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Review

Obesity from a health management perspective: A holistic view from epidemiology to policy

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ABSTRACT

Objectives: This systematic review aims to synthesize international and national literature on obesity through a health management and governance lens, reframing obesity from an individual behavioral issue into a complex, system-level health system challenge.

Materials and methods: This study is a systematic review conducted between June 2026 and July 2026 and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews.

Results: Searches of Web of Science, Scopus and PubMed, with national sources, were screened against predefined criteria; 75 sources were charted. Prevalence is rising across age and income levels, the obesogenic environment and inequalities shape its distribution, and direct and indirect costs burden budgets.

Conclusion: The review indicates that obesity care should be redesigned as an integrated service chain around the chronic care model, that policy mixes combining fiscal measures with labeling and school-based interventions should be adopted, that digital tools should complement rather than replace care, and that weight stigma should be addressed as a structural barrier. For Türkiye, an agenda converting the epidemiological base into evaluated policy follows.

Keywords: Economic burden, health management, health policy, obesity, obesogenic environment.

Obesity, an accumulation of body fat sufficient to impair health, has become one of the fastest-growing health problems of the twenty-first century.[1] This chronic, relapsing, and multifactorial disease ranks among the leading modifiable risk factors for noncommunicable diseases, most notably type 2 diabetes, cardiovascular disease, and several cancers; the forty-year evidence of the Nurses' Health Studies indicates that excess adiposity shapes these outcomes through environmental and social exposures accumulating across the life course rather than through individual behavior alone.[2] The rise is confined to no single age group or income setting: central obesity is high worldwide, while varying by age, sex, residence, and income,[1] the diabetes burden attributable to high body mass index (BMI) is projected to keep growing to 2045,[3] and the economic burden expands rapidly in low- and middle-income countries.[4]

This picture requires obesity to be treated not merely as a clinical condition but as a health management problem bearing on the financing, organization, workforce, and policy capacity of health systems. Resource allocation between prevention and treatment, reimbursement of the new generation of pharmacotherapies, the design of the service chain extending from primary care to bariatric surgery, and intersectoral regulation of the food environment all fall within the decision space of health

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managers and policymakers. Existing reviews, however, tend to examine these dimensions in isolation (the obesogenic environment, the economic burden, or digital interventions each treated within its own literature) so that the connections among surveillance, financing, service design, and policy remain dispersed across disciplines. This review addresses that gap by charting these strands within a single health-management frame and asking not what causes obesity but how health systems can be organized to govern it; to the authors' knowledge, no prior review has integrated the epidemiological, economic, service-delivery, and policy literatures on obesity from this managerial standpoint, with attention to the Turkish context.

The aim of this systematic review is to synthesize the international and national literature on obesity from a health management perspective, moving beyond individual behavior change to treat obesity as a system-level problem of management and governance. Following the methods below, the review is organized into thematic axes: surveillance, the obesogenic environment, economic burden, service delivery, the Turkish context, population policy, and digital health with weight stigma.

MATERIALS AND METHODS

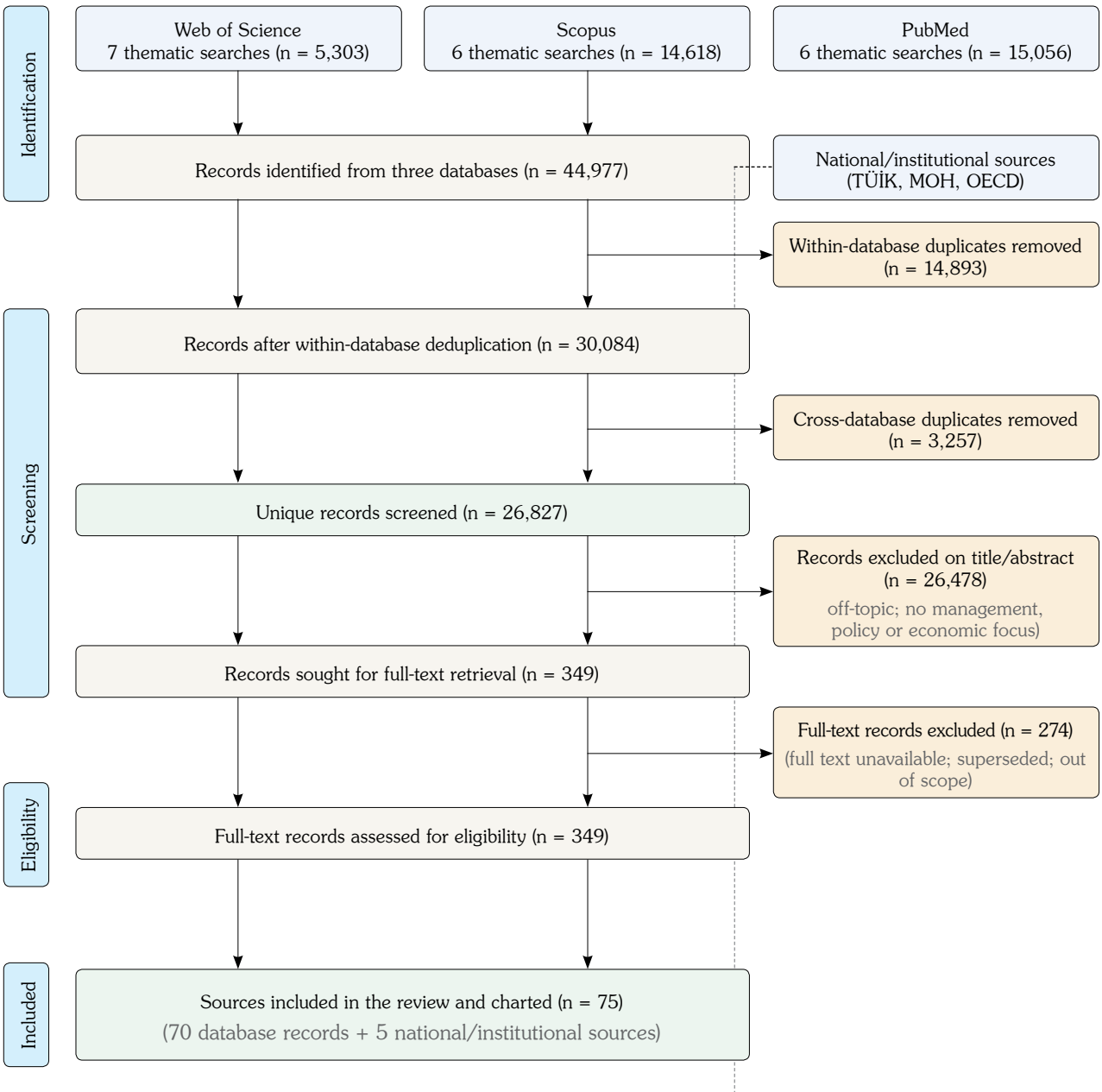
This study is a systematic review conducted between June 2026 and July 2026 and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR), chosen since the review maps a broad, multidisciplinary evidence base spanning epidemiology, health economics, service delivery, public policy, and digital health rather than estimating a single pooled effect. A predefined protocol specified the research question, the databases and search strings, the eligibility criteria, and the data-charting framework before screening began. The guiding question was how the international and national literature frames obesity as a health management problem across surveillance, the obesogenic environment, economic burden, service delivery, population policy, and digital health.

Searches were conducted in Web of Science (Core Collection), Scopus and PubMed, complemented by national sources from the Turkish Statistical Institute (TÜİK), the Ministry of Health and the OECD (Organisation for Economic Co-operation and Development). In Web of Science the Topic search field (TS=) was used, in Scopus, the TITLE-ABS-KEY field, and in PubMed a combination of MeSH and free-text (tiab) terms. A core obesity concept ("obesity", "overweight", "adiposity", "body mass index") was combined with the operator AND to a health-management block ("health policy", "health management", "health system", "health services" and the MeSH headings "Health Policy", "Health Services Administration", "Delivery of Health Care"). Thematic modules were joined with AND and internally with OR, drawing on terms including "Cost of Illness", "Health Expenditures", "Primary Health Care", "Bariatric Surgery", "Glucagon-Like Peptide-1 Receptor Agonists", "Taxes", "Food Labeling", "Nutrition Policy", "Telemedicine", "Mobile Applications" and "Weight Prejudice". Searches were run in the first quarter of 2025 and last accessed on 15 March 2025.

The population of interest was adult and child populations at the health system and policy level rather than specific clinical cohorts. Inclusion criteria were: publication between 2010 and 2025, with priority to work from 2015 onward for policy themes; English- or Turkish-language full text; and study types comprising original research (quantitative, qualitative, and mixed methods), systematic reviews and meta-analyses, health-economic evaluations, and authoritative guidelines and reports from bodies such as the World Health Organization (WHO), the OECD, and the Turkish Ministry of Health. Records were excluded where full text was unavailable, they were not indexed in any database, they addressed obesity solely from a clinical or basic-science standpoint without a management, policy, or economic dimension, or they duplicated a more comprehensive included source. Grey literature was admitted only for official statistics and national program documents, given their relevance to the Turkish policy context.

Records from the three databases were exported to a reference manager and

deduplicated first within and then across databases, using record identifiers, normalized digital object identifiers, and normalized title-year matching. The deduplicated records were screened against the eligibility criteria in two stages, title and abstract, then full text, with the thematic axes serving as the charting framework; national statistical and program sources were identified through targeted searching of official repositories and screened against the same criteria. Seventy-five sources met all criteria and were charted, and the selection process is reported in the PRISMA-ScR flow diagram in Figure 1. In-text citations follow the Index Medicus-NLM style, with bibliographic details taken from the source database records.



Flow follows the PRISMA 2020/PRISMA-SCR framework. Full-text exclusion reasons are recorded in the review protocol.

Figure 1. PRISMA-ScR flow diagram of the study identification and selection process.
TÜİK, Turkish Statistical Institute; MOH, Ministry of Health (T.C. Sağlık Bakanlığı); OECD, Organisation for Economic Co-operation and Development.

Risk of Bias

Since the included evidence spans heterogeneous designs for which no single instrument is valid, risk of bias was appraised with design-appropriate tools rather than one scale: AMSTAR-2 (A MeaSurement Tool to Assess systematic Reviews 2) for systematic reviews and meta-analyses, the Newcastle-Ottawa Scale for observational studies, the CHEERS (Consolidated Health Economic Evaluation Reporting Standards 2022) 2022 checklist for economic evaluations, the CASP (Critical Appraisal Skills Programme) checklist for qualitative work, SANRA (Scale for the Assessment of Narrative Review Articles) for narrative and conceptual papers, and the AACODS (Authority, Accuracy, Coverage, Objectivity, Date, Significance) checklist for grey literature. Consistent with a scoping synthesis, appraisal was summarized at the evidence-stream level, as shown in Table 1, since design characteristics rather than study-specific execution dominate the bias profile at this breadth; the stream-specific limitations are carried into the conclusion.

RESULS

Surveillance and measurement

The quality of epidemiological monitoring depends on the measurement approach. Body mass index remains the standard survey instrument for its ease of application yet reflects fat distribution poorly, whereas waist-based indicators capture the abdominal adiposity more directly tied to cardiometabolic risk, though differing definitions complicate comparison;[1] surveillance should therefore rest on standardized protocols covering both general and central obesity. Marked variation by age, sex, residence, and income requires the subgroup heterogeneity behind national averages to be addressed in planning, justifying differentiated rather than uniform weight-management services.[5]

The obesogenic environment and social determinants

A consequential shift in the obesity literature has been the reconceptualization of the problem from individual willpower towards systemic and environmental determinants,

Table 1. Risk-of-bias assessment by evidence stream

Evidence stream	n	Appraisal tool	Principal risk-of-bias considerations
Systematic reviews & meta-analyses	17	AMSTAR-2	Certainty depends on the primary-study pool; between-review heterogeneity in search rigour and overlapping primary studies limit independence
Observational studies (cohort, cross-sectional, service evaluations)	18	Newcastle-Ottawa Scale	Cross-sectional designs cannot establish temporality; residual confounding and residential self-selection threaten causal inference in environmental studies
Economic evaluations & modelling studies	14	CHEERS 2022	Estimates are sensitive to input assumptions, perspective, time horizon and discounting; causal-cost methods yield substantially higher figures than correlational ones
Qualitative & mixed-methods studies	6	CASP qualitative checklist	Findings are context-bound and shaped by setting and researcher position, constraining transferability rather than internal validity
Narrative reviews, conceptual & methodological papers	14	SANRA (narrative-review quality)	Used for framing and mechanisms rather than effect estimates; selection of cited evidence is author-driven and not systematically screened
Guidelines, reports & national statistics	6	AACODS checklist	Authoritative but not peer-reviewed; self-reported survey estimates understate measured prevalence, and programme documents report design rather than evaluated impact

AMSTAR-2, A MeaSurement Tool to Assess systematic Reviews 2; CHEERS 2022, Consolidated Health Economic Evaluation Reporting Standards 2022; CASP, Critical Appraisal Skills Programme; SANRA, Scale for the Assessment of Narrative Review Articles; AACODS, Authority, Accuracy, Coverage, Objectivity, Date, Significance.

captured in the notion of the obesogenic environment, the physical, economic and sociocultural conditions that steer individuals towards higher energy intake and lower expenditure. Synthesizing this evidence, the European SPOTLIGHT (the European SPOTLIGHT (Sustainable Prevention of Obesity Through Integrated Strategies) review found the association with urbanization relatively consistent but that with other environmental attributes heterogeneous,[6] an unevenness that recurs across the environmental literature and cautions against treating it as a settled evidence base.

Findings on the food environment reflect this heterogeneity. Gibson[7] reported that neighborhood grocery store density was associated with adult BMI in urban areas, whereas Shier et al.[8] found no consistent relationship with childhood obesity across alternative measures and specifications; identical data under different measures can yield contradictory results, counseling caution against causal readings of cross-sectional associations. A Mexican mixed-methods study showed, moreover, that in low-income areas the problem is less an absence of food access than a food swamp of unhealthy abundance,[9] so that access-oriented intervention logic does not hold everywhere; with digitalization, online food delivery platforms form a further regulatory domain.[10]

The built environment occupies a comparable place. Drawing on country, state and city-level data, Pucher et al.[11] showed that rates of active travel are positively associated with physical activity and inversely with the prevalence of obesity and diabetes, while a systematic review of the correlates of sedentary behavior within a socio-ecological framework demonstrates that individual, social, environmental, and policy-level factors must be considered jointly.[12]

Socioeconomic inequality is the principal axis shaping the social distribution of the obesogenic environment. Braveman et al.[13] established graded inequalities by income and education across many health indicators, obesity prominent among them, and a UK Biobank cohort showed the cumulative effect of unhealthy lifestyle factors is more adverse under higher deprivation.[14] Green-space investment, more strongly associated with physical health among disadvantaged groups, carries potential to reduce inequalities.[15] Combating obesity is therefore, beyond individual counseling, a multisectoral governance problem spanning urban planning, the food system, and social policy.

Disease burden and the economic dimension

The strongest evidence base concerning obesity in health management relates to its economic dimension. Tremmel et al.[16] showed that, alongside direct medical costs, indirect costs from productivity losses constitute a substantial burden, though method and scope differences limit comparability. In the United States, Kim and Basu[17] found cost estimates varying considerably with research design while the aggregate effect remained appreciable, and causal-inference methods established that the effect on expenditure exceeds earlier correlational estimates.[18] In the United Kingdom, Scarborough et al.[19] costed poor diet, inactivity and excess weight to the health service as evidence for prioritizing prevention.

The global distribution of the burden has likewise become visible. Okunogbe et al.[20] developed a comparable framework across eight countries and extended it to 161, establishing that the burden is growing rapidly in low- and middle-income settings, not confined to high-income ones.[4] On indirect costs, Cancelliere et al.[21] synthesized evidence that workplace health promotion can improve presenteeism, while Cawley and Ruhm[22] locate the economic rationale for public intervention in the externalities and time-inconsistent choices characteristic of obesity.

Using these estimates in managerial decisions requires methodological differences to be read correctly. Cost figures from different studies cannot be compared directly, since decisions on which comorbidities are attributed to obesity, which components of indirect cost are covered and which time horizon is adopted alter results considerably. That causal estimates exceed correlational ones[18] suggests conventional approaches understate the fiscal impact and undercount the return on prevention investment. Indirect costs, particularly presenteeism, remain

invisible since they fall outside health budgets, whereas from a societal perspective these losses can approach the magnitude of direct treatment costs.

Economic evaluation is likewise decisive in reimbursement. A health technology assessment stressed that pharmacotherapy must be evaluated in combination with non-pharmacological care,[23] while Kim et al.[24] showed cost-effectiveness analysis of semaglutide to be a fundamental information source for payers. The economic burden is therefore not cost accounting alone but a management question bearing on allocation between prevention and treatment, on reimbursement policy, and on workforce productivity.

Health systems and models of obesity care

The chronic, relapsing nature of obesity requires service delivery to shift from episodic treatment towards the chronic care model. A teamlet model of health coaches working alongside physicians improved chronic disease management,[25] and a Philippine study showed that integrating chronic care into existing primary care improved staff competence and clinical outcomes.[26] Adapting the model to obesity remains a live agenda: European payors identify financing, capacity, and governance barriers,[27] and experience with the WHO Acceleration Plan establishes that systems must move beyond prevention to encompass care and treatment.[28]

Primary care constitutes the screening and referral link of obesity management, yet the literature points to substantial gaps. An instrument enabling physical activity to be enquired about routinely proved usable in guiding counseling,[29] whereas United Kingdom data show that BMI recording and diagnostic coding are performed irregularly and monitoring remains inadequate.[30] Post-referral, patients achieved clinically meaningful weight loss overall, though outcomes varied by provider, sex, and obesity class,[31] and combining a mobile application with counseling produced weight loss in disadvantaged patients.[32]

Considered together, these findings indicate that the problem concerns system design rather than isolated implementation deficiencies: recording and coding gaps show that obesity is not addressed systematically in clinical encounters, and differences in outcome across providers show that post-referral service quality is not standardized. Screening cannot produce results unsupported by an effective intervention chain, so the picture is a service design problem requiring obesity management in primary care to be monitored through performance indicators, explicit referral pathways, and quality standards in provider contracts.

Bariatric surgery, at the advanced end of stepped care, raises problems of capacity and equity. Examining Canadian data, Padwal et al.[33] established that the population eligible for publicly funded surgery far exceeds capacity and that protracted waiting times generate inequity of access, while a qualitative study of the postoperative period shows that needs for structured follow-up and psychosocial support are largely unmet.[34] Bariatric surgery must therefore be planned not as a discrete procedure but as a service chain extending from preoperative preparation to long-term follow-up.

The development most recently straining health systems is the demand and cost pressure from glucagon-like peptide-1 receptor agonists. With over 40% of United States adults meeting obesity criteria, more than one hundred million potential users, equitable, sustainable access requires market mechanisms and policy solutions designed together.[35] The strategies for managing this pressure, summarized with the principal agents in Table 2, converge on a single managerial principle: the value of the new pharmacotherapies is defined not by short-term weight loss alone but together with long-term health outcomes and system-level opportunity cost, so that reimbursement, eligibility, and treatment-continuity decisions must be taken jointly rather than in isolation.

The Turkish context: National data, policy and institutional capacity

The Turkish evidence base has developed considerably, yet it remains concentrated in epidemiology and thin in the management, economic, and policy-evaluation dimensions.

Table 2. Current anti-obesity pharmacotherapies: a managerial comparison

Agent/class	Mechanism	Managerial and economic consideration
Semaglutide (GLP-1 receptor agonist)	Incretin mimetic; suppresses appetite and slows gastric emptying	Cost-effectiveness sensitive to price and eligibility; comparative analysis informs reimbursement[24]
Dual GLP-1/GIP receptor agonists	Combined incretin action with greater average weight reduction	Larger effect raises budget-impact and continuity questions across a large eligible population[35]
Anti-obesity pharmacotherapy in primary care (general)	Adjunct to lifestyle intervention	Should be evaluated jointly with non-pharmacological care rather than in isolation[23]
Weight-maintenance strategies after plateau	Lower-intensity continuation following initial weight loss	Staged pricing and treatment design mitigate cost and address regain after discontinuation[36]

GLP-1, glucagon-like peptide-1; GIP, glucose-dependent insulinotropic polypeptide.

According to the Türkiye Health Survey of the Turkish Statistical Institute, obesity prevalence among those aged 15 and over stood at 21.1% in 2019, 20.2% in 2022, and 21.8% in 2025, with a persistent gender gap in which it is markedly higher among women.[36] The OECD reports a comparable self-reported figure of around 20%, slightly above its average, while noting that self-report systematically understates measured prevalence.[37] This divergence between self-reported and measured data is not a technical footnote but a governance concern, since resource allocation and targeting rest on prevalence figures whose level depends on measurement method; the surveillance argument above applies with particular force to Türkiye.

Türkiye has, in parallel, accumulated a substantial policy architecture. The Ministry of Health launched the Türkiye Healthy Nutrition and Active Life Programme in 2010 and renewed it for 2014-2017, establishing an intersectoral framework for nutrition, physical activity and obesity prevention,[38] accompanied by the Programme for Reducing Excessive Salt Consumption and the periodic Türkiye Nutrition and Health Survey, whose 2017 findings informed the revised Türkiye Dietary

Table 3. National obesity policies and data sources in Türkiye

Instrument/source	Responsible body	Period/status	Function in obesity governance
Türkiye Healthy Nutrition and Active Life Program	Ministry of Health (HSGM)	2010; renewed 2014-2017	Intersectoral framework for nutrition, physical activity and obesity prevention[39]
Türkiye Program for Reducing Excessive Salt Consumption	Ministry of Health (HSGM)	2017–2021	Population-level dietary risk reduction complementing obesity policy
Türkiye Dietary Guidelines (TÜBER)	Ministry of Health (HSGM)	2015; updated 2022	Evidence-based dietary reference informed by TBSA 2017 data[40]
Türkiye Health Survey	Turkish Statistical Institute (TÜİK)	Periodic (2019, 2022, 2025)	National self-reported obesity surveillance; 21.8% in 2025[37]
Childhood Obesity Surveillance Initiative-Türkiye (COSI-TUR)	Ministry of Health/WHO Europe	Periodic rounds	Internationally comparable measured data on primary-school children
Health Institutes of Türkiye (TÜSEB)	Established under Law No. 6569	Since 2014	Funds and coordinates chronic-disease research via its Public Health and Chronic Diseases Institute

HSGM, General Directorate of Public Health; TÜBER, Türkiye Dietary Guidelines; TÜİK, Turkish Statistical Institute; WHO, World Health Organization.

Guidelines.[39] Childhood obesity is monitored through the WHO-linked COSI-TUR (Childhood Obesity Surveillance Initiative-Türkiye) initiative. At the institutional level, the Health Institutes of Türkiye (TÜSEB), established under Law No. 6569 in 2014, house a Public Health and Chronic Diseases Institute mandated to fund and coordinate noncommunicable-disease research,[40] a potential vehicle for the management- and policy-oriented studies the field currently lacks. These instruments and data sources are summarized in Table 3.

The gap is therefore not one of policy absence but of evaluation and managerial integration. The programs above are largely documented by design and activity rather than measured impact, and the fiscal, labeling and service-delivery instruments discussed in the international literature remain only partially reflected in the Turkish evidence base. National modeling work indicates what a management-oriented agenda could yield: building on the projection that obesity-reduction scenarios could constrain the rise in diabetes prevalence,[41] comparable cost and cost-effectiveness studies conducted with national data would allow prevention investment to be justified domestically rather than by extrapolation from other health systems.

Population-level policy instruments

Preventing obesity at scale requires instruments beyond individual interventions; fiscal policy, foremost among these, draws strong support from economic theory. Cornelsen et al.[42] showed that price changes affect consumption meaningfully and that substitution must inform design, while Andreyeva et al.[43] established that beverage taxes can both reduce consumption and fund obesity programs. A national excise tax would be cost-effective in quality-adjusted life year terms,[44] and New Zealand modeling showed that tax-subsidy combinations could yield substantial health gains and expenditure savings.[45] Examining the translation of WHO fiscal recommendations into practice, Thow et al.[46] synthesized lessons for overcoming tax design, industry opposition, and inter-agency coordination.

Implementation experience has strengthened the evidence on real-world effects. After the 2014 Mexican beverage tax, some consumers switched to cheaper taxed products, partly attenuating the effect.[47] The political economy is decisive: across Mexico, Chile, and Colombia, the fate of tax policies is shaped by power relations between civil society and transnational corporations,[48] and internal documents reveal systematic industry intervention to block taxation.[49] Pairing ultra-processed food taxes with subsidies on minimally processed foods could encourage healthier purchases among low-income households.[50] The lessons are that rates must be large enough to change behavior and coverage broad enough to include substitutes; documented interference shows, however, that technical design alone is insufficient and that fiscal policy requires managing a political process of evidence, coalitions and conflict-of-interest governance.

Food labeling constitutes a second cluster resting on consumer information. A traffic-light labeling and choice architecture intervention monitored over twenty-four months in a hospital cafeteria showed that the increase in healthy choices was sustained,[51] whereas the Australian front-of-pack debate illustrates that interpretive labeling, though consistent with the discourse of personal responsibility, meets industry resistance.[52] Chile offers the most comprehensive example: Rodríguez Osiac et al.[53] described an evidence-informed package comprising warning labels, marketing restrictions and school policies, while Villalobos Dintrans et al.[54] analyzed how multi-actor negotiations and political change shaped implementation from enactment to entry into force.

School-based interventions are the most researched field in preventing childhood obesity. Lavelle et al.[55] found modest but significant BMI reductions, larger where a physical activity component is present, while a two-year intervention among low-income pupils reported percentile improvement alongside a positive association with academic achievement,[56] a co-benefit strengthening the case for health-education collaboration. Programs combining environmental regulation with education prove more effective,[57] and syntheses from China and Latin America converge on integrating them into multilevel packages whose next challenge is implementation quality.[58,59]

Table 4. Digital health approaches in obesity management

Modality	Function in the care chain	Evidence and managerial caveat
Web-based weight-loss programs	Scalable, anonymous lifestyle support reducing workforce load	Short-term weight loss and lifestyle change demonstrated[60]
Mobile applications	Self-monitoring, feedback and engagement	Meta-analytic support for weight loss;[61] uptake varies by age, education and income[62]
AI-assisted self-regulation tools	Targets momentary eating urges in real time	Feasible for improving eating behavior in mixed-methods evaluation[63]
Digital adjuncts to pharmacotherapy	Behavioral support alongside GLP-1/dual agonists	Engagement associated with weight-loss outcomes[64]
Telemedicine and eHealth in bariatric care	Pre- and postoperative monitoring and continuity	Supports continuity; implementation and sustainability evidence still needed[65,66]

GLP-1, glucagon-like peptide-1.

The modest average effect indicates schools cannot reverse the trend alone.

Digital health, behavioral insights and weight stigma

Digital health technologies are spreading rapidly as a response to problems of access and scalability, spanning web-based programs, mobile applications, artificial-intelligence-assisted tools, and digital adjuncts to pharmacotherapy and telemedicine in bariatric care; their functions and the managerial caveats attached to each are summarized in Table 4.[60,61] The evidence is encouraging on short-term weight loss and continuity of care, yet two cross-cutting caveats recur. Uptake of mobile health applications, although broad, varies systematically by age, education and income,[62] and the strength of implementation and sustainability evidence remains uneven across modalities.[63]

Two conditions determine whether digital tools generate value at the system level. The first is equity of access: usage differences in national samples indicate that digital interventions may deepen inequalities where design neglects groups with low health literacy and limited technology access,[62] though community-health-center results show this risk can be overcome through deliberate design.[32] The second is evaluative discipline, since such interventions must be assessed across reach, adoption, implementation and maintenance, not effectiveness alone.[63] Digital tools are thus complements rather than substitutes for the care chain, closing discontinuities between screening and referral, gaps in follow-up, and geographical barriers.

The nudge approach originating in behavioral economics stands out among low-cost population interventions. Arno and Thomas[64] established through meta-analysis that choice architecture arrangements influence adult food choices favorably, which, read with the labelling and cafeteria arrangements above, indicates that behavioral insights form a policy layer complementary to conventional regulatory instruments.

A barrier increasingly recognized in the service quality and equity dimension of obesity management is weight stigma. Puhl and Heuer established that stigma directed at individuals with obesity is widespread, adversely affects health contrary to the belief that it motivates healthy behavior, and has been largely neglected on the public health agenda.[65] Stigmatizing attitudes affect not only individuals but also societal support for intervention,[66] the problem is now globalizing rather than limited to high-income,[67] its experience differs along gender and ethnicity[68] and is associated with mental health concerns among young people.[69] The consequence is twofold: stigma delays care-seeking and damages the therapeutic relationship, and publics who frame obesity as individual willpower give lower support to structural interventions.[66] Combating it is therefore both an ethical requirement and a strategic investment in the legitimacy of population policy.

DISCUSSION

The evidence charted in this review indicates that obesity has ceased to be conceptualized as an individual behavioral problem and is now understood as a systemic one testing the financing, organization and policy capacity of health systems. Epidemiological data establish that prevalence is rising across age groups and income levels; economic studies show that direct and indirect costs constitute a growing pressure on health budgets; and health services research shows that existing delivery models do not yet provide the continuity, teamwork, and inter-level coordination this chronic disease requires. The complexity of the problem calls for systems science approaches rather than isolated interventions, with dynamic modeling and the integration of systems thinking into implementation science offering a methodological framework, and the translation of evidence into policy itself requiring active management.[70-72]

This review also exposes tensions that a purely summative reading would obscure. As the stream-level appraisal in Table 1 indicates, the evidence is markedly uneven: cost estimates vary by an order of magnitude with study design, and causal methods yield substantially higher figures than correlational ones,[17,18] so headline burden figures are not directly comparable; the environmental literature rests largely on cross-sectional associations vulnerable to residential self-selection,[8] limiting causal inference where policy most needs it; and digital-health evidence is dominated by short-term efficacy studies with sparse data on maintenance and equity.[62,63] Much policy evidence, moreover, originates in a few settings, Mexico, Chile and some high-income countries, whose transferability to Türkiye is uncertain. These inconsistencies are compounded by a recurrent gap between what is measured and what is managed, as programs are often documented by design and activity rather than by evaluated impact.

A further pattern is the gap between evidence production and implementation capacity. Evidence on the effectiveness of fiscal policy, labeling regulation and school programs continues to accumulate; yet, as shown in Chile[54] and on a global scale,[28] converting commitments into implementation requires institutional capacity, coordination among actors and political continuity. Establishing monitoring and evaluation systems is therefore as important as obesity policy itself, and the need to monitor implementation quality identified for Latin America[59] applies to all countries adopting comparable packages.

The original contribution of this review lies less in the individual findings than in their integration: by charting epidemiological, economic, service-delivery, and policy evidence within one managerial frame, it makes visible the connections between measurement and resource allocation, between pharmacotherapy pricing and reimbursement design, and between environmental regulation and service capacity that discipline-bound reviews leave implicit, and it situates these within the Turkish policy context.

Three implications follow. First, allocation between prevention and treatment must rest on cost-effectiveness evidence spanning fiscal policy to reimbursement of the new pharmacotherapies. Second, obesity care must be redesigned around the chronic care model as an integrated chain from primary care screening to post-bariatric follow-up, with digital tools as complements closing its access and continuity gaps. Third, transforming the obesogenic environment is a multisectoral governance problem requiring institutional ownership at the national level.[28] For Türkiye, the priority is to convert an established epidemiological base and extensive policy architecture into an evaluated one through national cost-of-illness and cost-effectiveness studies, health services research on obesity management in primary care, and impact evaluations of the programs already in force. The institutional vehicle exists in TÜSEB and the Ministry of Health; what remains is to direct it towards the managerial and policy questions on which the national literature is still thin.

There are several limitations inherent to this review that should be taken into account when interpreting the findings. As a scoping review of heterogeneous designs, it charts the breadth of the evidence rather than pooling effect sizes, so no quantitative synthesis or certainty grading is offered; risk of bias was appraised at the

evidence stream rather than the individual study level (Table 1); the restriction to English- and Turkish-language, database-indexed sources may have excluded relevant grey literature; and reliance on official statistics and program documents for the national picture carries the reporting limitations inherent to such sources.

In conclusion, obesity has ceased to be an individual behavioral problem and has become a system-level challenge that tests the financing, organization, and policy capacity of health systems. Managing it effectively requires an integrated service chain built around the chronic care model, coherent policy mixes that combine fiscal, labeling, and school-based instruments, digital tools positioned as complements to the care chain, and the recognition of weight stigma as a structural barrier to quality and equity. For Türkiye, the priority is to convert an established epidemiological base and an extensive policy architecture into an evaluated one, so that resource-allocation decisions rest on domestic rather than extrapolated evidence.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

1. Wong MCS, Huang J, Wang J, Chan PSF, Lok V, Chen X, et al. Global, regional and time-trend prevalence of central obesity: A systematic review and meta-analysis of 13.2 million subjects. Eur J Epidemiol 2020;35:673-83. doi: 10.1007/s10654-020-00650-3.
2. Hruby A, Manson JE, Qi L, Malik VS, Rimm EB, Sun Q, et al. Determinants and consequences of obesity. Am J Public Health 2016;106:1656-62. doi: 10.2105/AJPH.2016.303326.
3. Huang X, Wu Y, Ni Y, Xu H, He Y. Global, regional, and national burden of type 2 diabetes mellitus caused by high BMI from 1990 to 2021, and forecasts to 2045: Analysis from the global burden of disease study 2021. Front Public Health 2025;13:1515797. doi: 10.3389/fpubh.2025.1515797.
4. Okunogbe A, Nugent R, Spencer G, Powis J, Ralston J, Wilding J. Economic impacts of overweight and obesity: Current and future estimates for 161 countries. BMJ Glob Health 2022;7:e009773. doi: 10.1136/bmjgh-2022-009773.
5. Breland JY, Phibbs CS, Hoggatt KJ, Washington DL, Lee J, Haskell S, et al. The obesity epidemic in the veterans health administration: Prevalence among key populations of women and men veterans. J Gen Intern Med 2017;32:11-7. doi: 10.1007/s11606-016-3962-1.
6. Mackenbach JD, Rutter H, Compernolle S, Glonti K, Oppert JM, Charreire H, et al. Obesogenic environments: A systematic review of the association between the physical environment and adult weight status, the SPOTLIGHT project. BMC Public Health 2014;14:233. doi: 10.1186/1471-2458-14-233.
7. Gibson DM. The neighborhood food environment and adult weight status: Estimates from longitudinal data. Am J Public Health 2011;101:71-8. doi: 10.2105/AJPH.2009.187567.
8. Shier V, An R, Sturm R. Is there a robust relationship between neighbourhood food environment and childhood obesity in the USA? Public Health 2012;126:723-30. doi: 10.1016/j.puhe.2012.06.009.
9. Bridle-Fitzpatrick S. Food deserts or food swamps?: A mixed-methods study of local food environments in a Mexican city. Soc Sci Med 2015;142:202-13. doi: 10.1016/j.socscimed.2015.08.010.
10. Bates S, Reeve B, Trevena H. A narrative review of online food delivery in Australia: Challenges and opportunities for public health nutrition policy. Public Health Nutr 2023;26:262-72. doi: 10.1017/S1368980020000701.
11. Pucher J, Buehler R, Bassett DR, Dannenberg AL. Walking and cycling to health: A comparative analysis of city, state, and international data. Am J Public Health 2010;100:1986-92. doi: 10.2105/AJPH.2009.189324.
12. O'Donoghue G, Perchoux C, Mensah K, Lakerveld J, van der Ploeg H, Bernaards C, et al. A systematic review of correlates of sedentary behaviour in adults aged 18-65 years: A socio-ecological approach. BMC Public Health 2016;16:163. doi: 10.1186/s12889-016-2841-3.

13. Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. Socioeconomic disparities in health in the United States: What the patterns tell us. Am J Public Health 2010;100:S186-96. doi: 10.2105/AJPH.2009.166082.
14. Foster HME, Celis-Morales CA, Nicholl BI, Petermann-Rocha F, Pell JP, Gill JMR, et al. The effect of socioeconomic deprivation on the association between an extended measurement of unhealthy lifestyle factors and health outcomes: A prospective analysis of the UK Biobank cohort. Lancet Public Health 2018;3:e576-85. doi: 10.1016/S2468-2667(18)30200-7.
15. Rigolon A, Browning MHEM, McAnirlin O, Yoon HV. Green space and health equity: A systematic review on the potential of green space to reduce health disparities. Int J Environ Res Public Health 2021;18:2563. doi: 10.3390/ijerph18052563.
16. Tremmel M, Gerdtham UG, Nilsson PM, Saha S. Economic burden of obesity: A systematic literature review. Int J Environ Res Public Health 2017;14:435. doi: 10.3390/ijerph14040435.
17. Kim DD, Basu A. Estimating the medical care costs of obesity in the United States: Systematic review, meta-analysis, and empirical analysis. Value Health 2016;19:602-13. doi: 10.1016/j.jval.2016.02.008.
18. Cawley J, Biener A, Meyerhoefer C, Ding Y, Zvenyach T, Smolarz BG, et al. Direct medical costs of obesity in the United States and the most populous states. J Manag Care Spec Pharm 2021;27:354-66. doi: 10.18553/jmcp.2021.20410.
19. Scarborough P, Bhatnagar P, Wickramasinghe KK, Allender S, Foster C, Rayner M. The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK: An update to 2006-07 NHS costs. J Public Health (Oxf) 2011;33:527-35. doi: 10.1093/pubmed/fdr033.
20. Okunogbe A, Nugent R, Spencer G, Ralston J, Wilding J. Economic impacts of overweight and obesity: Current and future estimates for eight countries. BMJ Glob Health 2021;6:e006351. doi: 10.1136/bmjgh-2021-006351.
21. Cancelliere C, Cassidy JD, Ammendolia C, Côté P. Are workplace health promotion programs effective at improving presenteeism in workers? A systematic review and best evidence synthesis of the literature. BMC Public Health 2011;11:395. doi: 10.1186/1471-2458-11-395.
22. Cawley J, Ruhm CJ. The economics of risky health behaviors. In: Pauly MV, McGuire TG, Barros PP, editors. Handbook of health economics. Vol 2. Amsterdam: Elsevier; 2012. p. 95-199. doi: 10.1016/b978-0-444-53592-4.00003-7.
23. Ara R, Blake L, Gray L, Hernández M, Crowther M, Dunkley A, et al. What is the clinical effectiveness and cost-effectiveness of using drugs in treating obese patients in primary care? A systematic review. Health Technol Assess 2012;16:1-195. doi: 10.3310/hta16050.
24. Kim N, Wang J, Burudpakdee C, Song Y, Ramasamy A, Xie Y, et al. Cost-effectiveness analysis of semaglutide 2.4 mg for the treatment of adult patients with overweight and obesity in the United States. J Manag Care Spec Pharm 2022;28:740-52. doi: 10.18553/jmcp.2022.28.7.740.
25. Chen EH, Thom DH, Hessler DM, Phengrasamy L, Hammer H, Saba G, et al. Using the Teamlet Model to improve chronic care in an academic primary care practice. J Gen Intern Med 2010;25:S610-4. doi: 10.1007/s11606-010-1390-1.
26. Ku GM, Kegels G. Integrating chronic care with primary care activities: Enriching healthcare staff knowledge and skills and improving glycemic control of a cohort of people with diabetes through the First Line Diabetes Care Project in the Philippines. Glob Health Action 2014;7:25286. doi: 10.3402/gha.v7.25286.
27. Schreurs L, Bowman-Busato J, Gies I, Calabrò M, Morovic ML, Silva-Nunes J, et al. Needs and challenges of the payor and regulatory community towards integrating obesity into a chronic care framework. Public Health 2025;241:151-7. doi: 10.1016/j.puhe.2025.01.021.
28. Celletti F, Chaumont C, Johnsen JT, Branca F, Wright A, Manne-Goehler J, et al. From endorsement of the WHO Acceleration Plan to Stop Obesity to national implementation: Country progress on health system preparedness to scale up a comprehensive obesity chronic care programme. Lancet Glob Health 2026;14:e653-62. doi: 10.1016/S2214-109X(25)00496-6.
29. Greenwood JL, Joy EA, Stanford JB. The physical activity vital sign: A primary care tool to guide counseling for obesity. J Phys Act Health 2010;7:571-6. doi: 10.1123/jpah.7.5.571.
30. Booth HP, Prevost AT, Gulliford MC. Epidemiology of clinical body mass index recording in an obese population in primary care: A cohort study. J Public Health (Oxf) 2013;35:67-74. doi: 10.1093/pubmed/fds063.
31. Dixon KJ, Shcherba S, Kipping RR. Weight loss from three commercial providers of NHS primary care slimming on referral in North Somerset: Service evaluation. J Public Health (Oxf) 2012;34:555-61. doi: 10.1093/pubmed/fds034.
32. Bennett GG, Steinberg D, Askew S, Levine E, Foley P, Batch BC, et al. Effectiveness of an app and provider counseling for obesity treatment in primary care. Am J Prev Med 2018;55:777-86. doi: 10.1016/j.amepre.2018.07.005.
33. Padwal RS, Chang HJ, Klarenbach S, Sharma AM, Majumdar SR. Characteristics of the population eligible for and receiving publicly funded bariatric surgery in Canada. Int J Equity Health 2012;11:54. doi: 10.1186/1475-9276-11-54.
34. Sharman M, Hensher M, Wilkinson S, Williams D, Palmer A, Venn A, et al. What are the support

experiences and needs of patients who have received bariatric surgery? Health Expect 2017;20:35-46. doi: 10.1111/hex.12423.
35. Pearson SD, Whaley CM, Emond SK. Affordable access to GLP-1 obesity medications: Strategies to guide market action and policy solutions in the US. J Comp Eff Res 2025;14:e250083. doi: 10.57264/cer-2025-0083.
36. Turkish Statistical Institute (TÜİK). Türkiye Health Survey, 2025. Ankara: TÜİK; 2026. Available from: https://data.tuik.gov.tr [Accessed: July 30, 2026]
37. OECD. Health at a Glance 2025: OECD Indicators. Paris: OECD Publishing; 2025.
38. Ministry of Health of Türkiye, General Directorate of Public Health. Türkiye Healthy Nutrition and Active Life Programme 2014-2017. Ankara: Ministry of Health; 2013.
39. Ministry of Health of Türkiye, General Directorate of Public Health. Türkiye Dietary Guidelines (TÜBER) 2022. Publication No: 1031. Ankara: Ministry of Health; 2022.
40. Health Institutes of Türkiye (TÜSEB). Establishment Law No. 6569. Official Gazette; 26 November 2014.
41. Sözmen K, Unal B, Capewell S, Critchley J, O'Flaherty M. Estimating diabetes prevalence in Turkey in 2025 with and without possible interventions to reduce obesity and smoking prevalence, using a modelling approach. Int J Public Health 2015;60:S13-21. doi: 10.1007/s00038-014-0622-2.
42. Cornelsen L, Green R, Turner R, Dangour AD, Shankar B, Mazzocchi M, et al. What happens to patterns of food consumption when food prices change? Evidence from a systematic review and meta-analysis of food price elasticities globally. Health Econ. 2015;24:1548-59. doi: 10.1002/hec.3107.
43. Andreyeva T, Chaloupka FJ, Brownell KD. Estimating the potential of taxes on sugar-sweetened beverages to reduce consumption and generate revenue. Prev Med 2011;52:413-6. doi: 10.1016/j.ypmed.2011.03.013.
44. Long MW, Gortmaker SL, Ward ZJ, Resch SC, Moodie ML, Sacks G, et al. Cost effectiveness of a sugar-sweetened beverage excise tax in the U.S. Am J Prev Med 2015;49:112-23. doi: 10.1016/j.amepre.2015.03.004.
45. Blakely T, Cleghorn C, Mizdrak A, Waterlander W, Nghiem N, Swinburn B, et al. The effect of food taxes and subsidies on population health and health costs: A modelling study. Lancet Public Health 2020;5:e404-13. doi: 10.1016/S2468-2667(20)30116-X.
46. Thow AM, Downs SM, Mayes C, Trevena H, Waqanivalu T, Cawley J. Fiscal policy to improve diets and prevent noncommunicable diseases: From recommendations to action. Bull World Health Organ 2018;96:201-10. doi: 10.2471/BLT.17.195982.
47. Salgado Hernández JC, Ng SW, Colchero MA. Changes in sugar-sweetened beverage purchases across the price distribution after the implementation of a tax in Mexico: A before-and-after analysis. BMC Public Health 2023;23:265. doi: 10.1186/s12889-023-15041-y.
48. Carriedo A, Koon AD, Encarnación LM, Lee K, Smith R, Walls H. The political economy of sugar-sweetened beverage taxation in Latin America: Lessons from Mexico, Chile and Colombia. Global Health 2021;17:5. doi: 10.1186/s12992-020-00656-2.
49. Pedroza-Tobias A, Crosbie E, Mialon M, Carriedo A, Schmidt LA. Food and beverage industry interference in science and policy: Efforts to block soda tax implementation in Mexico and prevent international diffusion. BMJ Glob Health 2021;6:e005662. doi: 10.1136/bmjgh-2021-005662.
50. Valizadeh P, Ng SW. Promoting healthier purchases: Ultraprocessed food taxes and minimally processed foods subsidies for the low income. Am J Prev Med 2024;67:3-14. doi: 10.1016/j.amepre.2024.02.019.
51. Thorndike AN, Riis J, Sonnenberg LM, Levy DE. Traffic-light labels and choice architecture: Promoting healthy food choices. Am J Prev Med 2014;46:143-9. doi: 10.1016/j.amepre.2013.10.002.
52. Magnusson RS. Obesity prevention and personal responsibility: The case of front-of-pack food labelling in Australia. BMC Public Health 2010;10:662. doi: 10.1186/1471-2458-10-662.
53. Rodríguez Osiac L, Cofré C, Pizarro T, Mansilla C, Herrera CA, Burrows J, et al. Using evidence-informed policies to tackle overweight and obesity in Chile. Rev Panam Salud Publica 2017;41:e156. doi: 10.26633/RPSP.2017.156.
54. Villalobos Dintrans P, Rodriguez L, Clingham-David J, Pizarro T. Implementing a food labeling and marketing law in Chile. Health Syst Reform 2020;6:1-8. doi: 10.1080/23288604.2020.1753159.
55. Lavelle HV, Mackay DF, Pell JP. Systematic review and meta-analysis of school-based interventions to reduce body mass index. J Public Health (Oxf) 2012;34:360-9. doi: 10.1093/pubmed/fdr116.
56. Hollar D, Messiah SE, Lopez-Mitnik G, Hollar TL, Almon M, Agatston AS. Effect of a two-year obesity prevention intervention on percentile changes in body mass index and academic performance in low-income elementary school children. Am J Public Health 2010;100:646-53. doi: 10.2105/AJPH.2009.165746.
57. Vézina-Im LA, Beaulieu D, Bélanger-Gravel A, Boucher D, Sirois C, Dugas M, et al. Efficacy of school-based interventions aimed at decreasing sugar-sweetened beverage consumption among adolescents: A systematic review. Public Health Nutr 2017;20:2416-31. doi: 10.1017/S1368980017000076.
58. Yuan C, Dong Y, Chen H, Ma L, Jia L, Luo J, et al. Public health interventions against childhood obesity in China. Lancet Public Health 2024;9:e1115-24. doi: 10.1016/S2468-2667(24)00245-7.

59. Melo G, Aguilar-Farias N, López Barrera E, Chomalí L, Moz-Christofoletti MA, Salgado JC, et al. Structural responses to the obesity epidemic in Latin America: What are the next steps for food and physical activity policies? Lancet Reg Health Am 2023;21:100486. doi: 10.1016/j.lana.2023.100486.
60. Beleigoli AM, Andrade AQ, Cançado AG, Paulo MN, Diniz MFH, Ribeiro AL. Web-based digital health interventions for weight loss and lifestyle habit changes in overweight and obese adults: Systematic review and meta-analysis. J Med Internet Res 2019;21:e298. doi: 10.2196/jmir.9609.
61. Pujia C, Ferro Y, Mazza E, Maurotti S, Montalcini T, Pujia A. The role of mobile apps in obesity management: Systematic review and meta-analysis. J Med Internet Res 2025;27:e66887. doi: 10.2196/66887.
62. Bhuyan SS, Lu N, Chandak A, Kim H, Wyant D, Bhatt J, et al. Use of mobile health applications for health-seeking behavior among US adults. J Med Syst 2016;40:153. doi: 10.1007/s10916-016-0492-7.
63. Messiah SE, Sacher PM, Yudkin J, Ofori A, Qureshi FG, Schneider B, et al. Application and effectiveness of eHealth strategies for metabolic and bariatric surgery patients: A systematic review. Digit Health 2020;6:2055207619898987. doi: 10.1177/2055207619898987.
64. Arno A, Thomas S. The efficacy of nudge theory strategies in influencing adult dietary behaviour: A systematic review and meta-analysis. BMC Public Health 2016;16:676. doi: 10.1186/s12889-016-3272-x.
65. Puhl RM, Heuer CA. Obesity stigma: Important considerations for public health. Am J Public Health 2010;100:1019-28. doi: 10.2105/AJPH.2009.159491.
66. Sikorski C, Luppa M, Kaiser M, Glaesmer H, Schomerus G, König HH, et al. The stigma of obesity in the general public and its implications for public health - a systematic review. BMC Public Health 2011;11:661. doi: 10.1186/1471-2458-11-661.
67. Brewis A, SturtzSreetharan C, Wutich A. Obesity stigma as a globalizing health challenge. Global Health 2018;14:20. doi: 10.1186/s12992-018-0337-x.
68. Himmelstein MS, Puhl RM, Quinn DM. Intersectionality: An understudied framework for addressing weight stigma. Am J Prev Med 2017;53:421-31. doi: 10.1016/j.amepre.2017.04.003.
69. Sonneville KR, Thurston IB, Gordon AR, Richmond TK, Weeks HM, Lipson SK. Weight stigma associated with mental health concerns among college students. Am J Prev Med 2024;66:260-8. doi: 10.1016/j.amepre.2023.09.021.
70. Luke DA, Stamatakis KA. Systems science methods in public health: Dynamics, networks, and agents. Annu Rev Public Health 2012;33:357-76. doi: 10.1146/annurev-publhealth-031210-101222.
71. Luke DA, Powell BJ, Paniagua-Avila A. Bridges and mechanisms: Integrating systems science thinking into implementation research. Annu Rev Public Health 2024;45:7-25. doi: 10.1146/annurev-publhealth-060922-040205.
72. Rychetnik L, Bauman A, Laws R, King L, Rissel C, Nutbeam D, et al. Translating research for evidence-based public health: Key concepts and future directions. J Epidemiol Community Health 2012;66:1187-92. doi: 10.1136/jech-2011-200038.