

Disparities in Childhood Obesity: A Comparative Analysis of Rural and Urban Environments in the United States: A Narrative Review

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Date of submission: Feb 01, 2026 Date of revision: March 11, 2026 Date of acceptance: March 21, 2026

doi: <https://doi.org/10.64433/k14vgx38>

ABSTRACT

Objectives: To examine the factors contributing to childhood obesity in rural and urban regions in the United States.

Methods: A structured narrative review was conducted using Google Scholar, PubMed, and government health websites. Search terms included combinations of “childhood obesity,” “rural vs urban health,” “health disparities,” and “socioeconomic factors” using Boolean operators. Articles published between 2008 and 2024 were considered. Studies were included if they focused on U.S. children (ages 2–19) and examined rural–urban differences in obesity. A total of 12 studies were selected following screening and analyzed using a thematic synthesis approach, with basic appraisal of study quality.

Results: The findings indicate that rural children experience higher obesity rates compared to urban children due to limited healthcare access, food insecurity, reduced opportunities for physical activity, and increased exposure to socioeconomic stressors. Environmental limitations and behavioural patterns such as sedentary lifestyles and emotional eating further contribute to this disparity.

Conclusion: Addressing rural childhood obesity requires targeted, multi-level interventions that consider social determinants of health. Improving access to healthcare, nutrition education, and community-based resources is essential for reducing disparities and promoting long-term health outcomes.

Keywords: Childhood obesity, rural health, urban health, health disparities, socioeconomic factors.

INTRODUCTION

The rising rates of childhood obesity in the US are an important public health issue, with estimates showing that 1 in 5 children and adolescents are living with obesity.¹ Childhood obesity is correlated with a range of chronic diseases including Type 2 diabetes, high blood pressure, cardiovascular disease, and mental health conditions such as low self-esteem and depression.

These diseases lower the quality of life in the short term and increase the risk for chronic conditions in the long term. Childhood obesity is considered one of the major public health crises of the 21st century, due to the severity of risks to the stability of children's physical and mental health.² Although childhood obesity is prevalent in children across all

demographics, new research has revealed significant differences in rates by geographic location in the US. Rural children have notably been found to exhibit higher rates of obesity and overweight than the nation as a whole, yet many rural communities do not have the resources to address this critical health concern. These differences emphasize the need for ongoing investigation of systemic and structural factors contributing to health disparities, and understanding why these exist. This is vital to achieving the goal of developing and implementing targeted, effective interventions.

While previous studies have documented higher obesity prevalence in rural children and identified contributing structural factors, this review adds

value by integrating these findings into a comparative framework that synthesizes socioeconomic, environmental, behavioural, and policy-level determinants within a single narrative. In addition, this review not only describes established associations but also highlights inconsistencies across studies, particularly in how rural environmental factors are measured and how intervention effectiveness is interpreted across different rural contexts in the United States.

METHODS

This narrative review was conducted to examine disparities in childhood obesity between rural and urban populations in the United States. A structured literature search was performed using electronic databases including Google Scholar, PubMed, and government health websites.

Search terms included combinations of: “childhood obesity,” “rural vs urban health,” “health disparities,” “socioeconomic factors,” and “youth obesity,” using Boolean operators (AND/OR). The search was limited to articles published between 2008 and 2024 and restricted to English-language studies.

Inclusion criteria were: (1) studies focused on children and adolescents (ages 2–19), (2) research examining obesity prevalence or related determinants, and (3) studies comparing or addressing rural and urban populations within the United States. Exclusion criteria included studies focused solely on adult populations, non-U.S. populations, or those not addressing geographic disparities.

An initial pool of approximately 30 articles was identified through title and abstract screening. Following full-text review, 12 studies were included based on relevance to prevalence patterns, contributing factors, and intervention strategies. Relevance was operationalized as direct examination of rural–urban differences or clear linkage between geographic context and obesity-related outcomes. The final selection prioritized

studies with clear methodology and population focus to reduce selection bias.

Although this review is narrative in design, a basic quality appraisal was conducted. Studies were assessed for methodological clarity, sample size, and consistency of findings. Greater emphasis was placed on peer-reviewed studies with transparent design and reproducible methods.

Data were synthesized using a thematic approach. Findings were grouped into recurring domains: socioeconomic factors, environmental influences, behavioural/psychological factors, and policy-related interventions. This approach allowed for comparison across studies while identifying patterns, inconsistencies, and gaps in the literature.

RESULTS

Across the 12 included studies, a consistent pattern emerged showing higher obesity prevalence among rural children compared to urban counterparts. Reported prevalence ranged from approximately 21–22% in rural populations versus 17% in urban populations.

Several studies identified key contributing factors, including:

- Lower physical activity levels in rural children
- Higher rates of food insecurity
- Increased screen time and sedentary behaviour
- Limited access to healthcare and nutrition services
- Psychosocial factors such as parental stress and emotional eating were also frequently associated with increased obesity risk.

DISCUSSION

This review builds on existing literature by going beyond simple rural–urban comparisons of childhood obesity rates and instead bringing together a range of factors across socioeconomic, environmental, behavioural, and policy areas. Rather than examining risk factors in isolation, it integrates evidence from different levels and highlights where findings align, where they differ, and where important gaps remain in the literature.

In this context, rural residence is not treated as a direct cause of obesity, but more as a background factor that overlaps with broader structural influences such as income levels, regional policy differences, racial and ethnic composition, and access to healthcare. While higher obesity rates in rural populations are consistently reported, the evidence suggests the underlying reasons are complex and vary across studies, meaning these associations should be interpreted carefully rather than as clear cause-and-effect relationships.

The literature also shows mixed results regarding the strength of individual contributing factors. For example, food environments and opportunities for physical activity are often linked to obesity risk, but their effects tend to change once other factors such as income, parental education, and regional deprivation are considered. This points to interacting influences rather than single, independent causes.

Finally, rural populations are not homogeneous; there is meaningful variation across geography, socioeconomic conditions, Indigenous and non-Indigenous communities, and levels of remoteness. However, many studies group rural populations together without sufficient stratification, which limits how precisely differences can be understood and may mask important variation within rural communities.

Prevalence of childhood obesity in rural vs. Urban areas

Recent National health surveys have produced a consistent finding: childhood obesity rates are higher in rural than urban areas. According to Ogden et al., children aged 2 to 19 years who lived in nonmetropolitan areas had obesity prevalence rates of 21.7%, while those living within large metropolitan areas had rates of 17.1%.³ Severe obesity was also observed at a greater percentage in nonmetropolitan areas (9.4%) as compared to their urban counterparts (5.1%).³ These disparities suggest a gap that cannot be solely attributed to individual behaviours or lifestyle choices.

Similarly, Joens-Matre et al. observed that rural elementary school children had higher body mass indexes (BMIs), and demonstrated fewer healthy behaviours (i. e. eating healthy meals and physical exercise) than urban children.⁴ The University of South Carolina Rural Health Research Centre provided additional support for these findings. Their study showed that rural counties received a higher-than-average score in environmental characteristics associated with childhood obesity, including access to affordable nutrition and opportunities for physical activity. Rural counties averaged 52.9 points on the Childhood Obesogenic Environment Index, whereas urban counties averaged 46.5 points. Furthermore, evidence from longitudinal research shows that this gap is not merely a temporary fluctuation in rural communities. The trend of rural populations having higher rates of obesity extends back several decades - pointing to structural inequities rather than cultural shifts at play. For instance, economic changes, such as in manufacturing jobs or reduced family farming, have altered rural communities and created a barrier to healthy food access, incomes, and healthy behaviours. These long-term socioeconomic changes combined with under-resourced rural health systems continue to negatively affect the health of rural youth. This level of consistency across studies highlights the importance and urgency of addressing regional differences through targeted intervention.

Socioeconomic factors and access to resources

Socioeconomic status (SES) is widely recognized as a major determinant of health outcomes, specifically childhood obesity. Families experiencing low SES encounter multiple barriers to adopting a healthy lifestyle (including financial barriers, food insecurity, job insecurity, and possibly lower levels of education).⁴ For families experiencing low SES, the barriers to healthy lifestyles that exist are more likely to be found in rural areas, where resources are often limited, and poverty rates are consequently more pronounced.

Rural populations frequently report a lack of access to healthcare infrastructure such as pediatric specialists, nutritionists, and weight management programs. To illustrate, rural healthcare settings are understaffed and don't have the necessary health resources for quality care for those with obesity-related disorders. The lack of immediate access to healthcare in rural communities is further complicated when residents must travel long distances to access healthcare facilities, exercise facilities, and healthy food, causing delays in treatment and prevention. With the absence of child-centered health services in rural areas, schools and families are left with the difficulty of dealing with obesity without the expertise needed to do so. In some regions, school nurses might be the only healthcare providers regularly engaging with children, but they are often overwhelmed with responsibilities beyond weight monitoring or health education.

Food insecurity is another key factor related to childhood obesity in rural areas. Rural families tend to be living in “food deserts,” indicating a predominant absence of grocery stores with fresh and nutritious food at affordable prices. As a result, many families are limited to cheaper, calorie-dense, processed foods, which can lead to unhealthy weight gain. Furthermore, Singh et al. found that in impoverished rural counties, children had significantly higher rates of obesity than children in urban or suburban counties, and rates were even higher among racial and ethnic minorities. This supports the larger concern of social inequity leading to poorer health outcomes for already disadvantaged populations.⁵

Furthermore, the educational divide between urban and rural settings can influence awareness and implementation of healthy living habits. Families living in lower-income neighbourhoods may be disconnected from health education, or may not fully understand the long-term consequences of poor diet and inactivity. Contreras et al., emphasize that rural regions experience insufficient nutrition education and limited access to preventative healthcare resulting in unhealthy dietary practices

from an early age.⁶ This underscores the need for culturally appropriate education campaigns that resonate with rural families and address their unique challenges.

Environmental influences on physical activity and diet

The environment has a considerable impact on health behaviours, especially concerning opportunities for physical activity and access to healthy food options. In rural communities, there are limited resources in place to foster physically active lifestyles. For example, when children are raised in these environments and attend school locally where there is a scarcity of parks, recreational areas, sidewalks, bike trails, and exercise facilities, they typically have fewer opportunities to engage in organized physical activity and physical education classes. It is also likely, that these children are less likely to walk or bike to school due to safety concerns and long distances. Regardless of the physical and social benefits of outdoor play in rural contexts, the lack of safe and accessible outdoor play spaces prevents these children from structured physical activity, which leads to sedentary behaviour as a standard pattern. In urban contexts, there are typically more built environments that afford incidental activity behaviour, such as walkable neighbourhoods, bike paths, and transportation supported through municipalities to facilitate more recreation opportunities for children.

Access to nutritious foods and beverages is further complicated by transportation issues. For instance, many rural families must travel long distances to find grocery stores that sell fresh fruits, vegetables, and healthy foods. This could lead families to choose convenience stores or fast-food restaurants that do not sell healthy options. Rural environments typically do not support active modes of transportation, such as walking or biking, which may contribute to lower levels of physical activity and reliance on cars for transportation. Environmental factors include limited access to safe, clean drinking water; safe playgrounds; and

school resources that encourage physical activity. These stressors influence children's dietary patterns and physical activity levels, increasing their susceptibility to early-onset obesity. These are particularly concerning for rural people lacking access to mental health care or coping mechanisms for their issues.

Psychological and behavioural factors

In addition to physical and environmental factors, psychological/behavioural factors also play a substantial role in the development of childhood obesity, particularly in rural areas. Living in an area with economic instability, social isolation, and family stress may lead to children developing coping strategies, such as emotional eating or other patterns of behaviour that are damaging to their health. Hatem et al. highlight the connection between stress and emotional eating in children living in rural regions.⁷ Stressors such as financial distress, unstable housing, and limited access to mental health or social services increase family stress. Stressful situations may trigger the use of food as emotional support when healthier choices are not readily available or when strategies to cope with stress cannot be utilized. Parental influences are another major factor. McCarthy et al. stated that higher levels of parental stress and depression among rural families were correlated to increased childhood obesity.⁸ When parents face mental health challenges, they may be limited in their ability to maintain healthy routines or model healthy behaviours (e.g., diet, and exercise) for their children. Failure to have a supportive community network leads families to feel less willing to seek help and support.

Additionally, the rural stigma related to mental health can be a barrier to families engaging in psychological help. In the absence of support, these behavioural and emotional experiences may solidify and result in health problems later in life.

In addition, behavioural factors such as screen time, sleep hygiene, and meal patterns, while sometimes neglected, are also quite relevant. When children

are in homes where they are on screens for extended periods typically because they have no other options evidence shows among adolescents, physical inactivity tends to increase sharply.⁹ In fact, these behavioural factors, are also more common in homes that are stressed or working multiple jobs, all of which have been linked to an increased risk of obesity in children.

Effective interventions and policy recommendations

Addressing rural childhood obesity requires interventions that are not only evidence-informed but also feasible within the structural constraints of rural healthcare and community systems. The literature reviewed in this study suggests that obesity disparities are primarily driven by food insecurity, limited physical activity environments, and restricted healthcare access. Therefore, interventions must be prioritized based on both strength of evidence and practical applicability in rural settings.

Evidence-supported community and school-based programs

Community engagement is an essential component of any intervention's success. Interventions that are designed to involve schools, churches, and local businesses may create supportive environments for healthier choices. Programs that include growing a garden at a local school, or an after-school program to promote children to make healthier eating choices, will contribute to their eating behaviours to change and be beneficial for local agricultural producers as well. In addition, walking clubs or community fitness events may support an increase in physical activity and social connections to support children's physical activity engagement.

Schools are also instrumental in developing children's perspectives about food and movement. Programs that provide effective nutrition education can help children learn how to read food labels, plan balanced meals, and think critically about portion sizes, which all can help promote healthy habits.¹⁰

More intensive programs can be implemented as well, that involve the school meal services providing nutritious and visually appealing meals in conjunction with nutrition education programs. For rural areas, integrating food literacy into core subjects like math or science can make these lessons more accessible and engaging.

Infrastructure development and environmental interventions

Investment in rural infrastructure is another vital element of building healthy environments. Establishing wellness centers, building bike paths and walking trails, and enhancing access to parks and recreational areas are important. Such initiatives are capable of fostering physical activity and reducing high rates of inactivity. Schools should be equipped with modern fitness equipment for a variety of sports and recreation, as well as trained personnel who can provide a comprehensive wellness curriculum. Finally, financial support should be offered to rural establishments that sell healthy food through grants and tax incentives that promote a healthy food environment and availability in rural communities.

Access to healthcare services is also a structural issue in rural areas. Increasing access to healthcare services using telehealth services and mobile clinics can mitigate access to healthcare in rural areas.¹¹ This could allow families access to nutrition education, behavioural therapy, and weight management programs, without significant travel time. School-based programs can partner with healthcare agencies to conduct routine screening for obesity-related conditions and offer early intervention.

Policy-level interventions

Policymakers can assist in closing the gap for rural health equity. Subsidizing healthy food items in rural grocery stores, working with local farms to supply farmer's markets, and providing grants/development incentives to support health-promoting infrastructure are all reasonable

solutions. Programs such as the Supplemental Nutrition Assistance Program Education (SNAP-Ed) have been effective in building nutrition knowledge and behaviours for low-income families.¹²

Critical appraisal and feasibility considerations

While these interventions are supported in the literature, their feasibility in rural U.S. settings must be critically considered. Workforce constraints, funding limitations, and geographic barriers may affect the implementation of healthcare, school-based, and infrastructure programs. Rural communities often face shortages in healthcare professionals and limited access to sustained public health funding, which may reduce the scalability of certain interventions.

Therefore, while the interventions proposed are evidence-informed, their success depends on adaptation to local capacity and resource availability.

This review has several limitations. As a narrative review, it does not follow a fully systematic methodology, which may introduce selection bias in the studies included. Although a basic appraisal of study quality was conducted, a formal and standardized quality assessment was not performed, limiting the ability to evaluate the strength of evidence across studies.

Additionally, the relatively small number of included studies (n=12) may restrict the generalizability of findings. There is also potential for publication bias, as studies with significant or positive findings are more likely to be published and included.

Furthermore, the included studies are limited by predominantly cross-sectional designs, which restrict causal inference between identified risk factors and childhood obesity. In addition, inconsistent adjustment for key confounders such as income, race/ethnicity, and regional policy differences, along with variation in study design, population characteristics, and obesity

measurement, reduces the ability to isolate rurality as an independent predictor and limits comparability across findings. Despite these limitations, this review provides a comprehensive overview of key factors contributing to disparities in childhood obesity between rural and urban populations.

CONCLUSION

The disparities in childhood obesity rates between rural and urban contexts are alarming and multifaceted, indicating the necessity for public health interventions that are specifically tailored to address the unique challenges of rural residents. Findings from this analysis confirm the role of socioeconomic factors, environmental barriers, and psychological factors in creating an epidemic of obesity. Rural residents - who often reside in high-poverty areas, have limited access to healthcare, and have limited opportunities for physical activity - face a cumulative risk that leads to the higher rates of obesity observed in rural youth. Addressing childhood obesity in rural spaces is more than about equitable access to healthy food or places to be physically active; it is about addressing the social determinants of health that impact rural populations. The challenges of poverty, mental health issues, and limited access to specialized health all compound the ability of rural children to achieve and maintain a healthy weight. In order to promote health policy, rural health infrastructure needs to be prioritized, nutrition education in schools needs to be increased, and healthier living needs to be made easier. If programs and policies make these changes in rural communities, they will create a culture where rural children are empowered to be healthier and change their health outcomes. Moving forward, additional research and ongoing commitment to reducing health disparities will be required for equitable health outcomes for all children, regardless of their location. Only through an interconnected, inclusive, community-based approach can we begin to reverse the disturbing trends in rural childhood obesity, and mitigate the impact of childhood obesity on the next generation.

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Table 1. Summary of Included Studies

Author (Year)	Study Design	Population	Key Findings
Ogden et al. (2018)	Cross-sectional	US children (2–19)	Higher obesity in rural (21.7%) vs urban (17.1%)
Joens-Matre et al. (2008)	Cross-sectional	Elementary children	Rural children had higher BMI and lower physical activity
Singh et al. (2008)	Multilevel analysis	US youth	Higher obesity in low-income rural counties
Contreras et al. (2020)	Observational	Low-income preschoolers	Rural children had higher obesity-related risk behaviours
Hatem et al. (2020)	Longitudinal	Children → adolescents	Food insecurity linked to mental health and obesity risk
McCarthy et al. (2023)	Observational	Preschool children	Parental stress associated with obesity risk
Twenge & Campbell (2018)	Cross-sectional	Adolescents	Increased screen time linked to inactivity and obesity risk
NIDDK (2017)	Government health statistics report	U.S. children	~1 in 5 children/adolescents affected by obesity nationally
Balasundaram & Krishna (2023)	Clinical review	Children	Childhood obesity linked to Type 2 diabetes, CVD, mental health outcomes
Silva et al. (2023)	Narrative review	General population	Nutrition literacy affects dietary behaviours and obesity risk
Anawade et al. (2024)	Literature review	Healthcare systems	Telemedicine improves healthcare access in underserved areas
USDA SNAP-Ed (Policy document)	Government policy report	Low-income families	Nutrition education improves dietary habits and food choices

Conflict of Interest:

The authors declare that there is no conflict of interest regarding the publication of this paper.

Source of Funding: None

Author's contribution:

Ibrahim Ahmed Khan: Conception of the study, study design, methodology, literature review, overall supervision, drafting of the manuscript, critical revision, final approval, and accountability for all aspects of the work.

All the authors have approved the final version to be published and agree to be accountable for all aspects of the work.



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