FOOD SUBSIDIES TO PROMOTE HEALTHY EATING AND REDUCE FOOD PRICES: A RAPID LITERATURE REVIEW

DISCUSSION PAPER

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Health, Nutrition, and Population (HNP) Discussion Paper

Food Subsidies to Promote Healthy Eating and Reduce Healthy Food Prices: A Rapid Literature Review

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Abstract

This working paper presents the results of a rapid literature review of program evaluations of food subsidies to promote healthy eating that address sales/prices, consumption, and/or health outcomes. It presents policy relevant findings on food subsidies to promote healthy eating that have been implemented globally, summarizing their impact on sales/prices, food consumption, and health outcomes, as well as circumstantial factors under which food subsidies have greater impact.

Thirty-five publications that described 20 different programs across eight different countries with heterogeneous methodological quality were included in this review. Most of the programs found were implemented in the United States targeting vulnerable population groups. They used varied policy instruments (e.g., vouchers to produce discounts, cash-back rebates, etc.) and ways of administration (e.g., loyalty cards, paper-based vouchers) to provide a variety of subsidies for healthy foods.

Only two programs included reported a high impact on price reduction to the consumer (Shop N Save conducted in South Carolina, US) and food consumption (Healthy Incentives Pilot, conducted in Utah, US). Most of the programs included reported low impact, and seven of them reported a moderate impact on either price or food consumption. Finally, very limited evidence reports that there might be a low impact of these programs on health outcomes.

The amount of the subsidy (higher amounts tend to produce higher impacts) and the fact that it was implemented complementing an established program rather than created in isolation might explain a higher impact of these programs, but the certainty of the evidence is not strong to support this conclusion.

Keywords: Food subsidies, nutritional policies, fiscal policy, healthy diet, rapid reviews

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PART I – INTRODUCTION

Fiscal policies to promote nutritional outcomes

In addition to raising revenue, fiscal instruments can be used to affect behavior, for instance, to improve health outcomes by providing specific incentives to the population and markets. In the context of public health policies, they have commonly been used to address tobacco and alcohol consumption and also pursue nutritional outcomes by disincentivizing unhealthy consumption and/or incentivizing the production, distribution, and consumption of healthy foods (WHO, 2022).

Taxing unhealthy products, such as sugar-sweetened beverages, alcohol, and tobacco is a common element of countries' strategies to discourage unhealthy consumption. These taxes can be framed around three goals: to reduce externalities related to consumption, for example, publicly funded health care costs, traffic accidents, and secondhand smoke; to cut "internalities" related to individual harm, including death and disability; as well as to generate revenue to meet fiscal needs (Lane et al. 2003).

Taxes on alcohol and tobacco have a long history across countries with strong evidence that they have helped to reduce consumption (Guindon et al. 2022; Ho et al. 2017; Guindon et al. 2015; Nazar et al. 2021), which has led to global recommendations to increase taxes on these products (WHO, Regional Office for Europe. 2022; WHO 2023). The World Cancer Research Fund International has reported that more than 40 countries also implemented some type of health-related food taxes (*World Cancer Research Fund*, n.d.). For example, France, Mexico, and Chile implemented taxes on sugar-sweetened beverages in 2012, 2014, and 2015, respectively, becoming leading countries in creating these types of fiscal policies to promote healthy eating. While a number of evaluations of these programs have been conducted, the effectiveness might depend on a variety of factors and contexts, and the true impact of these policies might not be seen until several years after implementation (Hammaker et al. 2022; Wright, Smith, and Hellowell 2017). Furthermore, taxation of unhealthy food might not always be the right policy tool. For instance, it might disproportionally affect low-income individuals, creating potentially regressive effects that may be outweighed by long-term indirect health benefits of these policies, requiring other complementary or compensatory mechanisms (Hammaker et al. 2022; Wright, Smith, and Hellowell 2017).

A number of countries have also chosen to using food subsidies to promote nutritional outcomes by increasing access to healthy foods, particularly for low-income populations. Food subsidies appear more attractive from a political economy point of view and, if well-targeted, can address concerns about the potentially regressive effect of a food tax by providing critical and focalized aid to low-income families to incentivize healthy eating (Black et al., 2012). Food subsidies take various forms, such as vouchers or coupons that can be used to purchase healthy foods, or subsidies for the production and distribution of healthy foods. Their effectiveness to promote nutritional outcomes might also depend on the circumstances under which the program is implemented.

Using existing evaluations to determine the impact of interventions

Using existing evaluations of programs in one country to anticipate the impact of interventions in another country is a common method to support evidence-based policy design. This approach entails reviewing and synthesizing existing program evaluations of

similar interventions or policies that have been implemented in other settings or contexts, and summarizing the impact to later assess their potential applicability in a new context.

This process commonly takes place by conducting extensive systematic reviews, which are evidence syntheses of the literature that collect, appraise, and summarize all available evidence to address a given question (Lasserson et al. 2022). Systematic reviews have long been classified as the most suitable study design to provide insights into the effects (e.g., benefits and harms) of interventions. Hence, well-conducted systematic reviews can provide strong and robust evidence on whether an intervention works or not (Burns, Rohrich, and Chung. 2011).

However, the effects of complex interventions might have important nuances when collecting evaluations conducted elsewhere, as complex interventions are often context-specific and dependent on local factors, such as culture, infrastructure, and resources. In this case, understanding the critical factors, contexts, and settings in which a given intervention might have a differential impact is critical to planning and developing any public policy.

This working paper is structured as follows. Part II states the objectives of the study and the methods applied to achieve it. Part III presents the results of the rapid review, and Part IV presents the discussion and conclusion of these results.

PART II – AIM AND METHODS

Study aims

This paper aims to review the existing literature on food subsidies and to understand the impact that they might have on food prices or sales, consumption, and health outcomes, as well as under what circumstances (e.g., context, specific populations, etc.) this impact may vary.

Specifically, this paper aims to undertake the following:

1. Collect relevant literature that addresses the impact of food subsidies on food prices, healthy eating, and health outcomes.
2. Expand understanding of circumstances and variables that maximize the impact of food subsidies in a given context.

Study methods

A rapid literature review approach was used to identify and assess the relevant literature. Rapid reviews are a specific type of literature review that are used to inform issues where time is relatively constrained. Where common systematic literature reviews are commonly produced in over a year (Borah et al., 2017), rapid reviews can be delivered in a shorter period of time by using specific methodological shortcuts that substantially reduce the time (Tsertsvadze et al. 2015; Haby et al. 2016).

Eligibility criteria

Articles in any language were eligible for inclusion if they had the following characteristics:

- Were evidence syntheses of the existing literature (e.g., systematic review, scoping review, etc.)
- Aimed to address the impact of the use of food subsidies
- Included studies that were not solely conducted in experimental conditions

Studies that only addressed the impact of other fiscal policies (e.g., taxes) or that evaluated the impact of food subsidies that were not programs implemented in a given territory (e.g., were only experimental interventions) were excluded from this analysis.

Search methods

To identify potentially relevant documents, the following bibliographic databases were searched:

- Medline using Ovid
- EMBASE using Ovid
- Cochrane database (including CENTRAL)
- Epistemonikos

These databases were searched on October 18, 2022, using the following strategy in title or abstract:

1. (meta-analysis or "meta-analysis" or metanalysis).ti,ab.

2. (systematic or scoping or qualitative or quantitative or evidence or critical or mapping or integrative or state-of-the-art or literature or umbrella) adj3 (review or synthesis or overview).ti,ab.

3. 1 or 2

4. (meta-synthesis or meta-summary or meta-review).ti,ab.

5. 3 or 4

6. ((food* or fruit* or vegetable* OR health*) adj5 (subsid* or reimbursement* or reward* or incentive* or compensat* or voucher or incentiv* or refund* or rebat* or discount* or cash or bonus* or coupon or token or repay* or ticket)).ti,ab.

7. 5 and 6

Finally, a complementary search of programs was conducted on Google and of key international organizations (World Health Organization [WHO], Pan American Health Organization [PAHO], Food and Agriculture Organization of the United Nations [FAO], Organisation for Economic Co-operation and Development [OECD], etc.) websites. References of the included studies that reported potentially relevant programs were also included and searched to find additional programs that might be eligible. Hence, there might be some studies that are not included in the original review in which most of the data were collected.

Study selection

Duplicates were removed using Covidence ®. All titles and abstracts, and full texts were screened by a single reviewer, and Covidence ® was used for this process.

In conducting this process, one systematic review was prioritized for its inclusion, given its relevance (economic and health outcomes associated with food taxes and subsidies), quality (AMSTAR[1] score 9/11) and recency (the search for studies was conducted on June 1, 2020).

This review included all articles that conducted an evaluation of an existing program to tax or subsidize food and that included an economic or health outcome. From this review, only the studies that were addressing food subsidies were selected for inclusion.

Data extraction

From the review, the following information was extracted by a single reviewer from each article:

- Lead author, month, year, and citation
- Setting of the program being evaluated (country and jurisdictional level)
- Characteristics of the intervention, including the following:
    - Population targeted by the program
    - Name of the program
    - Date on which the program started
    - Type of compensation mechanism (vouchers to purchase, vouchers to produce discounts, cash-back rebates, discounted items or other)

[1] AMSTAR is a tool to evaluate the quality of an evidence synthesis by looking at 11 different characteristics of it (Shea et al., 2007). It is well-accepted that evidence syntheses with AMSTAR score < 4 are low-quality, while evidence synthteses with AMSTAR score > 7 are high-quality and more reliable.

    - How the subsidy was delivered (loyalty card, paper-based vouchers, other methods)
    - The amount of the subsidy
    - Entity in charge of delivering the subsidy
    - Whether the recipients were households or schools
    - Type of food that was being targeted
    - Any co-interventions implemented

- Characteristics of the impact evaluation, including the following:
    - Study design
    - Population targeted by the impact evaluation
    - Setting of the evaluation
    - Time line in which the evaluation took place
    - Impact on sales or price, consumption, and health outcomes
    - Sample size

This information was first collected from what was reported by the original review (Andreyeva et al. 2022). For the information that was not available in the original review, the source of each article was consulted to extract the information missing.

Complementarily, when the name of the program (and its URL for the website) was available, the official information was also consulted to complete any missing information.

Finally, the methodological limitations of each study were collected from the original review and were not assessed for the studies that were captured with complementary searches.

Data analysis

After the information was collected from the sources, a descriptive analysis of the included studies was conducted, calculating the absolute and relative frequencies of the number of papers that were reporting each characteristic extracted, as described above.

Next, the size of the effect of each impact evaluation was classified into three levels (low or very low, moderate, or high) for each outcome (price or sales, consumption, and health outcomes), and the methodological limitations (as stated by the original review) were also classified into three levels (low, moderate, and high).

The effect size was considered by making a judgment looking at several inputs. First, the studies included in the meta-analysis of the original review were segmented by whether they showed a greater or lower effect than the pooled price elasticity results. For studies showing positive price elasticities (i.e., a price decrease entailed a decrease in the outcome) or an elasticity that was lower than the pooled results, the effects were considered as low or very low. Second, for the results that were not part of the meta-analysis, an individual judgment was made based on the specific outcome that was reported, and, when possible, a benchmark was established for some outcomes (e.g., WHO recommendations for a healthy diet (WHO n.d.). Third, the conclusions that each article made were also considered to make this judgment.

The methodological limitations of the articles included were extracted from the categories used by the original review used to conduct this rapid review. Methodological limitations of all studies are included as part of the extraction sheet available in Appendix A.

Finally, the programs and their characteristics were identified and displayed in terms of their impact on each outcome to explore potential patterns that might explain what characteristics of the program might produce higher and lower impacts.

PART III – RESULTS

Characteristics of the included studies

While the original review that was selected included 54 studies, 19 of them were excluded because they were evaluating the impact of policies that only included food taxes. Thirty-five studies were included, while two papers were additionally retrieved from complementary searches of the programs that were identified. Additionally, five papers were retrieved from searching the original papers, but they only complemented the description or evaluation of the programs, without providing additional results. Five experiments of interventions that have not yet been implemented as nationwide programs were also considered for inclusion. Finally, one article is currently under embargo until 2024 and could not be retrieved (Atoloye, 2019).

In total, 20 programs were included. These programs were described in 35 publications. Table 1 shows the details of these programs, including the countries in which they were implemented, the population that was targeted by them, whether the program is currently available, the type of instrument and type of food that was targeted, and the entity in charge of the program.

The vast majority (60 percent) of the programs were implemented in the United States, with a very limited number of studies conducted in low- and middle-income countries (LMICs). The large proportion of studies found in the United States can also be explained by the long history of these programs in the country.

While only three programs were targeting the general population, 80 percent of them were designed for vulnerable populations and, specifically, for people who were already part of an existing social program (e.g., the Supplemental Nutrition Assistance Program [SNAP] or the Supplemental Nutrition Program for Women, Infants and Children [WIC], which was mainly targeting mothers and infants, in the United States), in which the program studied was applied on top of an existing intervention. One study conducted in South Africa was run by a private insurance company for their clients (tagged as “Other” in Table 1).

In 12 of the 20 programs, we found evidence that the initiative was still running, while in 8 of them we could not find evidence online that the program was active. Furthermore, a large proportion of the studies (25 percent) did not report who was the entity in charge of the program.

Most subsidies targeted fruits and vegetables, and the programs were mostly managed by a public health institution, although nongovernmental organizations (NGOs), public agriculture institutions, and private companies were also commonly in charge of these programs.

In terms of the ways in which the subsidies are administered, a similar proportion of programs used loyalty cards that can normally be used only in selected chain stores (e.g., supermarkets), and paper-based coupons or vouchers that are normally used at the entrance of city markets that sell fresh fruits and vegetables.

Table 1. Description of the Programs* Included as Part of This Rapid Review

	N	%
Countries of implementation of the programs		
Australia	1	5
Canada	1	5
India	2	10
Latvia	1	5
Norway	1	5
South Africa	1	5
United Kingdom	1	5
United States	12	60
Population targeted by the programs		
Specific vulnerable population	16	80
General population	3	15
Other	1	5
Currently available		
Yes	12	60
No	8	40
Types of subsidies		
Vouchers to purchase	4	20
Vouchers to produce discounts	6	30
Cash-back rebates	5	25
Discounts	1	5
Other	4	20
Ways of administering subsidies		
Discounts	2	10
Loyalty/gift cards	7	35
Paper-based vouchers/coupons	8	40
Other	3	15
Entity in charge of the program		
Public health institution	5	25
Public agriculture institution	3	15
NGO	3	15
Private company	3	15
Other	1	5
Not reported	5	25
Type of food targeted		
Fruits and/or vegetables	15	75
Healthy food (broader definition)	3	15
Other	2	10

Source: Authors based on the data collected from papers.
Notes: NGO = Nongovernmental organization.

There were four programs that were categorized as “Other” in terms of the classification of the subsidy. First, there was one program in Norway that provided a daily free portion

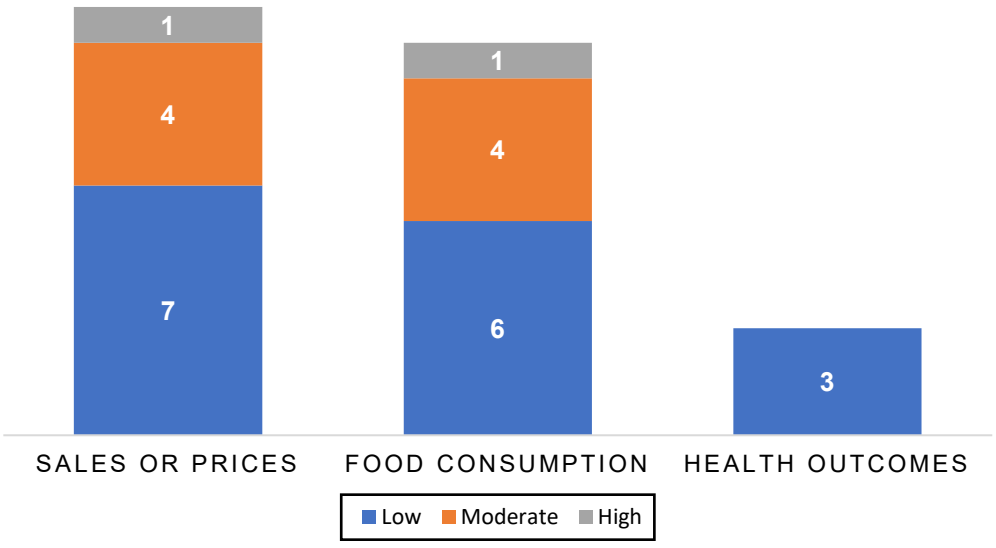
of fruit to students. Second, two programs in India were implemented to introduce changes in the distribution charge of subsidized flour (made from pulses) that was already distributed nationally. Finally, there was one program implemented in Latvia to modify the value-added tax (VAT) (from 21 to 5 percent) for fruits and vegetables.

Finding on contexts that might allow the interventions to work better

Tables 2 and 3 show the characteristics of the programs that were evaluated (in columns), and their classification of effect size in each one of the outcomes considered (sales or price and food consumption, respectively). The programs are characterized by each one of the details that were extracted, and classified into high, moderate, and low impact. Very few studies evaluated the impact of food subsidies on health outcomes. Hence, these studies are not shown in a separate table.

Figure 1 shows the effect size of each one of the programs included and represented by the different outcomes that they are reporting in their evaluations. Finally, appendix B shows the full level of details that were extracted from each paper to build these tables, with the specific judgment that was made to classify impact as high, moderate, and low.

Figure 1. Number of Programs Evaluated and Their Effect Size (Low, Moderate, or High) by Outcome (Sales or Prices, Food Consumption, and Health Outcomes)



Source: Authors based on the data collected from papers.

Effects on sales or price

Twelve different programs reported results on their effects on sales or prices (to see more details on this and other programs, see the data extracted in Appendix A). Only one program was considered to have a high effect by increasing the sales of fruits and vegetables (Shop N Save, with vouchers in the United States/South Carolina), while four of them have shown a moderate impact on sales or price (in the United States with vouchers for fruits and vegetables increasing sales, and in the United Kingdom and South Africa with cash-back rebates increasing the sales of a broader healthy food list). Seven

other programs reported low effect sizes and were conducted in Latvia, the United States, and India.

While the program classified as high-effect size used paper-based vouchers to produce discounts on fruits and vegetables, other programs showing moderate or low effects also used the same mechanism, or loyalty cards to purchase, as well as cash-back rebates. Two programs were substantially different in the interventions used, by applying a modification in the VAT in Latvia, and the introduction of pulses in a public distribution system in India.

The entity in charge of administering the program for the high-impact intervention was not reported, and a variety of institutions were in charge of the rest of the programs included in this section (public health institutions, agriculture institutions, NGOs, private companies, etc.).

While one of the studies (the high-impact program) was not included in the original review (i.e., we do not have an assessment of their methodological limitations), the three studies showing moderate effects have moderate to high quality, and only one study (that reported a low effect) was considered as low-quality.

For evaluations that reported impacts on sales or prices, contextual factors that might explain the higher or lower effects of the programs were not consistent across them (e.g., every program implemented with vouchers showed a moderate or high effect size).

Effects on food consumption

Eleven different programs reported some results on their effects on food consumption. Only one program showed a high effect, that is, an increase in the consumption of targeted food (Healthy Incentives Pilot, implemented in the United States/Massachusetts), but these findings are inconsistent with what is reported in a separate evaluation of the program. Four programs (conducted in the United States and South Africa) reported a moderate impact on food consumption, while seven other programs reported low-effect sizes (conducted in Canada, the United States, Australia, and India).

While the program with the higher-effect size used paper-based vouchers to produce discounts on fruits and vegetables, other programs showing moderate or low effects also used either the same mechanism (i.e., paper-based vouchers), loyalty cards to purchase, paper-based vouchers to purchase items, or cash-back rebates. Two programs were different in their type of subsidy, and they were both conducted in India. The first program is the abovementioned introduction of pulses in a public distribution system in India, while the second is the provision of subsidized wheat flour in the same distribution system in India.

The entity in charge of administering the program in the high-impact intervention was an agriculture institution, while a variety of institutions were in charge of the rest of the programs included in this section (public health institutions, agriculture institutions, NGOs, private companies, etc.). For the programs that were conducted in India, we could not get specific information on what institution is in charge of the public distribution system.

Only three studies (the one showing high impact, and two showing low impact) were considered as having high quality, and most of the studies included in this outcome were

considered as low-quality (including all that showed moderate effect size). Three evaluations were not included in the original review, and, hence, we do not report their methodological limitations here.

In terms of the amount that the subsidy provided, the data are variable among studies. However, we see a trend showing higher amounts of subsidy (i.e., higher discounts in price, lower price) in moderate- or higher-effect sizes (i.e., higher food consumption), while low-effect studies tend to show smaller amounts of subsidies (e.g., four coupons of US$6 per year, £4–£8 per week).

Finally, the only program that was not implemented on top of an existing one in the moderate-effect size group was Healthy Food (South Africa), which was a program only designed for members of private health insurance. At the same time, the only two programs that reported having been implemented on top of an existing one in the low-effect size group were the initiatives implemented in India that, as mentioned above, were implementing different interventions.

While there is some correlation between the effectiveness of the program and these two factors—the amount of the subsidy and the implementation on top of an established intervention—the evidence has important, mainly methodological, limitations, among the included studies.

Effects on health outcomes

Only three programs reported here evaluated health outcomes, and all of them reported very limited impact. The Fruit and Veggie program implemented in Australia to provide a subsidized food box for aboriginal families showed a nonsignificant effect on children's weight. The Healthy Food program implemented in South Africa to provide cash-back rebates for members of the health insurance Discovery (mentioned above) showed no strong evidence that participating in the program might have an effect on obesity rates or body mass index (BMI). Finally, the Norway School Fruit Program concluded that 1.0 to 2.5 years of having implemented this program did not explain an appreciable benefit of BMI, obesity, or overweight rates.

Table 2. Effects of Food Subsidy Programs on Sales or Price

Effect size*	Name of program / Country	Type of mechanism	How the subsidy is delivered	Type of food targeted	Other programs	Entity in charge	Amount of the subsidy	References
High	Shop N Save (US, South Carolina)	Vouchers to produce discounts	Paper-based vouchers	Fruits and/or vegetables	Yes	Not reported	Discount of US$5/week/person	(Freedman et al., 2014) (Not included in the original review)
Moderate	Double Up Food Bucks (US, Arkansas) Healthy Start (UK) Cash-Value Voucher/Benefit (CVV/B) (US, federal) Healthy Food (South Africa)	Vouchers to produce discounts (US, Arkansas; and UK) Vouchers to purchase (US, federal) Cash-back rebates (South Africa)	Paper-based vouchers (US) Loyalty cards (UK and South Africa)	Fruits and/or vegetables (US) Healthy food, broader definition (UK and South Africa)	Yes (US) No (UK and South Africa)	NGO (US, Arkansas) Public health institution (UK) Agriculture institution (US) Private company (South Africa)	50% discount, up to US$20/day/person (US, Arkansas) Discount of £4–£8/person/week (UK) US$6–US$10/month (US, federal) 10–25% discount up to 4,000 rands/month (South Africa)	(Henderson, 2020) (Griffith et al., 2018) (Andreyeva & Luedicke, 2015) (Sturm et al., 2013)
Low	Article 42 of the Latvian VAT Law (Latvia) Cash-Value Voucher/Benefit (CVV/B) (US, federal)** Double Up Food Bucks (US, Michigan) Frequent Buyer Rewards study (US, Pennsylvania) Health Bucks (US, New York) Healthy Incentives Pilot (US, Massachusetts) Name not reported (India)	Modification of VAT (Latvia) Vouchers to purchase (US, federal, New York) Cash-back rebates (US, Michigan, Pennsylvania) Vouchers to produce discounts (US, Massachusetts) Introduction of pulses in the public distribution system (India)	Discount in price (Latvia) Paper-based vouchers (US federal, New York) Loyalty cards (US, Michigan, Pennsylvania)	Fruits and/or vegetables (Latvia and US) Pulses (India)	Yes (US and India) Not reported (Latvia)	Agriculture institution (US federal, Massachusetts) NGO (US, Michigan) Private company (US, Pennsylvania) Public health institution (US, New York) Department of Food and Supplies (India)	Modification of VAT from 21% to 5% (Latvia) US$6–US$10/month (US, federal) 50% discount up to US$20/day (US, Michigan 50% discount (US, Pennsylvania) 40% discount (US, New York) 30% discount (US, Massachusetts) Pulse was sold at between Rs 20–50 per kg, giving 0.5 or 1.0 kg per ration card per month (India)	(Nipers et al., 2019) (Zenk et al., 2014) (Rummo et al., 2019) (Steele-Adjognon & Weatherspoon, 2017) (Phipps et al., 2015) (Olsho et al., 2015) (Bartlett, 2014) (Wilde et al., 2016) (Chakrabarti et al., 2018)

Source: Authors based on the data collected from papers.
Notes: VAT = Value-added tax; kg = Kilograms; NGO = Nongovernmental organization.

*The effect size was classified as high, moderate, and low by making a judgment based on the results shown in the meta-analysis and international recommendations about some outcomes.
**One program can be in more than one row as there might be more than one evaluation conducted in different geographical locations.

Table 3. Effects of Food Subsidy Programs on Food Consumption

Effect size*	Name of program / Country	Type of mechanism	How the subsidy is delivered	Type of food targeted	Other programs	Entity in charge	Amount of the subsidy	References
High	Healthy Incentives Pilot (US, Massachusetts)	Vouchers to produce discounts	Loyalty cards	Fruits and/or vegetables	Yes	Agriculture institution	30% discount (up to 60 US$/month/household)	(Olsho et al., 2015)
Moderate	Double Up Food Bucks (US, Utah) Healthy Food (South Africa) Bonus Bucks (US, New York) Farmers Market Fresh Fund Incentive Program (US, California)	Vouchers to produce discounts (US, Utah) Cash-back rebates (South Africa; and US, California) Match-monetary incentives (US, New York)	Paper-based vouchers (US, Utah, California) Loyalty cards (South Africa; and US, New York)	Fruits and/or vegetables (US, Utah and New York) Healthy food, broader definition (South Africa; and US, California)	Yes (US) No (South Africa)	Public health institution (US, Utah and California) Private company (South Africa) NGO (US, New York)	50% discount (up to 10 US$/day/person) 10–25% cash back (up to 4,000 rands/month/individual) 40% discount + 20 US$ in bonus buck tokens (up to 120 US$) 50% discount up to 20 US$/month	(Durward et al., 2019) (An et al., 2013; An & Sturm, 2017) (Bowling et al., 2016) (Lindsay et al., 2013)
Low	BC Farmers' market nutrition coupon (Canada, British Columbia) Farmers Market Nutrition Program (US, federal) Fruit & Veggie program (Australia, New South Wales) Healthy Incentives Pilot (US, Massachusetts)** Healthy Start (UK) Name not reported (India—2 programs)	Vouchers to produce discounts (Canada; US, Massachusetts Vouchers to purchase (US, federal; UK Discounted items (Australia) Introduction of pulses in the public distribution system (India) Reduced price of fortified	Paper-based vouchers (Canada; and US, federal) Discount in price (Australia) Loyalty cards (US, Massachusetts; UK)	Healthy food, broader definition (Canada and UK) Fruits and/or vegetables (US and Australia)	Yes (India) No (US, federal) Not reported (Canada; US, Massachusetts; UK)	Public health institution (Canada; UK) Agriculture institution (US, federal, Massachusetts, Not reported (India)	16 coupons of US$ 21 over 10–15 weeks 6 US$ coupons (4 coupons/individual/year) 35 $A discount in food box 30% discount (up to 60 US$/month/household) Discount of £4–£8/person/week (UK) Pulse was sold at between Rs 20–50 per kg giving 0.5 or 1 kg per ration card per month (India)	(Aktary et al., 2023) (Anderson et al., 2001) (Anliker et al., 1992) (Black et al., 2012) (Bartlett, 2014) (Klerman et al., 2014) (Parnham et al., 2021) (Scantlebury et al., 2018) (Chakrabarti et al., 2018) (Chakrabarti et al., 2019)

		wheat flour (India)	Flour sold at 11 Rs/kg with max 35 kg per family/month

Source: Authors based on the data collected from papers.
Notes: NGO = Nongovernmental organization; kg = Kilograms.
*The effect size was classified as high, moderate, and low by making a judgment based on the results shown in the meta-analysis and international recommendations about some outcomes.
**One program can be in more than one row as there might be more than one evaluation conducted in different geographical locations.

PART IV – DISCUSSION AND CONCLUSION

This paper presents the results of a rapid review of the literature to understand the impact of food subsidies to promote healthy eating. We presented the results of 20 different programs that implemented some type of subsidy to encourage healthy eating. While the programs were conducted in eight different countries, most of them came from the United States, and a limited number of them were implemented in an LMIC and were targeted to vulnerable population groups. The preponderance of the studies conducted in the United States could be explained by the Food Insecurity Nutrition Incentive (FINI).

The instruments (e.g., vouchers, discounts, loyalty cards) were variable across countries and programs, while there are also a highly variable methodological limitations (i.e., quality or risk of bias) that the different studies included presented.

Only two programs reported a high impact on the price (Shop N Save conducted in South Carolina, US) and food consumption (Healthy Incentives Pilot, conducted in Utah, US), and most of them reported low or moderate effects on either price or food consumption. Finally, very limited evidence reports that there might be a low impact of these programs on health outcomes.

While the primary objective of this rapid review was to identify potential variables that might explain why some programs had a higher effect size than others, none of the variables used had a clear connection with the effect size of the programs. The only potential connection that was found was that higher amounts of subsidies, and programs implemented on top of an established intervention might produce a higher consumption of the targeted food.

Decision makers could expect that food subsidies might have an impact on prices. However, the certainty of the existing evidence does not allow for stronger recommendations. When designing a program, the amount of the subsidy as well as having complementary programs might be important variables to consider, as evidence suggests they could have a role in the effects of a food subsidy program.

We need more studies that evaluate these types of programs in other countries and contexts that could increase the certainty of the existing evidence and its applicability to other contexts. Additionally, we need more program evaluations (and evidence syntheses of them) that are already being implemented to better understand the different variables that explain program success, as well as the longer-term impact of these interventions, and particularly when they are combined with other fiscal (e.g., taxes) and nonfiscal policies.

This study has several important strengths. First, it conducts a rapid systematic search of the literature by focusing on a high-quality systematic review that conducted a recent search to find potentially relevant studies and complemented that search with other studies that were also relevant. Second, this review does not have any specific limitations in eligibility criteria, including any type of program evaluation that had been conducted in any country, regardless of their publication status. Finally, this study not only collects and

summarizes the existing literature on this topic but also aims to find potential variables that could explain the differences between high- and low-impact programs.

This review also has some limitations. First, because this was a rapid literature review, there might be some studies that were not necessarily captured as part of the search strategy. This is particularly important for studies that might not necessarily be called “subsidies” (e.g., free fruits in schools; having pulses like beans, lentils, peas, and the like in food distribution systems), but that were included in this review as strategies to improve the access to healthy foods. Second, we conducted a judgment of effect size based on what the authors of the original review reported in their meta-analyses, and using existing guidance about each outcome. However, a broader and more systematic way to determine effect size could be conducted by using alternative approaches (e.g., expert panels). Third, the amount of the subsidies that were found were based on monetary terms of different countries and times, which might make it difficult to conduct a comparison against them. Finally, as the large number of studies included in this review showed no effect of these programs, further studies might be needed to determine whether other variables could explain this absence of the effect and particularly the variables related to the design of each study (e.g., statistical power, sample size, etc.).

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APPENDIXES

APPENDIX A. DATA EXTRACTION TABLE OF THE INCLUDED STUDIES

Please access the data extraction table with all the studies included here:

https://www.dropbox.com/s/eybf0e82vy3ln5a/HNP%20paper_data%20extraction_2023-04-17.xlsx?dl=0

APPENDIX B. DESCRIPTION OF THE PROGRAMS INCLUDED

Compensation mechanism/How is it delivered?	Australia	Canada	India	Latvia	Norway	South Africa	United Kingdom	United States
Cash-back rebates								
Loyalty/gift cards						Healthy food		Healthy Double Study (Double-dollar incentive) Frequent Buyer Rewards study Double Up Food Bucks (DUFB) Michigan —. (experiment)
Paper-based vouchers/coupons								Farmers Market Fresh Fund Incentive Program
Discounted items								
Discount in price	Fruit & Veggie Program							
Other								

Discount in price		Article 42 of the Latvian VAT Law		
Other		Not reported	Norway School Fruit Program	
Vouchers to produce discounts				
Loyalty/Gift cards				Healthy Incentives Pilot Healthy Foods, Healthy Families (HFHF) – Now called Bonus Bucks
Paper-based vouchers/coupons	BC Farmers' Market Nutrition Coupon Program (BCFMNCP)			Shop N Save (SNS) Double Up Food Bucks (DUFB)
Vouchers to purchase				
Loyalty/Gift cards				Healthy Start

Paper-based vouchers/coupons	Health Bucks Cash-Value Voucher/Benefit (CVV/B) for WIC Farmers Market Nutrition Program (FMNP) — (experiment)

Notes: — = Not available

This working paper presents the results of a rapid literature review of program evaluations of food subsidies to promote healthy eating that address sales/prices, consumption, and/or health outcomes. It presents policy relevant findings on food subsidies to promote healthy eating that have been implemented globally, summarizing their impact on sales/prices, food consumption, and health outcomes, as well as circumstantial factors under which food subsidies have greater impact.

Thirty-five publications that described 20 different programs across eight different countries with heterogeneous methodological quality were included in this review. Most of the programs found were implemented in the United States targeting vulnerable population groups. They used varied policy instruments (e.g., vouchers to produce discounts, cash-back rebates, etc.) and ways of administration (e.g., loyalty cards, paper-based vouchers) to provide a variety of subsidies for healthy foods.

Only two programs included reported a high impact on price reduction to the consumer (Shop N Save conducted in South Carolina, US) and food consumption (Healthy Incentives Pilot, conducted in Utah, US). Most of the programs included reported low impact, and seven of them reported a moderate impact on either price or food consumption. Finally, very limited evidence reports that there might be a low impact of these programs on health outcomes.

The amount of the subsidy (higher amounts tend to produce higher impacts) and the fact that it was implemented complementing an established program rather than created in isolation might explain a higher impact of these programs, but the certainty of the evidence is not strong to support this conclusion.

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