinal design	Controlled before-and-after quasi-experimental longitudinal design
Outcome variable(s)	BMI difference in difference (DID) kcal difference in difference (DID)	BMI difference in difference Fruit and vegetable intake difference in difference (Assessed using the Block Food Frequency Questionnaire)
Treatment	Exposed to introduction of new supermarket in a food desert	Exposure to introduction of new full service supermarket within 1.5 miles of resident
Control	Socio-economically and geographically matched neighbourhood with no new supermarket access	Socio-economically and geographically matched neighbourhood with no new supermarket access within 1.5 miles
Magnitude of effect	BMI (DID) = 0.31 NS kcal (DID) = -178, $p< 0.001$	BMI DID =-0.46, $p=0.56$ (ITT analysis) Fruit and vegetable intake DID = -0.05, $p=0.84$ (ITT analysis)
Notes	For modelling the impact of this policy, the review highlighted in the green column was used.	

Rapid umbrella review

Background

Access to specific food environments has been linked with increased incidence of obesity (Cooksey-Stowers et al., 2017). It is increasingly recognised that changes to the retail food environment may be central to the development of systems solutions for tackling population obesity (Findling et al., 2018). Supermarkets are frequently regarded as the 'best in class' for food access because they typically offer lower prices, greater variety, and higher quality of food compared to smaller retailers such as convenience stores (Titis, 2023). Supermarkets have the potential to make healthier food options more available, although this advantage is balanced out by the fact that they also offer easy access to unhealthy foods that are high in fat, sugar, and salt (Freire and Rudkin, 2019). Enhancing accessibility through the establishment of new supermarkets in under-served neighbourhoods could contribute to preventing obesity by facilitating healthier dietary practices.

Objective

To summarise the best available evidence that evaluates the impact of interventions to increase supermarket availability and access on obesity and overweight.

Methods

We aimed to identify and synthesise reviews and meta-analyses that included quantitative research synthesis of the impact of opening new supermarkets on outcomes relevant to calorie consumption, body weight change, or obesity.

Eligibility

Types of review. To be eligible for inclusion, articles were required to use systematic review methodology (ie, use of systematic search and inclusion strategy to identify all available studies) and include quantitative data synthesis (ie, meta-analysis) of multiple studies that examined the effect of increasing access to supermarkets on outcomes relevant to calorie consumption, weight loss, or obesity.

If the search did not identify any studies where a meta-analysis has been conducted due to heterogeneity of outcomes, we included reviews with narrative synthesis. We did not set inclusion criteria on the number or type of databases searched.

We selected a single review that best represents our research question. If more than one review were identified, we assessed the quality and selected the one with the highest rating (taking into account year of publication).

Participants. To be eligible for inclusion, articles were required to examine the changes in access to supermarkets on outcomes relevant to calorie consumption, weight loss, or obesity.

Intervention. We defined the intervention as exposure to a change in supermarket access, including the opening of new supermarkets. All types of experimental data were eligible to be included with no restrictions.

Comparator. The comparator group was individuals or populations who were not exposed to a change in supermarket access.

Outcomes. To be eligible for inclusion, reviews must include either clinical (eg, weight, BMI, % fat change) or behavioural outcome (including, but not limited to: eating behaviour, food diaries). Reviews that only include measures of intentions/plans for future behaviour were excluded due to evidence of the gap between intended and actual eating behaviour.

Information sources and article selection

The search strategy was designed to identify syntheses of research evidence such as systematic reviews and meta-analyses between the year 2010 and the date of search. Initial keywords were identified via scoping review of relevant papers and reports as well as via MEDLINE using the MeSH function. A search was performed in MEDLINE and the Cochrane Database of Systematic Reviews. We searched grey literature using Google, Google Scholar and policy databases (eg, the NOURISHING database) to identify relevant reports.

Screening

Due to the rapid nature of the reviews, a single reviewer screened titles and abstracts and discussed any uncertainty with a second reviewer. For relevant titles/abstracts, the full text was retrieved for full text review.

Assessment of methodological quality

All included systematic reviews were critically appraised by two reviewers individually using the JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses. When unclear, a second reviewer performed an additional appraisal independently.

Article selection

If the search identified more than one review that includes meta-analysis with a pooled effect size, we selected the single review that best represents our research question. Where there was equal suitability to the research question across the reviews, selection was based on the JBI quality rating taking year of publication into consideration (with more up-to-date reviews being seen as more favourable due to the probable inclusion of more studies). If the search did not identify any reviews that include a meta-analyses/pooled effect size we did one of the following:

- used a published evaluation of a policy reported on the NOURISHING database
- used an Impact Assessment that has been published by a UK (or devolved) government that has been conducted in partnership with an academic institution
- used the highest quality evidence from individual studies reported in a narrative synthesis.

We planned to make the decision based on what we considered to be the most appropriate and robust evidence to answer the research question.

Data extraction

The JBI Data Extraction Form for Review for Systematic Reviews and Research Syntheses was used for data extraction for the final included review. Extracted characteristics included:

- Review characteristics: author/year, objectives, participants (characteristics, total number), setting/context, interventions of interest, date range of included studies, detailed description of the included studies (number/ type/country of origin), appraisal instrument and rating, type of review/method of analyses and outcomes.
- Results: findings of the review and comments.

Results

Abeykoon et al. (2017) is a systematic review examining the impact of newly opened grocery stores on diet and selected health-related outcomes.

What were the systematic review methods?

The review was conducted according to the procedures recommended by Canada's Effective Public Health Practice Project (EPHPP). The authors were comprehensive in their search for studies having searched eight electronic databases: Ovid MEDLINE, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL), ProQuest Public Health, Web of Science, Scopus, PsycINFO and Cochrane Library. The search strategy, initially developed on MEDLINE, was further adapted for seven additional databases. These searches were followed up with hand searching and checking of reference lists.

Initial article screening was conducted by five reviewers whilst abstract and full text screening was done by the lead author. Articles which were excluded during abstract and full screening were reviewed by a second reviewer.

What studies did the review include?

The review included nine quantitative studies, which met the following inclusion criteria; they:

- assessed adults
- measured the impact of newly opened retail grocery stores on physical or psychological health (self or clinician assessed) including obesity (BMI), psychosocial factors, food security, fruit and vegetable (F&V) consumption/purchase or other food-related behaviours
- were peer-reviewed articles published between 1995 and up until submission of the article for publication in 2016.

There were no inclusion criteria specific to study design and as a consequence study designs were diverse. Approximately half (n=5/9) the included articles had comparison groups. Studies included a once off retrospective survey, uncontrolled pre/post, pre/post studies with different samples from the same population and controlled pre-post quasi-experiments. All the included studies reported on the impact of the opening of large new supermarkets, two of which occurred in the UK (Leeds and Glasgow).

The most frequent outcome measure in the selected studies was the number of portions of fruit and vegetables eaten each day. Although one study (Dubowitz et al., 2015) measured calorie intake via 24hr dietary recall and two studies measured BMI or body weight.

Note on bias

Eligible studies were assessed for bias according to the EPHPP quality assessment instrument, a standardised tool for evaluating the quality of quantitative studies. Rating was performed by two authors, with disagreements resolved through consultation with a third rater. All studies were included regardless of their quality rating. This was in order to account for natural experiments in which new supermarkets were opened in previously poorly catered neighbourhoods and where controlled exposure the intervention, in the form of randomised controlled trials, was constrained.

What did the review find?

This is a non-exhaustive summary of the review findings. Please see the original article for more detail missing here. The authors included nine quantitative studies in this review. All included studies evaluated the impact of opening new supermarkets in areas where there had previously been low access to grocery stores. Of these nine studies, two were rated as having highly robust methodology, two as moderately robust, whilst all remaining studies were rated as methodologically weak.

The impact of the new supermarket or grocery store on fruit and vegetable consumption was reported in all studies, but with diverse findings. Only one study reported an increase in the consumption of fruits and vegetables amongst the intervention group relative to the controls. Four studies reported no change in consumption, whilst two reported a decrease in fruit and vegetable consumption. Dubowitz et al. (2015), who found no change in fruit and vegetable consumption, reported a significant decline in overall calorie consumption (-178kcal) in the intervention group relative to controls. One of the studies found the intervention group was significantly more likely to consume ready-meals following the opening of the new supermarket (Sadler et al., 2013).

Only two studies included body weight and/or BMI as an outcome measure. Neither reported pre- to post-intervention differences in BMI or body weight between control and intervention groups in either intention to treat or per protocol analysis. Cummins et al. (2014) conducted a controlled pre-to-post quasi-experimental study which examined the impact of opening a 3810m^2 supermarket in a low-income Pennsylvania neighbourhood. Difference in difference analyses showed no significant benefits to self-reported BMI of shoppers using the new store relative to the comparison group (BMI DID =-0.46, p=0.56). Similarly, Dubowitz et al. (2015) found no significant impact of a new supermarket on researcher-measured BMI. Mean BMI was similar in intervention (BMI = 30.04, SE = .30) and comparison (BMI = 30.8, SE = .49) neighbourhoods at baseline. BMI was unchanged in the intervention neighbourhood but increased somewhat amongst the controls (+.44, p=.02). However, the difference in difference estimate was non-significant.

Although the quality of the Abeykoon et al. 2017 review was generally high, the preponderance of studies with weak methodology makes it challenging to draw

conclusions about the impact of new supermarkets on dietary behaviour and health outcomes. In addition, the diversity of follow-up periods, sample sizes and study designs make the comparison between the studies themselves challenging. Broad conclusions about the efficacy of introducing new supermarkets to areas previously poorly served by retail grocery outlets should be drawn only with caution based on the evidence from this study.