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Original Paper

A Review of the Relationship Between Food and Health: Environmental, Behavioral, and Policy Perspectives—Based on the Journal Health & Place

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Abstract

The relationship between food and health is an important research area in public health and health studies. This review examines the relationship from multiple dimensions, including food environments, dietary behaviours, health impacts, and policy interventions. Food environments encompass aspects such as food retail distribution and advertising, which are closely associated with population health and exhibit geographical and demographic variations. Dietary behaviours are shaped by multiple factors and, in turn, influence health outcomes. The effects of food on health encompass a range of conditions, including obesity and cardiovascular diseases, with different food categories exerting varying effects. Policy interventions play an important role in improving food environments and promoting healthy eating. Future research should focus on the combined effects of multiple factors, the assessment of food environments, further policy research, and the evaluation of intervention effectiveness. These efforts will contribute to advancing the field and provide an evidence base for improving public health.

Keywords

Food and Health, Food Environment, Dietary Behaviour, Health Impacts, Policy Interventions

1. Introduction

The relationship between food and health is one of the central concerns in public health. Adequate food intake is essential for maintaining normal physiological functions and preventing diseases. With socioeconomic development and changes in lifestyles, food environments have become increasingly complex and have emerged as important determinants of dietary behaviours and population health. Food environments encompass various dimensions, including the spatial distribution of food retail

outlets, food availability, affordability, food prices, quality, and advertising, all of which collectively shape individuals' food choices and dietary practices[1]. Previous studies have found associations between the spatial distribution of unhealthy food retail outlets and health outcomes such as overweight and obesity among residents. These associations are also influenced by socioeconomic backgrounds and the methods used to measure food environments [2]. Furthermore, residents' daily activity spaces and household food purchasing practices are also important factors influencing dietary behaviours[3].Understanding the relationship between food and health is of great significance for improving public health policies and enhancing the nutritional status of residents. This paper reviews research on the relationship between food and health from four perspectives: food environments, dietary behaviours, health impacts, and policy interventions. Existing studies suggest that traditional residential-based measures of food environments may not fully capture individuals' actual exposure to food environments. Greater attention should therefore be paid to daily activity spaces and household food purchasing practices [4]. Therefore, future research should strengthen spatiotemporal assessments that integrate residential environments with activity spaces, pay greater attention to food affordability and socioeconomic inequalities, and further evaluate the health effects of environmental and policy interventions. These efforts will provide an evidence base for promoting healthy eating and improving public health.

2. Food Environments and Health

2.1 Food Retail Environments and Health

The food retail environment is an important component of the broader food environment. Factors such as its spatial distribution, types, and density have significant implications for residents' health. The food retail environment not only determines the convenience of food access but also influences dietary choices and health outcomes. Numerous studies have demonstrated that variations in food retail environments are closely associated with residents' dietary quality and health status. Agyei-Mensah and de-Graft Aikins pointed out that Ghana's food environment has undergone significant changes alongside economic development and accelerating urbanisation [5]. The rapid growth of the fast-food industry has increased people's exposure to high-calorie and high-fat foods, a trend closely associated with the rising prevalence of non-communicable diseases. This phenomenon is not unique to Ghana, as many cities worldwide face similar challenges. The convenience and affordability of fast food attract large numbers of consumers, particularly low-income groups and young people, potentially contributing to the development of unhealthy dietary habits. A study by Bernsdorf . in the Capital Region of Denmark found a significant association between the accessibility of fast-food outlets and residents' fast-food consumption [6]. Specifically, higher densities of fast-food outlets are associated with more frequent fast-food consumption among residents. This finding suggests that the spatial distribution of food retail outlets has a direct influence on dietary behaviours. Similarly, a study by Pearce . in London revealed significant differences in food retail environments across different areas.

These disparities affect residents' food access and choices, thereby influencing their health outcomes [7]. For example, some areas may lack retail outlets offering healthy food, while others may be saturated with fast-food outlets selling high-calorie and high-fat foods. Large food retailers, such as supermarkets, play an important role in providing access to healthy food. Studies have shown that the distribution and density of supermarkets are associated with residents' healthy eating behaviours. Supermarkets typically offer a wider variety of food products, including fresh fruits, vegetables, whole grains, and low-fat foods, which are essential for maintaining a healthy dietary pattern [8]. However, in some areas, the lack of supermarkets makes it difficult for residents to access fresh and healthy foods, thereby affecting dietary quality and health outcomes. This phenomenon is particularly prevalent in low-income communities and is commonly referred to as a "food desert", defined as an area with limited access to healthy food options.

However, some studies have pointed out that simply increasing the number of supermarkets does not necessarily lead to improvements in residents' healthy eating behaviours. Dietary behaviours are shaped by a combination of factors, including income levels, transport accessibility, and cultural backgrounds. For example, low-income residents may be unable to afford relatively expensive healthy foods due to financial constraints, or may find it difficult to travel to supermarkets because of inadequate transport access. In addition, cultural backgrounds can influence residents' acceptance of and preferences for healthy foods.Beyond supermarkets, other types of food retail outlets, such as convenience stores and farmers' markets, also play important roles in food access. Convenience stores generally offer a convenient shopping experience, but their product ranges are relatively limited, and the availability of healthy food options may be insufficient. Many convenience stores primarily sell processed foods, snacks, and beverages, which are often high in sugar, salt, and fat and may therefore have adverse effects on health. Nevertheless, convenience stores are widely distributed, particularly in city centres and residential areas, and consequently occupy an important place in residents' everyday diets [9].

In contrast, farmers' markets primarily sell fresh agricultural produce and can help residents gain access to healthier foods. They typically offer locally produced fruits, vegetables, meat, and seafood, which are not only fresh but also often less expensive than those available in supermarkets. Furthermore, farmers' markets provide consumers with opportunities to interact directly with farmers, thereby enhancing their understanding of food origins and quality. However, in some areas, the distribution and opening hours of farmers' markets may limit residents' access to them. For example, farmers' markets may operate only at weekends or be located in areas with poor transport accessibility, making it difficult for some residents to fully benefit from them.

In summary, food retail environments have far-reaching implications for residents' health. Different types of retail outlets—from fast-food restaurants and supermarkets to convenience stores and farmers' markets—play distinct roles in shaping residents' dietary choices. Improving dietary quality and health outcomes requires comprehensive strategies. These should not only focus on optimising the spatial

distribution of food retail outlets and increasing the availability of healthy foods, but also take into account residents' economic circumstances, transport accessibility, and cultural preferences. Policymakers, urban planners, and public health professionals should work together to improve food retail environments and encourage the adoption of healthy eating behaviours, thereby enhancing the overall health of the population.

2.2 Food Information Environments and Health

The food information environment encompasses various forms of communication, including advertising and media coverage, which subtly influence consumers' food choices and health behaviours. In contemporary society, food advertising is ubiquitous. In particular, advertisements for foods high in sugar, fat, and salt that target children and adolescents have a significant influence on their dietary preferences and purchasing behaviours. Wray examined the effects of outdoor food and beverage advertising on adolescents' purchasing behaviours. The study found that although exposure to different types of advertisements was not significantly and directly associated with purchasing behaviours, interactions existed between exposure to certain combinations of advertising types and purchasing behaviours [10]. This may be attributed to the spatial co-location of different types of food advertisements, whereby adolescents exposed to one type of advertisement may also encounter others, consequently influencing their purchasing decisions. Furthermore, some studies have shown that the content and format of food advertisements can shape consumers' perceptions and attitudes towards food, thereby influencing their purchasing behaviours.

Media coverage also plays an important role in shaping public perceptions of food and health. By promoting the principles and knowledge of healthy eating, the media can encourage the public to make healthier food choices [11]. The rise of social media platforms has also created new channels for disseminating food-related information. Health food bloggers and social media influencers, for example, share their dietary experiences and recipes, thereby influencing the eating behaviours of large numbers of followers. However, the quality of information on social media varies considerably, and false or misleading information may have adverse effects on public health.

2.3 Regional Differences in Food Environments and Their Health Impacts

Food environments vary significantly across different regions. These differences are shaped by a range of geographical, economic, and sociocultural factors, which in turn have varying impacts on residents' health. In urban areas, food resources are relatively abundant, with a wide range of food retail outlets available. However, urban areas also face challenges such as an excessive concentration of fast-food outlets and the relatively high prices of healthy foods. A study conducted in New York City found that, despite the abundant food supply in urban areas, some low-income communities experience food desert conditions, where residents have limited access to fresh, healthy, and affordable foods [12]. Food environments in rural areas exhibit different characteristics. Due to lower population densities, large food retailers such as supermarkets are relatively scarce, making food access less convenient for residents. Rural residents may rely more heavily on local farmers' markets or small grocery stores, but

the variety and quality of food available at these outlets may be limited. Poor transport accessibility in rural areas further increases the difficulty of accessing healthy foods, posing challenges to maintaining healthy diets [13]. Regional differences in food environments are also reflected in food cultures. People in different regions have distinct dietary habits and food preferences, and these cultural factors influence their food choices and consumption patterns. In some regions, traditional food cultures emphasise fresh ingredients and balanced diets, whereas in others, there may be a greater preference for processed and high-calorie foods. Such differences in food culture are closely associated with local health outcomes. For example, some regions where fresh produce is a major component of the local diet have relatively low rates of obesity [14].

3. Dietary Behaviours and Health

3.1 Factors Influencing Dietary Behaviours

Dietary behaviour is a complex process influenced by a range of factors, including individual, social, and environmental factors. Individual factors, such as personal taste preferences, health awareness, and cultural background, play an important role in shaping dietary behaviours. Studies have shown that personal taste preferences are among the key factors influencing food choices, as people tend to favour foods they enjoy [15]. For example, individuals who prefer sweet foods may consume more sugar-containing products as part of their diets. Health awareness also influences dietary behaviours, with individuals who have a higher level of health awareness being more likely to choose healthier foods, such as fresh fruits, vegetables, and whole grains.

Social factors, such as family, friends, and social networks, also have a significant influence on dietary behaviours. The family is the first social environment with which individuals interact, and family eating habits and food choice patterns can have a profound and lasting influence on them. Parents' dietary behaviours and attitudes towards healthy eating directly shape their children's food preferences and eating habits [16]. Friends and social networks also influence individuals' dietary behaviours, as food choices in social settings are often shaped by the behaviour of others. For example, when dining together, people may choose the same foods as others in order to fit in with the group.Environmental factors, such as food availability, price, and convenience, also influence dietary behaviours. When healthy foods are readily accessible and reasonably priced, people are more likely to adopt healthy eating habits. Conversely, if there are numerous fast-food outlets nearby offering relatively inexpensive meals, people may be more inclined to choose fast food. By contrast, when farmers' markets are located nearby and fresh produce is affordable, residents are more likely to purchase fresh fruits and vegetables [17].

3.2 The Relationship Between Dietary Behaviours and Health

Dietary behaviours are closely associated with health. Unhealthy dietary behaviours, such as the excessive consumption of foods high in sugar, fat, and salt, are closely linked to the development and progression of various chronic diseases. Bernstein et al. found that the long-term consumption of

sugar-sweetened beverages can lead to elevated blood glucose levels and increase the risk of developing diabetes [18]. A high-salt diet is closely associated with the development of hypertension, as excessive salt intake can raise blood pressure and increase the risk of cardiovascular disease [19]. Unhealthy dietary behaviours are also closely associated with obesity. With the widespread availability of fast food and processed foods, dietary patterns have changed, and the consumption of high-calorie and high-fat foods has increased, contributing to rising obesity rates. Obesity is an important risk factor for many chronic diseases, including cardiovascular disease, diabetes, and hypertension [20]. By contrast, healthy dietary behaviours can help prevent chronic diseases and maintain overall health. Diets rich in fruits, vegetables, whole grains, and low-fat dairy products provide abundant vitamins, minerals, and dietary fibre, which help maintain normal physiological functions and reduce the risk of chronic diseases. A study of the Mediterranean diet found that this dietary pattern, characterised by a high intake of olive oil, fruits, vegetables, whole grains, and fish, is associated with a lower incidence of cardiovascular disease [21].

4. Specific Health Impacts of Food

4.1 The Relationship Between Food and Obesity

The relationship between food and obesity is one of the major topics of current research. A substantial body of evidence indicates that food types and intake quantities are closely associated with the development of obesity. Energy-dense foods, such as fast food, fried foods, and sugar-sweetened beverages, are important contributors to obesity. These foods are typically high in calories, fat, and sugar, making excessive energy intake more likely and consequently increasing the risk of obesity.Several studies have further confirmed the relationship between food consumption and obesity through surveys and analyses of different population groups. For example, a study of children and adolescents in the United States found a positive association between fast-food consumption and obesity rates, with children and adolescents who frequently consumed fast food facing a higher risk of obesity [22]. Research on adults has also found that the consumption of sugar-sweetened beverages is closely associated with weight gain and the development of obesity.In addition to food types, the quantity of food consumed is another important factor influencing obesity. With improvements in living standards, overall food consumption has generally increased, particularly the intake of high-calorie foods. Some individuals tend to overeat, resulting in energy intake exceeding energy expenditure. The excess energy is then stored as body fat, leading to weight gain.

4.2 The Relationship Between Food and Cardiovascular Disease

Food plays an important role in the development and progression of cardiovascular disease. Unhealthy dietary patterns, such as diets high in cholesterol, saturated fat, and salt, are major risk factors for cardiovascular disease. A high-cholesterol diet can increase blood cholesterol levels and raise the risk of atherosclerosis, which may subsequently lead to cardiovascular disease. A diet high in saturated fat can increase levels of low-density lipoprotein cholesterol in the blood, further aggravating

atherosclerosis.Studies have shown that increasing the consumption of fruits, vegetables, whole grains, and fish can help reduce the risk of cardiovascular disease. Fruits and vegetables are rich in vitamins, minerals, and dietary fibre, and possess antioxidant and anti-inflammatory properties that help protect the cardiovascular system. Whole grains contain abundant dietary fibre and complex carbohydrates, which can help lower cholesterol levels and reduce the risk of cardiovascular disease. Fish is rich in unsaturated fatty acids, particularly omega-3 fatty acids, which have protective effects on the cardiovascular system. They can help lower blood lipid levels, reduce blood clot formation, and decrease the risk of cardiovascular disease [23].

4.3 The Relationship Between Food and Other Health Issues

In addition to its close association with obesity and cardiovascular disease, food is also linked to a range of other health issues. For example, food allergies are an increasingly common health concern, with their occurrence being associated with both the types of food consumed and individual immune responses. Atiim's study found that there were considerable challenges in the awareness and management of food allergies in Ghana, where a lack of relevant policies and public awareness adversely affected patients' health and quality of life. Food allergies can cause physical discomfort, such as skin itching and breathing difficulties, and may even be life-threatening in severe cases.Food quality and safety also have a direct impact on human health. Unsafe food may contain harmful substances, such as pesticide residues, heavy metal contaminants, and microbial contaminants. These substances can pose risks to human health and cause food poisoning, intestinal diseases, and other health problems [24]. In some regions, food may be contaminated by pesticides, and long-term consumption of such food may lead to chronic poisoning and adversely affect residents' health.

5. Policy Interventions and Food-Related Health

5.1 The Impact of Policies on Food Environments

Policies play an important role in improving food environments and promoting healthy eating. Governments can regulate food retail environments through relevant policy measures and encourage the food industry to provide healthier food options. Some cities have adopted planning policies to restrict the number of fast-food outlets in designated areas, such as around schools and within residential communities, in order to reduce residents' exposure to fast food [25]. Governments can also use taxation policies to impose higher taxes on unhealthy foods, thereby increasing their prices and reducing consumer demand. At the same time, subsidies can be provided for healthy foods to lower their prices and encourage consumers to purchase them [26]. Policies can also shape food information environments. Governments can strengthen the regulation of food advertising and restrict advertisements for unhealthy foods targeting children and adolescents, thereby reducing the influence of such advertising on their dietary behaviours [27]. Relevant regulations can also be introduced to require food advertisements to provide truthful and accurate information about the nutritional content and health implications of food products, preventing consumer misinformation. In addition,

governments can implement public education policies to improve public knowledge and awareness of healthy eating and encourage people to make healthier food choices.

5.2 Policy Guidance on Dietary Behaviours

Policies can guide people's dietary behaviours in various ways and promote healthy eating. For example, governments can implement nutrition education policies by organising nutrition education programmes in schools, communities, and other settings to improve public nutrition knowledge and raise awareness of healthy eating [28]. Schools can also introduce nutrition courses to equip students with knowledge and practical skills related to healthy eating, thereby fostering healthy dietary habits.Governments can further guide dietary behaviours through food procurement policies that encourage public institutions to purchase healthy food and set a positive example for the wider public. Some government departments and school canteens have begun to prioritise the procurement of organic food, locally produced food, and nutrient-rich food products to promote healthy eating [29]. In addition, governments can use subsidy policies to encourage food businesses to produce healthier food products, thereby providing consumers with a wider range of healthy choices.

5.3 Evaluating the Effectiveness of Policy Interventions

Evaluating the effectiveness of policy interventions is an important means of assessing policy performance. By examining changes in food environments and residents' dietary behaviours following policy implementation, it is possible to determine the actual impacts of policies and provide an evidence base for their adjustment and improvement. Some studies have evaluated changes in fast-food outlet density and residents' fast-food consumption following policy interventions, finding that such interventions have reduced the density of fast-food outlets to some extent and decreased residents' fast-food consumption [30]. However, the effectiveness of policy interventions is influenced by multiple factors, including the level of policy enforcement, public acceptance, and changes in the socioeconomic environment. Some policies may fail to achieve their intended outcomes due to inadequate implementation or public resistance. Changes in the socioeconomic environment, such as economic recessions or inflation, may also affect policy implementation and outcomes. Therefore, the evaluation of policy interventions needs to take multiple factors into account to ensure the accuracy and reliability of the findings.

6. Conclusions and Future Research Directions

6.1 Summary

Based on a review of the existing literature, this paper has provided a comprehensive examination of the relationship between food and health. Food environments have a significant influence on residents' health, with variations in food retail environments and food information environments shaping food choices and health outcomes. For example, urban food environments, as a primary means through which residents access food, have become an important topic in urban studies and public health research. Studies have shown that the decline in home cooking and increasing reliance on pre-prepared

and takeaway foods have become prominent trends in dietary transitions. These changes often result in insufficient consumption of healthy foods, such as fruits and vegetables, alongside excessive intake of sugar, salt, and saturated fats, thereby increasing the risk of chronic health conditions, including obesity, type 2 diabetes, and coronary heart disease.

Dietary behaviours are influenced by a range of individual, social, and environmental factors. Unhealthy dietary behaviours are closely associated with various health problems, including obesity and cardiovascular disease. Food types and consumption quantities are also closely linked to health conditions such as obesity, cardiovascular disease, and food allergies.

Policy interventions play an important role in improving food environments and guiding dietary behaviours, although their effectiveness is constrained by various factors. For example, while improving access to healthy foods is an important measure for promoting healthier dietary behaviours, simply increasing the number of supermarkets or the supply of healthy foods cannot fully address the challenges residents face in maintaining healthy diets.

Factors such as individuals' economic circumstances, cultural backgrounds, and lifestyles can also influence policy outcomes. Furthermore, improving food environments requires interventions at multiple levels, including the family, community, and school, to encourage the adoption of healthy dietary behaviours.

6.2 Research Limitations and Future Prospects

Although research on food and health has made considerable progress, several limitations remain. Some studies examining the relationship between food and health have failed to adequately consider the combined effects of multiple factors, thereby limiting the scope of their findings. For example, many studies focus exclusively on individual dimensions, such as food retail environments or food information environments, while overlooking the interactions between these and other relevant factors. Such single-dimensional approaches may be insufficient to reveal the complex relationships between food environments and health.

Existing approaches to food environment assessment also have limitations. Current studies often employ inconsistent measurement methods and incomplete indicators, which may affect the comparability and accuracy of research findings. For example, although commonly used activity-space measurement approaches offer a more comprehensive perspective than traditional residential-based measures, they still cannot accurately identify the specific exposure contexts that have a substantial or actual influence on dietary behaviours and health outcomes. Future research should therefore develop more precise and comprehensive tools for assessing food environments to better capture the relationship between food environments and health.

Further research is also needed on policy interventions. Although policies play an important role in improving food environments and health outcomes, existing research on policy formulation, implementation, and evaluation remains relatively limited. For example, while improving access to healthy foods is an important strategy for promoting healthier dietary behaviours, simply increasing the

number of supermarkets or the availability of healthy food products cannot fully resolve the challenges associated with healthy eating. Future studies should further investigate how to develop more effective policies, strengthen policy implementation, and improve public acceptance to achieve better intervention outcomes.

In addition, the geographical and population coverage of existing research needs to be expanded. Current studies are concentrated mainly in developed countries and selected regions, while relatively little attention has been paid to developing countries and populations from different socioeconomic backgrounds. For example, although China's National Survey on Nutrition and Health covers regions with different levels of economic development, further research is still needed at the global level. Future studies should pay greater attention to food-related health issues across diverse geographical regions and population groups worldwide, providing more targeted recommendations and interventions.

In summary, future research should focus on integrating multiple influencing factors, improving assessment methods, deepening the investigation of policy interventions, and expanding geographical and population coverage. These efforts will contribute to a more comprehensive understanding of the relationship between food and health and provide a stronger scientific basis for the development of public health policies.

6.3 Recommendations for Future Research Directions

Future research could explore several directions. First, multiple influencing factors should be considered through interdisciplinary approaches to investigate the complex relationship between food and health. This relationship is shaped by a combination of factors, including individuals' physiological and psychological characteristics, sociocultural backgrounds, environmental conditions, and policy orientations. Research approaches based on a single discipline are therefore often insufficient to fully explain the underlying mechanisms. Integrating theories and methods from geography, sociology, psychology, and public health could provide a more comprehensive understanding of how individual, social, environmental, and policy factors jointly influence food choices and health outcomes. For example, geography can provide insights into the spatial distribution of food environments; sociology can reveal how social structures shape dietary behaviours; psychology can explain individual food preferences and decision-making processes; and public health can assess the effects of food environments on health from a population-level perspective.

Second, the development and application of more precise food environment assessment tools represent another important direction for future research. With ongoing technological advances, geographic information systems (GIS) and global positioning systems (GPS) offer new possibilities for food environment research. These technologies can facilitate more accurate measurements of food environment characteristics and changes, as well as individuals' exposure to different environments. For example, GIS can be used to map the spatial distribution of food retail outlets and analyse their relationships with residents' health, while GPS technology can track individuals' activity trajectories in

real time, providing insights into the time they spend in different food environments and the frequency of their exposure. These technologies can not only provide richer data for research but also help researchers develop a deeper understanding of the mechanisms through which food environments influence dietary behaviours and health outcomes.

Furthermore, future research could explore the causal relationships between food environments and health in greater depth. Most existing studies focus on analysing correlations, while relatively few have investigated causal relationships. More rigorous research designs, such as randomised controlled trials and quasi-experimental studies, could help clarify the effects of food environments on health. At the same time, combining big data analytics with machine learning algorithms could facilitate the more efficient processing and analysis of large volumes of food environment data, helping researchers identify underlying patterns and relationships within the data.

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