

# INPLASY

## Considering the double burden of malnutrition in the context of overweight interventions in low- and middle-income countries: a scoping review protocol

INPLASY2025100085

doi: 10.37766/inplasy2025.10.0085

Received: 23 October 2025

Published: 23 October 2025

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### ADMINISTRATIVE INFORMATION

**Support** - None.

**Review Stage at time of this submission** - Piloting of the study selection process.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY2025100085

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 October 2025 and was last updated on 23 October 2025.

## INTRODUCTION

**Review question / Objective** Review objective: This review aims to identify evaluation studies of interventions targeting overweight and obesity in low- and middle-income countries (LMICs). Specifically, it seeks to determine whether these studies evaluate only the impact on overweight/obesity indicators or also consider their impact on undernourishment indicators, thereby adhering to a double-duty approach. The objectives are to provide an overview of the impacts these studies reported and, where applicable, highlight the intervention's double-duty potential. For that purpose, and given the potentially heterogeneous nature of the studies, a systematic scoping review is conducted.

Concept: The IFPRI Global Nutrition Report 2015 acknowledged that LMICs face common drivers

for both under- and overnutrition, collectively referred to as the double burden of malnutrition (DBM). The report called for “double-duty” actions to address this issue holistically. In 2017, the WHO identified five specific areas and six platforms for interventions with double-duty potential (augmented by Pradeilles et al., 2019, by two more areas). The concept comprises interventions that address overweight/obesity within these 13 domains that possess double-duty potential, from individual- to national-level interventions. Interventions may include, but are not limited to, school nutrition policies, behavioral counseling, fiscal policies (e.g., sugar taxes), marketing restrictions, or structural changes (e.g., food system reforms). The key is that each intervention falls into one or more of the 13 double-duty categories, making it relevant for potential effects on undernourishment.

**Context:** The context is limited to LMICs experiencing a DBM. These settings are characterised by coexisting rates of undernourishment and overweight/obesity. Interventions in high-income countries (HICs, which can exhibit high rates of overweight/obesity but low rates of undernourishment), or in settings without evidence of DBM, are outside the review's context. The institutional, environmental, or policy setting of the intervention (school, urban/rural, national program) is not restricted. For the purpose of this study, a country is classified as a DBM country if the following criteria are met. Following the prevalence thresholds of de Onis et al. (2019), wasting or stunting among children under five years of age must exhibit at least medium prevalence ( $\geq 5\%$  wasting or  $10\%$  stunting). At the same time, the prevalence of overweight among children under five years must also be at least medium ( $\geq 5\%$ ). Adult prevalence is examined in a second step. For this, adapted prevalence thresholds are applied, defining medium prevalence of overweight in adults as more than  $20\%$  (following Shekar and Popkin, 2020; Popkin et al., 2020) and medium prevalence of underweight in adults as at least  $20\%$  (following WHO, 2024). Country-level data are taken from the Global Nutrition Report (2022), scanning countries in Africa, Asia, Latin America and the Caribbean, and Oceania (except Australia and New Zealand). For the present analysis, it suffices if a country met the defined thresholds at any point during the 20-year period from 2000–2019.

**Population:** Studies may involve any age group (children, adolescents, adults) and all genders living in DBM countries. The population may include individuals directly targeted by the overweight intervention, or indirectly connected groups (e.g., caregivers, parents, households).

**Background** Overweight and undernourishment, though seemingly opposite conditions, share several common risk factors that can be categorized into biological, environmental, and socioeconomic factors (WHO 2017). Biological factors include maternal and early-life nutrition, which can adversely affect individuals and lead to both undernutrition and overweight. The environment of individuals plays a crucial role by either providing or limiting access to healthy and nutritious foods, health care, and other infrastructure such as safe water and sanitation. Socioeconomic factors, such as poverty, inequality, food insecurity, and lack of educational attainment, are risk factors for all forms of malnutrition.

In response, the concept of double-duty actions has been proposed to address all forms of malnutrition more effectively. This approach advocates for holistic strategies rather than isolated interventions, since they may inadvertently cause harm while addressing a specific issue. By considering the interconnected nature of various forms of malnutrition, double-duty actions aim to create comprehensive solutions that mitigate the risk of negative side effects (e.g. Hawkes et al. 2017).

**Rationale** According to the double-duty call for action, efforts aimed at mitigating the overweight problem and efforts aimed at reducing undernutrition in LMICs should not negatively interfere with each other. Whether this norm is already being applied as common research practice for evaluating overweight interventions or not, is unknown. How undernourishment interventions affect both undernourishment and overweight indicators is the other side of the question and not part of this project. Against this background, the goal of this review is to give an overview of how (or if) current analyses of overweight interventions ("treatments") include not solely the effects on overweight indicators but also on undernourishment indicators.

## METHODS

**Strategy of data synthesis** The initial attempts at formulating search terms involve an informal review of existing articles and systematic reviews in PubMed. This review helps identify additional words, synonyms, and word forms to include in the search strategy. Artificial intelligence is also utilized to suggest synonyms and other word forms. Through an iterative process, the search terms are continually refined.

Databases to be searched are PubMed, Cochrane Database of Systematic Reviews, CINAHL, and WHO Global Index Medicus.

Our search strategy comprises three components:

- (a) overweight; + synonyms<sup>1</sup>
- (b) DBM country names + DBM region names + developing country; + synonyms<sup>1</sup>
- (c) interventions with double-duty potential identified by WHO (2017) and Pradeilles et al. (2019); + synonyms<sup>1</sup>

<sup>1</sup> Synonyms include also other word forms, such as adjectives and verbs.

The following presents the exact search string, which will be modified as needed to meet each database's technical specifications:

(a) obesity OR obese OR overweight OR overnutrition OR adipos\* OR malnutrition OR malnourish\*

(b) "developing countr\*" OR "developing region\*" OR "developing state\*" OR "least developed countr\*" OR "low-income countr\*" OR "middle-income countr\*" OR "global south" OR "third world" OR Africa\* OR Asia\* OR Caribbean OR "Central America\*" OR "Latin Amer-ica\*" OR "South-America\*" OR Melanesia\* OR "Middle-East\*" OR Maghreb OR Sahel OR Barbados OR Belize OR Bolivia OR Colombia OR "Dominican Republic" OR Ecuador OR "El Salvador" OR Guatemala OR Guyana OR Haiti OR Honduras OR Mexico OR Nicaragua OR Panama OR Paraguay OR Peru OR Suriname OR "Trinidad and Tobago" OR Uruguay OR Venezuela OR Algeria OR Angola OR Benin OR Botswana OR "Burkina Faso" OR Bu-rundi OR Cameroon OR "Central African Republic" OR Chad OR Comoros OR Congo OR "Cote d'Ivoire" OR Djibouti OR Egypt OR "Equatorial Guinea" OR Eritrea OR Eswatini OR Swaziland OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guinea\* OR "Guinea-Bissau" OR Kenya OR Lesotho OR Liberia OR Libya OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Morocco OR Mozambique OR Namibia OR Niger OR Nigeria OR Rwanda OR "São Tomé and Príncipe" OR Senegal OR "Sierra Leone" OR Somalia OR "South Africa" OR "South Sudan" OR Sudan OR Tanzania OR Togo OR Tunisia OR Uganda OR Zambia OR Zimbabwe OR Afghanistan OR Armenia OR Azerbaijan OR Bangladesh OR Bhutan OR "Brunei Darussalam" OR Cambodia OR China OR "Democratic People's Republic of Korea" OR "North Korea" OR Georgia OR India\* OR Indonesia OR Iraq OR Jordan OR Kazakhstan OR Kyrgyzstan OR "Lao People's Democratic Republic" OR Lebanon OR Malaysia OR Maldives OR Mongolia OR Myanmar OR Nepal OR Oman OR Pales-tin\* OR Pakistan OR Philippines OR "Saudi Arabia" OR "Sri Lanka" OR Syria\* OR Tajiki-stan OR Thailand OR "Timor-Leste" OR Turkey OR Turkmenistan OR Uzbekistan OR "Viet Nam" OR Yemen OR Fiji OR Kiribati OR "Marshall Islands" OR Nauru OR "Papua New Guinea" OR "Solomon Islands" OR Tonga OR Tuvalu OR Vanuatu

(c) breastfeed\*

OR "maternal nutrition" OR "mother\* nutrition" OR "maternal diet\*" OR "mother\* diet\*" OR "nutrition during pregnancy" OR "prenatal nutrition" OR "antenatal nutrition" OR "nu-trition for maternal health" OR "nutritional care for mother\*" OR "antenatal care" OR "pre-natal care" OR "maternity care" OR "care during pregnancy" OR "care during

pregnancy" OR "maternal health" OR "pregnancy health"

OR "early life nutrition" OR "infant nutrition" OR "infant feeding" OR "nutrition in early childhood" OR "nutrition in early life" OR "nutrition in the first 1000 days" OR "nutrition during infancy" OR "nutrition for early development"

OR "school food" OR "school meal\*" OR "school lunch\*" OR "school nutrition\*" OR "student meal\*" OR "meal program\* for school\*" OR

OR "marketing regulat\*" OR "advertis\* regulat\*" OR "marketing control\*" OR "marketing restrict" OR "advertis\* restrict\*" OR "marketing guideline\*" OR "advertis\* guideline\*" OR

OR "national diet\* guideline\*" OR "national diet\* polic\*" OR "national food polic\*" OR "national nutrition\* guideline\*" OR "national nutrition\* recommendation\*" OR "national food and nutrition guideline" OR "food-based dietary guideline\*" OR

OR tax OR taxing OR "nutrition\* educat\*" OR "front-of-packag\* label\*" OR reformulat\* OR fruit\* OR vegetable\*

OR "health care" OR "healthcare" OR "health services" OR "health treatment\*" OR "pre-ventive care" OR "universal health care"

OR "humanitarian aid" OR "nutritional aid" OR "emergency nutrition\*" OR "acute nutri-tion\*" OR "emergency food" OR "acute food" OR "humanitarian assistance" OR "relief aid" OR "emergency relief" OR "crisis aid" OR "disaster aid" OR "relief support" OR "cri-sis support" OR "emergency assistance" OR "humanitarian relief" OR "food assistance" OR "disaster relief" OR "humanitarian response" OR "emergency response"

OR "urban food" OR "urban agricultur\*" OR "direct farm marketing" OR "direct farm-consumer marketing" OR "urban farm\*" OR "urban garden\*" OR "community garden\*" OR "rooftop farm\*" OR "urban horticultur\*" OR

OR "female\* educat\*" OR "women\* educat\*" OR "girl\* educat\*" OR "matern\* leave"

OR "urban water" OR "urban sanitation" OR "urban hygiene\*" OR "urban waste manage-ment"

OR "nutrition\* advice" OR "diet\* advice" OR "nutrition\* treat\*" OR "diet\* treat\*" OR "nu-trition\* counsel\*" OR "diet\* counsel\*" OR "diet\* guidance" OR "nutrition\* consult\*" OR "diet\* consult\*" OR

The search only includes results in English language and for the period 01.01.2018–30.06.2025. All three sets must be included in the title or abstract to be a potentially relevant article, so they are connected by the Boolean operator AND. Within each of the three sets, synonyms are connected by the operator OR to allow any of the synonyms to be relevant. Wildcard \* is used in some words to account for different versions of the

word stem, e.g. “developing countr\*”. Proximity operators (e.g. NEAR or NEXT) and grouping of terms through parentheses are used to account for differently phrased terms, e.g. “(maternal OR mother\*) NEAR (nutrition\* OR diet\*)”.

**Eligibility criteria** The review includes any study conducted in countries with a double burden of malnutrition, with no restrictions on age groups and gender. The review aims to gather all empirical studies published in academic journals that evaluate any overweight intervention with double-duty potential undertaken in a country that exhibits DBM status in order to prepare, compare, and assess their outcome variables. The specific interest is to assess whether the outcome variables in the studies solely include overweight indicators or also undernourishment indicators.

Only publications written in English and published between January 2018 and June 2025 were considered. The term and call for “double-duty action” was first coined by IFPRI (2015) and further operationalised by WHO (2017). Therefore, this study aims to analyze whether overweight intervention studies followed this guidance and integrated both aspects of malnutrition into their evaluations. 2018 serves as the starting point for the analysis to focus on contemporary scientific practices following the WHO’s 2017 publication. Including earlier studies might capture immediate responses to IFPRI’s 2015 call or even earlier practices, but such studies are less likely to have explicitly embraced the double-duty concept. Considering the typical timelines of research projects and publication processes, most literature published before 2018 probably did not yet reflect the double-duty approach. Studies published after 2018 but before the publication of Pradeilles et al. (2019) will not have included their two added areas with double-duty potential.

Excluded are studies focused solely on medical comorbidities, surgical or pharmacological obesity treatments, laboratory/animal experiments, genetic predisposition studies, or evaluations conducted in HICs (including subpopulations of low-income settings within them).

**Source of evidence screening and selection** A scanning of existing systematic reviews on related literature identified important databases: Databases searched are PubMed, Cochrane Database of Systematic Reviews, CINAHL, and WHO Global Index Medicus. The following relevance criteria are formulated for the reviewers to result in consistent selection decisions and to make the selection process as transparent and replicable as possible. For solving disagreements between reviewers, see Data Management.

All relevance criteria shall include synonyms of overweight and intervention, respectively:

1. The text is relevant if the study analyzes an overweight intervention. It is not relevant if it merely describes the obesity phenomenon or discusses intervention needs without evaluation.
2. The text is relevant if the study is empirical or experimental; theoretical or conceptual papers are excluded.
3. The text is not relevant if the study focuses solely on interventions in HICs, including low-income settings therein. The text is relevant if the location studied is within a country with DBM status.
4. The text is not relevant if the study focuses on other medical conditions but analyzes obese patient groups, or on diseases associated with obesity (such as diabetes or colon cancer).
5. The text is not relevant if the study solely analyzes obesity surgery.
6. The text is not relevant if the study solely analyzes obesity drug treatments.
7. The text is not relevant if the study analyzes laboratory or other interventions on animals.
8. The text is not relevant if the study focuses only on genetics (dispositions) in the context of overweight and obesity.
9. The text is relevant if it analyzes interventions around the following topics that have double-duty potential (according to WHO, 2017, and Pradeilles et al., 2019):
  - a. National dietary guidelines (WHO action platform 1)
  - b. National-level policies for overweight, obesity, non-communicable diseases (such as taxes, nutritional education, front-of-package labeling, reformulation, fruit and vege-table subsidies) (WHO action platform 2)
  - c. Health system improvements (strong primary care, universal health care provision, an-tenatal and maternal care for mothers and their infants, long-term care for NCDs) (WHO action platform 3)
  - d. Humanitarian aid and emergency nutrition programs not only focused on food quantity and food security, but also on quality, nutritious diets (WHO action platform 4)
  - e. Urban food policies and systems, such as urban agriculture and direct farm-consumer marketing (WHO action platform 5)
  - f. Social policies for women, such as improving female access to education or paid ma-ternity leave (WHO action platform 6)
  - g. Protections and promotion of exclusive breastfeeding (WHO double-duty candidate 1)
  - h. Maternal nutrition and antenatal care programs (WHO double-duty candidate 2)

- i. Actions to optimize early nutrition/promotion of appropriate early and complementary feeding in infants (WHO double-duty candidate 3)
- j. School food policies and programs (WHO double-duty candidate 4)
- k. Marketing regulations (WHO double-duty candidate 5)
- l. Improving access to safe water, sanitation, and hygiene in urban settlements (Pradeilles et al. additional double-duty candidate 1)
- m. Develop and strengthen social support systems to enable people to seek specific nutrition advice and treatment (Pradeilles et al. additional double-duty candidate 2).

**Data management** Two reviewers will be involved in selecting the studies for inclusion. First, the search term will be applied to all four databases, and results saved. All results will be independently coded by the reviewers as either relevant or not relevant, based on the predefined relevance criteria described above. If inter-reviewer consistency is below 80% (Krippendorff 2004) after comparing a random sample of 75 references, relevance criteria will be adjusted. The process ensures the development of reliable relevance criteria, supporting a transparent and replicable study selection process (Lacy et al. 2015). The combined list of references will be screened first by title and abstract, followed by a full-text review. The reviewers will adhere to the PRISMA-ScR scheme. Any potential sources of disagreement, whether in the initial or subsequent coding phase, will be analyzed to identify systematic issues. This may lead to further adjustments in the search term or relevance criteria. For example, disagreements might arise from the discovery of previously undefined synonyms of search phrases. This will be addressed by extending the search terms and initiating a new search query. Any remaining disagreements will be resolved through manual consensus.

Citavi and Rayyan will be used for collecting results lists and recording selection decisions. Depending on the final size of the search output, approximately 20% of the sources will be manually screened for eligibility, while the remaining 80% will be prioritized using Rayyan's machine-learning-assisted relevance prediction. This active-learning algorithm continuously refines relevance scores ("star ratings" from 1 to 5) based on prior reviewer decisions and has been applied in other scoping reviews (e.g., Kratzer et al., 2024). References with higher predicted relevance are prioritized for manual review, whereas those with low predicted probabilities (e.g., below 2.5 out of 5 stars) will be excluded automatically once the model's accuracy is verified.

**Reporting results / Analysis of the evidence** A standard extraction template will be used by both reviewers. Key fields to be extracted include:

- Authors, publication year, title, journal, journal focus, doi, year of analysis, country/location of analysis, last access date
- Population characteristics
- Intervention description (type, duration)
- Study design
- Outcome variables measured (whether overweight, undernourishment, or both)
- Key findings, limitations
- Double-duty area(s) addressed or double-duty potential.

**Language restriction** Search results are limited to English language.

**Country(ies) involved** Germany.

**Keywords** Overweight; obesity; undernutrition; double burden of malnutrition; double-duty call to action; intervention analysis; scoping review.

#### Contributions of each author

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