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Fiscal policies for healthy diets: Can taxes and subsidies change what you buy?

Malnutrition affects at least 2.6 billion people worldwide. In 2020, 1.9 billion adults were overweight or obese, and 45 per cent of deaths among children under five were linked to undernutrition.¹ Both the World Health Organization and the latest Lancet Series on adolescent nutrition recommend that governments adopt fiscal policies, such as taxes and subsidies, to encourage diverse, healthy diets that include fruit, vegetables, legumes, nuts and whole greens and less than 10 per cent of total energy from free sugars to combat the double burden of malnutrition.^{2,3,4}

Governments implement taxes on unhealthy foods and beverages to increase the prices of such goods. These taxes are expected to discourage consumers from purchasing and eating them. Conversely, governments implement subsidies on healthy foods and beverages to reduce the prices of subsidized goods. Subsidies are expected to encourage consumers to purchase and eat subsidized products. Therefore, changes in price may improve diet quality and health outcomes.

While at least 50 countries have implemented tax and subsidy policies to support healthy diets, systematic evidence to support their impacts is lacking, particularly in low- and middle-income country (L&MIC) contexts.⁵ To fill this gap and understand the effects of fiscal policies on diet quality and health, we conducted a systematic review of impact evaluations and other systematic reviews.

Highlights

- Most studies evaluate taxes in high-income settings; findings may not be generalizable to L&MICs.
- Overall, the evidence base is inconclusive on whether fiscal policies can meaningfully influence the availability and accessibility of food and beverages, diet quality, and health outcomes.
- Health information campaigns delivered in conjunction with the rollout of fiscal policies may facilitate beneficial effects on consumption and diet.
- Policymakers implementing taxes should consider collaborating locally to mitigate cross-border shopping.
- Product reformulation can potentially reduce consumption of sugars, even for consumers who do not change their purchasing behaviour.
- Tax policies pay for themselves and may be cost-effective to implement.
- Data limitations prevented authors from conducting key analyses to better understand the impacts of fiscal policies.

Overview of evidence

Most studies evaluate taxes in high-income settings; findings may not be generalizable to L&MIC contexts. Our initial search returned 6,585 studies, of which 2,113 remained after de-duplication. We included 24 impact evaluations and two systematic reviews in this review. Nearly all studies were quasi-experimental and evaluated policies in high-income countries, primarily in the United States and Europe. Just four studies evaluated subsidies; two of these took place in India (Table 1).



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Table 1: Details on included studies

Intervention Group	Number of studies	Implementation country(ies)	Outcomes evaluated	Indicators evaluated
Taxes on sugar-sweetened beverages (SSBs), aerated SBs or carbonated beverages	18	Barbados, USA, Spain, Chile, France, Portugal, Saudi Arabia, United Kingdom	All purchases	Calories purchased in beverages Calories purchased in high-sugar foods Sugar purchased in beverages Sugar purchased in high-sugar foods Volume of purchased beverages
			Taxed purchases	Calories purchased in taxed beverages Volume of beverage purchases
			Untaxed purchases	Calories purchased in untaxed beverages Grams of sugar purchased in beverages Volume of purchased beverages
			Diet quality	Consumption of grams of added sugar Ratio of post to pre-tax prevalence of regular consumption of taxed beverage
Taxes on SSBs and high-sugar foods	4	Mexico, Hungary, Norway	All purchases	Calories purchased in beverages Volume of purchased beverages
			Taxed purchases	Calories purchased in taxed beverages Volume of beverage purchases
			Untaxed purchases	Calories purchased in untaxed beverages Volume of purchased beverages
			Health	Outpatient visits for dental caries
Subsidies for staples (pulses, fortified wheat)	2	India	Subsidised purchases	Purchases of pulses
			Diet quality	Daily household intake of protein
			Health	Haemoglobin levels
Subsidies for fruits and vegetables	2	Norway, USA	Diet quality	Intake of fruits (excluding fruit juices) and vegetables (excluding potatoes) Servings of fruit in the previous week



Main findings

Imposing taxes on unhealthy goods may decrease purchases. However the evidence base is too limited to draw conclusions on subsidies.

Our meta-analysis suggests that imposing taxes may decrease purchases of taxed goods ($\mu = -0.14$ [95% CI: -0.26 to -0.03], $n = 15$), but this impact was driven by a single study that we assessed as high risk of bias. We did not find evidence that taxed beverages were substituted with untaxed 'healthier' beverages or with sugary food. Since only four studies evaluated subsidies, the evidence base is too limited to draw conclusions about the effects of subsidies on purchasing or diet quality. Overall, the evidence base is inconclusive on whether fiscal policies can meaningfully influence the availability and accessibility of foods and beverages, diet quality, and health outcomes.

Health information campaigns, larger tax jurisdictions and manufacturer reformulation can facilitate positive impacts on diet and health. Several tax policies were implemented alongside health information campaigns to inform consumers of the adverse health effects of consumption of sugar-sweetened beverages (SSBs) or high-sugar foods. Authors reported that exposure to this health information may have influenced consumption. Many authors also noted that to avoid paying taxes, consumers sometimes travel to stores outside the tax jurisdiction to purchase taxed foods at relatively lower prices. Larger tax jurisdictions limit opportunities for tax evasion and may further reduce the consumption of taxed products. In countries that taxed sugar directly, SSB manufacturers reformulated products to reduce added sugars and pay a lower tax rate. In contexts where the volume of purchases of SSBs or high-sugar foods did not change,

product reformulation may still lead to changes in the consumption of added sugars.

Tax policies are potentially cost-effective to implement. Taxes generate revenue, which can be invested in nutrition and health programming to offset the indirect costs that unhealthy foods may impose on the health systems. Many of the fiscal policies we analysed are still in place today.

Limitations in data prevented authors from conducting key analyses to better understand the impacts of fiscal policies. In many studies, the data sources used did not have key information needed to quantify impacts and adequately respond to the research questions. We assessed all 24 impact evaluations as having some concern or high risk of bias for at least two criteria. Common quality concerns were related to confounding and reporting bias. We did not observe publication bias.



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Implications

Policy and practice

Additional research on the effects of fiscal policies on diet quality and health is needed. Since these policies are implemented worldwide, policymakers should commission additional research to understand what works and what does not. Only two studies considered the impacts of these taxes on diet quality, and only four studies evaluated subsidies. The evidence that beverage taxes reduce purchases of taxed products is driven by a single study that we assessed as having a high risk of bias.

Imposing taxes may not influence consumers to substitute unhealthy foods and beverages with healthy ones. To facilitate impacts on diet and health, policymakers should consider additional actions when rolling out taxes. These actions could include 1) implementing health information campaigns; 2) collaborating with local government to increase the tax jurisdiction, and 3) spurring manufacturers to reformulate high-sugar products. Before rolling out health information campaigns, policymakers should consider conducting a needs assessment to better understand health knowledge in their population. If appropriate, they may incorporate health information campaigns to amplify the signalling effects of the taxes, increase compliance with taxes, reduce

purchases of unhealthy foods, and improve diet and health. Collaboration with other local governments to form larger tax jurisdictions may further reduce avoidance behaviours, such as cross-border shopping, and increase adherence to taxes. Product reformulation can potentially reduce the consumption of sugars even for consumers who do not change their purchasing behaviour.

Revenue from taxes can be allocated for health and nutrition programming. Tax policies pay for themselves by generating revenue and may be more sustainable than other nutrition interventions.

Integrating subsidies into existing food support systems may facilitate greater access among low-income populations. These policies can be rigorously evaluated if governments share routine monitoring data with researchers.

Researchers

Develop rigorous evaluation design strategies to overcome data limitations such as confounding and independence bias. Synthetic control analysis may be appropriate in these settings where there is a single intervention unit and non-intervention sites are likely to be fundamentally different from intervention sites.^{6,7} Evaluations should use all available data and diversify data sources to

better understand the impacts of SSB and high sugar food taxes on diet and health outcomes. Researchers should consider collecting new data or leveraging large-scale data sources such as those available through DHIS2, DQQ and the FAO and partnering with the government to access nutrition and health information.^{8,9,10}

Prioritise evaluations in L&MIC contexts and evaluations of subsidies in all contexts, especially those focusing on healthy foods, such as fruits, vegetables and pulses. Evaluations should include equity aspects, such as subgroup analysis by socioeconomic status, body-mass index or pre-existing health conditions that may correlate with consumption of healthy or unhealthy foods and beverages. Theory-based evaluations should prioritise measuring the impacts of these interventions on diet quality and health, rather than purchasing behaviour. Mixed-methods evaluations could elucidate how consumers respond to these fiscal policies. More cost-evidence is needed to justify the use of subsidies but may not be needed for the implementation of taxes, which generate revenue. Long-term outcomes should also be investigated as some consumer behaviours, such as purchases of diet cola, may change over time.

End notes

¹ 'Fact sheets – Healthy diet' World Health Organization (2021). Available at: <https://www.who.int/news-room/fact-sheets/detail/healthy-diet>

² Hargreaves, Dougal, Emily Mates, Purnima Menon, Harold Alderman, Delan Devakumar, Wafai Fawzi, Geva Greenfield, et al. "Strategies and Interventions for Healthy Adolescent Growth, Nutrition, and Development." *The Lancet* 399, no. 10320 (January 8, 2022): 198–210. [https://doi.org/10.1016/S0140-6736\(21\)01593-2](https://doi.org/10.1016/S0140-6736(21)01593-2).

³ 'Taxes on Sugary Drinks: Why do it?' World Health Organization (2017). Available at: <https://apps.who.int/iris/bitstream/handle/10665/260253/WHO-NMH-PND-16.5Rev.1-eng.pdf;sequence=1> (Accessed: 24 January 2022).

⁴ 'Fact sheets – Healthy diet' World Health Organization (2020). Available at: <https://www.who.int/news-room/fact-sheets/detail/healthy-diet>

⁵ 'Countries that have implemented taxes on sugar-sweetened beverages (SSBs).' *Obesity Evidence 955 Hub*, (no date) Available at: <https://www.obesityevidencehub.org.au/collections/prevention/countries-that-have-implemented-taxes-on-sugar-sweetened-beverages-ssbs> [Accessed March 15 2021]

⁶ Kurz, C.F. and König, A.N. (2021) 'The causal impact of sugar taxes on soft drink sales: evidence from France and Hungary', *The European journal of health economics: HEPAC: health economics in prevention and care*, 22(6), pp. 905–915. doi:10.1007/s10198-021-01297-x.

⁷ Puig-Codina, L., Pinilla, J. and Puig-Junoy, J. (2021) 'The impact of taxing sugar-sweetened beverages on cola purchasing in Catalonia: an approach to causal inference with time series cross-sectional data', *The European Journal of Health Economics*, 22(1), pp. 155–168. doi:10.1007/s10198-020-01246-0.

⁸ 'Collect, Visualize and Analyze Your Data with DHIS2, the World's Largest Health Information Management System, a Global Public Good', DHIS2 (no date). Available at: <https://dhis2.org/>.

⁹ 'DQQ Tools & Data' (2021), Global Diet Quality Project. Available at: <https://www.globaldietquality.org/dqq>

¹⁰ 'FAO/WHO GIFT | Food and Agriculture Organization of the United Nations.' FAO (2022). Available at: <https://www.fao.org/gift-individual-food-consumption/en/>



What is a systematic review?

3ie systematic reviews use rigorous and transparent methods to identify all of the studies that qualify for analysis and synthesis to address a specific research question. Reviewers identify published and unpublished studies and use theory-based, mixed methods to analyze and synthesize the evidence from the included studies. The result is an unbiased assessment of what works, for whom, why and at what cost.

About the review

This brief is based on the GIZ-funded Systematic Review on Fiscal Policy Interventions for Healthy Diets, by Jane Hammaker, Daniela Anda, Tomasz Kozakiewicz, Viniha Bachina, Shannon Shisler and Charlotte Lane (forthcoming).

The review authors found and appraised the quality of 24 impact evaluations and two systematic reviews on the use of fiscal policies in health in low- middle- and high-income countries. The analysis takes into consideration elements of risk of bias, consistency and precision, plausible confounding, effect size and the likelihood of publication bias. This review has been commissioned and funded by Germany's Federal Ministry for Economic Cooperation and Development (BMZ) through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) through its "Knowledge for Nutrition" Programme. The contents are the responsibility of the International Initiative for Impact Evaluation (3ie) and do not necessarily reflect the views of GIZ or the Government of Germany.

About this brief

This brief was authored by Jane Hammaker and Charlotte Lane. They are solely responsible for all content, errors and omissions. This brief was designed and produced by Tanvi Lal, Akarsh Gupta and Durgadas Menon.




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