

MANUSCRIPT

Obesity and Food Affordability: The Influence of Addictive Processed Foods in Hispanic Young Adults

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Introduction

Obesity presents a significant public health challenge globally, disproportionately affecting Hispanic young adults [1]. While obesity rates have plateaued in some U.S. demographics, they continue to rise among Hispanic young adults group, raising concerns due to the associated long-term health consequences like cardiovascular disease, type 2 diabetes, and certain cancers [2]. Understanding the contributing factors to this disparity is crucial for developing effective interventions. Several factors, including genetic predisposition, maternal obesity, and prenatal exposures, have been suggested [2]. However, the simultaneous rise in obesity across various ethnicities and age groups suggests broader influences like changes in food production, marketing, and the availability of affordable, energy-dense foods [2]. The most significant increase in obesity prevalence between 1991 and 1998 was observed among individuals aged 18–29 years [3], emphasizing the importance of focusing on this age group, especially within the Hispanic population, to mitigate long-term health risks associated with early-onset obesity. Food affordability is a critical factor shaping dietary choices and influencing obesity risk, particularly among socioeconomically disadvantaged populations. Access to affordable, nutritious food is often limited in low-income communities, leading to a reliance on cheaper, energy-dense, and nutrient-poor options [4]. This disparity in food access is linked to "food deserts," areas with limited access to healthy and affordable food [5]. Addictive processed foods, characterized by high fat, sugar, and salt content, are also a significant driver of obesity, particularly among young adults [6]. These foods, often termed "highly processed" or "ultra-processed," are designed for palatability and reward, triggering brain responses similar to drugs of abuse [7], [6]. The

incentive sensitization theory suggests that the craving or "wanting" aspect of these foods, rather than enjoyment, drives compulsive consumption and contributes to problematic eating behaviors and weight gain [6].

Epidemiology of Obesity in Hispanic Young Adults

Obesity among Hispanic young adults includes prevalence statistics, contributing risk factors, and comparisons with other ethnic groups, highlighting the need for targeted interventions. Understanding these specific challenges is crucial for targeted interventions and public health initiatives.

Prevalence of Obesity in Hispanic Young Adults

Studies highlight an alarming prevalence of obesity among Hispanic young adults [8]. Schulte and Gearhardt found higher obesity prevalence in Hispanic individuals compared to non-Hispanic white individuals, underscoring the need for focused research and interventions within the Hispanic community [8]. While Nelson et al. discussed weight gain and related behaviors in emerging adulthood and college-aged youth [3], and White et al. explored the impact of retail access on dietary intake [5], neither study specifically focused on Hispanic populations. Miller et al. investigated the link between acculturation, familial support, and dietary patterns in a Latino population, revealing that increased acculturation was associated with decreased dietary quality and increased fast food consumption [9]. Eskandari et al. conducted a mixed-methods review on the influences of food environments and food insecurity on obesity, finding a significant association between food insecurity and obesity [10]. This adds another layer of complexity, particularly for vulnerable populations like Hispanic young adults who may experience higher rates of food insecurity.

Risk Factors Contributing to Obesity in Hispanic Young Adults

Multiple risk factors contribute to the high obesity prevalence among Hispanic young adults, encompassing genetic, environmental, socioeconomic, and cultural influences. Miller et al. identified a strong association between acculturation and unhealthy dietary patterns, with US-born, English-speaking Hispanics consuming more fast food and processed food [9]. This suggests that cultural shifts associated with acculturation play a significant role. Socioeconomic factors also contribute. Kim and Tsoh found that food insecurity was significantly associated with current smoking and suggested that socioeconomically disadvantaged young adults experiencing food insecurity may be at high risk for unhealthy behaviors, including overeating [11]. Polk et al.'s research on wanting and liking in problematic eating behavior further emphasizes the role of highly processed foods, which are craved more and positively associated with food addiction symptoms [6]. Wattick et al. examined the impact of early life influences on

food addiction in college-attending young adults, highlighting the role of Adverse Childhood Experiences (ACEs) and mental health [12]. While not specifically focused on Hispanic young adults, the findings suggest these are important factors to consider.

Comparative Analysis Between Hispanic and Other Ethnic Groups

Comparative analyses reveal disparities in obesity prevalence and associated risk factors. Schulte and Gearhardt found that the prevalence of food addiction, measured by the Yale Food Addiction Scale, was higher among Hispanic individuals compared to non-Hispanic white individuals [8]. This suggests food addiction may be a more significant contributor to obesity within the Hispanic community. Maqsood et al. examined the cumulative impact of social determinants of health on obesity, finding a stronger association between unfavorable social determinants and obesity in young adults compared to older populations [1]. Rodgers et al. discussed prevalence trends in the U.S. obesity epidemic, noting a simultaneous increase in weight across different ethnic groups [2]. Gearhardt et al. examined the relationship between BMI across adolescence and substance use problems in early adulthood, finding that obese adolescents had fewer drinking and illicit drug problems [13].

Food Affordability and Accessibility

The relationship between food affordability, accessibility, and obesity among Hispanic young adults, exploring how socioeconomic status shapes food choices, the impact of food deserts, and the role of government policies.

Socioeconomic Status and Food Choices

Socioeconomic status (SES) significantly impacts dietary habits, determining the types and quality of food consumed. Lower SES is often associated with limited access to nutritious foods due to financial constraints [5]. Polk et al. found that highly processed foods, often cheaper and more readily available, are craved more overall [6]. This preference for highly processed foods, high in fat and refined carbohydrates, contributes to increased obesity risk. Research suggests that restraint in food choices is negatively associated with both craving and liking of highly processed foods [6]. Individuals with lower SES, having less flexibility in their food choices, may be more vulnerable to consuming highly processed foods, potentially leading to adverse health outcomes. Access to transportation and information also influences dietary choices. Limited transportation restricts access to supermarkets with diverse fresh and healthy options, leading to reliance on convenience stores stocking primarily processed foods [5]. Limited access to nutrition education hinders informed food choices [3], perpetuating unhealthy eating habits. Limited disposable income further restricts access to healthier options [5].

Food Deserts and Dietary Habits

Food deserts, areas with limited access to affordable and nutritious food, exacerbate dietary challenges for lower SES individuals. These areas often lack supermarkets, leaving residents with limited options beyond convenience stores and fast-food restaurants offering primarily energy-dense, nutrient-poor foods [5]. White et al. emphasize considering transportation and proximity when evaluating food access [5]. Physical distance and limited transportation can significantly restrict access to healthier choices. The scarcity of fresh produce and whole grains in food deserts further contributes to unhealthy dietary patterns, increasing obesity and related health risks [4]. Research on food deserts shows mixed findings regarding the availability and cost of healthy options [5]. Some studies suggest healthy foods are less available in poorer areas, while others find supermarkets in these areas offer comparable or even better availability of fresh produce. However, affordability remains a significant barrier for low-income individuals, even when healthy options are available [5]. The consumption of fast food and takeaway meals, readily available in many food deserts, further contributes to increased energy intake and a higher risk of obesity [14].

Government Policies, Food Pricing, and Availability

Government policies significantly influence food environments, impacting affordability and accessibility. Policies related to agricultural subsidies, food assistance programs, and nutrition labeling can affect food availability and cost [15], [16]. Subsidies favoring certain crops, like corn and soybeans, can lead to oversupply and lower prices, making them prevalent in processed foods [15]. This can create price imbalances, making healthier options like fruits and vegetables relatively more expensive. Food assistance programs, while aiming to alleviate food insecurity, can also influence dietary habits. Some programs may restrict the types of food purchased, potentially limiting access to fresh produce [10]. Reliance on food banks, often offering primarily shelf-stable and processed foods, can contribute to unhealthy dietary patterns [10]. Nutrition labeling policies can empower consumers to make informed choices, but their effectiveness depends on consumer understanding [16]. Policies restricting unhealthy food marketing to children, particularly highly processed foods and sugary drinks, can create healthier food environments [3]. Taxation and subsidization schemes can influence food prices, making healthier options more affordable, such as taxing sugary beverages and subsidizing fruits and vegetables [4].

Addictive Processed Foods

The role of addictive processed foods in obesity, particularly among Hispanic young adults, examining their characteristics, research findings on food addiction, and the underlying psychological and physiological mechanisms.

Characteristics of Processed Foods Contributing to Addictive Eating Behaviors

Highly processed foods, often high in added fats and/or refined carbohydrates, are implicated in problematic eating behaviors [6], [7]. Engineered for hyper-palatability, they maximize desirable taste qualities like sweetness and fattiness, potentially leading to overconsumption and a cycle of craving and reward-seeking [7]. The incentive sensitization theory suggests that "wanting" or craving, rather than "liking," drives compulsive consumption [6]. This theory may apply to highly processed foods, as they can trigger intense cravings even without true hunger. The high energy density and rapid absorption of these foods can lead to rapid blood sugar spikes and subsequent crashes, potentially perpetuating craving and consumption [17]. Trans fats, common in processed foods, are linked to food addiction in African American adolescents with obesity [18]. The combination of loss of control and consumption of large quantities of food, particularly those high in trans fats, appears key in food addiction.

Research Findings on Food Addiction and its Impact on Dietary Intake

Research on food addiction, primarily assessed using the Yale Food Addiction Scale (YFAS), has shown associations with obesity, binge eating, and highly processed food consumption [18]. One study found that approximately 10% of African American adolescents with obesity met the criteria for food addiction using the YFAS-C (Children's version) [18]. YFAS-C scores were strongly associated with objective binge episodes and, to a lesser extent, with percent overweight and subjective binge episodes [18]. Higher YFAS-C scores correlated with increased consumption of calories, fat, saturated fat, trans fat, carbohydrates, sugar, and added sugar, with the strongest association being with trans fat [18]. Pursey et al.'s systematic review examined the relationship between addictive eating and dietary intake, finding that foods high in both fat and refined carbohydrates were commonly associated with addictive eating, and individuals with addictive eating consumed higher amounts of energy, carbohydrates, and fats [19]. However, the review noted heterogeneity in study methodologies and outcomes, making it difficult to draw definitive conclusions about specific foods, nutrients, or dietary patterns that facilitate the addictive process. A nationally representative U.S. study found a food addiction prevalence of 15%, with higher rates among younger, Hispanic individuals, and those with higher incomes [8]. Food addiction was associated with both underweight and obese individuals compared to those of normal or overweight. Another systematic review, including twenty-five studies and 196,211

participants, found a weighted mean prevalence of food addiction of 19.9%, higher in adults over 35, females, and clinical samples [20].

Psychological and Physiological Mechanisms of Food Addiction

The mechanisms driving food addiction are complex and interconnected. The brain's reward system, involving dopamine pathways, plays a crucial role [7]. Ultra-processed foods (UPFs), with their high palatability and energy density, can trigger strong rewarding stimuli, influencing feeding facilitation circuits [7]. This can lead to a cycle of craving, consumption, and reward, similar to substance use disorders [21]. Gordon et al.'s systematic review found support for various addiction characteristics related to food, including brain reward dysfunction, impaired control, and tolerance/withdrawal [21]. Evidence suggests that processed foods high in sweeteners and fats have the greatest addictive potential. Wiss et al. highlighted stress, trauma, and adversity, especially during early life, as contributing factors to both drug and food addictions [22]. Early adversity can cause lasting changes in glucocorticoid and dopamine systems, increasing addiction vulnerability. A study examining the relationship between childhood or adolescent abuse victimization and food addiction in adult women found that severe childhood abuse was associated with a roughly 90% increased risk of food addiction [23]. Cummings et al. found that intake of sweet, high-fat foods, fast foods, and sugary drinks was associated with immediate increases in positive emotions and decreases in negative emotions, but these effects were short-lived [24]. This suggests that the ability of highly processed foods to briefly alter emotions may be key to their reinforcing nature.

Cultural Factors Influencing Eating Behaviors

This section explores the cultural factors that influence eating behaviors, particularly within the Hispanic community.

Cultural Attitudes Towards Food in Hispanic Communities

Food is central to Hispanic culture, encompassing social gatherings, celebrations, and expressions of love and connection [9]. Shared meals reinforce family bonds and transmit cultural values. Traditional Hispanic cuisine often features fresh produce, legumes, and whole grains [15]. However, acculturation to American culture has shifted dietary patterns, with increased consumption of fast food, processed foods, and sugary drinks [9]. This shift is often attributed to accessibility and affordability, particularly in low-income communities [5]. Miller et al. found that US-born, English-speaking Hispanics consumed more fast and processed foods than their immigrant, Spanish-speaking counterparts [9]. This cultural shift is complicated by the potential for these foods to trigger addictive-like behaviors. Highly processed foods, often high in fat and refined carbohydrates, activate reward pathways in the brain [6]. This can lead to

increased cravings and difficulty controlling consumption. Polk et al. found that highly processed foods were craved more overall, with craving positively associated with Yale Food Addiction Scale (YFAS) scores [6]. This suggests the incentive sensitization framework, where "wanting" drives compulsive drug use, may also be relevant to problematic food consumption.

Family and Social Influences on Food Choices

Family and social networks are crucial in shaping eating behaviors within Hispanic communities [25], [26]. Traditional family structures emphasize shared meals and the importance of food in social gatherings. This can create a positive environment for healthy eating when traditional diets are followed, but can contribute to unhealthy patterns when processed foods become integrated. Eneli et al. highlight family dynamics in the trust model of feeding, emphasizing the division of responsibility between caregivers and children in establishing healthy eating habits [26]. Caregivers provide nutritious options, while children self-regulate intake, trusting internal cues of hunger and satiety. However, cultural factors and parental anxieties about weight or nutrition can interfere with this trust, leading to restrictive or pressuring feeding practices. Social networks also influence food choices, particularly among young adults [25]. Peer influences, social norms, and the availability of healthy food options within one's social environment all contribute to eating behaviors. Li et al. note that social influence can promote or hinder healthy eating through various pathways, including instrumental support, informational support, and social integration [25].

The Role of Traditional Dietary Practices and Their Evolution

Traditional Hispanic diets, rich in fruits, vegetables, legumes, and whole grains, offer protection against obesity [15]. However, these practices are evolving due to acculturation and changing food environments. Increased availability and affordability of highly processed foods, combined with targeted marketing, contribute to a shift away from traditional diets [27]. This shift is pronounced among young adults, susceptible to peer influences and media messages promoting processed foods [3]. Nelson et al. highlight the transition to young adulthood as critical for forming lasting dietary habits [3]. This period involves increasing autonomy but also a lack of adult responsibilities and financial stability, making young adults vulnerable to unhealthy choices. The transition to college can exacerbate these challenges, presenting new food choices and social norms, with increased access to fast food and less emphasis on traditional family meals [3]. Kavle et al.'s research in Egypt highlights the cultural perception of "junk foods" as essential, particularly for toddlers [27]. This resonates with Miller et al.'s findings regarding increased processed food consumption among acculturated Hispanics [9], suggesting a broader trend of incorporating processed foods into cultural norms.

Interventions and Strategies

This section explores interventions and strategies to mitigate the impact of food affordability and addictive processed foods on obesity in Hispanic young adults.

Successful Interventions Targeting Obesity in Hispanic Populations

Several interventions show promise. Family-based interventions, incorporating behavioral therapy and lifestyle modifications, have demonstrated efficacy in reducing weight and improving health outcomes [26]. Culturally tailored interventions considering specific cultural values, beliefs, and practices within Hispanic communities have also shown success [27]. Community-based interventions implemented through schools, churches, or community centers can reach wider audiences and address broader environmental factors [25]. Pan et al. examined the association between fast food intake and coronary heart disease (CHD) risk among Singaporean Chinese adults, revealing a significant association between frequent fast food consumption and increased CHD risk [15]. This highlights the negative health impacts of consuming highly processed foods. Addressing emotional and psychological factors associated with food addiction is crucial. Programs incorporating cognitive behavioral therapy (CBT) or other evidence-based therapies can help manage cravings, develop coping mechanisms, and improve emotional regulation [24]. Interventions focusing on social support networks and access to mental health services can further enhance effectiveness [28]. Adolescence and young adulthood are critical periods for intervention [3]. School-based programs promoting healthy eating, physical activity, and media literacy can be impactful [25]. Interventions targeting college-aged Hispanic young adults are also essential [3].

Policy Recommendations to Improve Food Affordability and Access to Healthy Foods

Policy changes are vital for creating environments supporting healthy eating. Improving food affordability and access to healthy options is particularly relevant for Hispanic young adults, who often experience high rates of food insecurity [11]. Key recommendations include increasing Supplemental Nutrition Assistance Program (SNAP) benefits and expanding eligibility [10]; promoting affordable healthy foods in underserved communities through farmers' markets, community gardens, and healthy corner store programs [5]; and zoning regulations limiting fast-food restaurant density and promoting grocery stores in low-income neighborhoods [16]. Fiscal policies, such as taxes on sugar-sweetened beverages and subsidies for fruits and vegetables, can influence food choices [15], [4], [29]. Taxes on unhealthy foods can generate revenue for programs promoting healthy eating and physical activity. Policies regulating food marketing, especially targeting children and adolescents, can reduce exposure to unhealthy food advertising [3]. Addressing food insecurity is crucial. Food banks provide immediate relief, but long-term solutions require addressing the root causes of poverty and inequality. Policies supporting

economic stability, like job training programs, affordable housing, and living wages, can improve food security and health outcomes [11].

Community Programs Focused on Reducing Food Addiction and Promoting Healthier Eating

Community programs translate policy recommendations into actions. Programs focusing on reducing food addiction and promoting healthier eating can be particularly effective in Hispanic communities [9]. Cooking classes and nutrition education workshops empower individuals to make healthier choices [25]. Community gardens and urban farms increase access to fresh produce and provide opportunities for physical activity [5]. Support groups and peer counseling offer social support for those struggling with food addiction [13]. Interventions should be culturally tailored to address the specific needs of Hispanic young adults [30]. Community health workers (CHWs) can deliver culturally competent interventions and connect individuals with resources [31]. Partnering with faith-based organizations can leverage existing social networks and provide access to wider audiences [32]. Community programs should address broader environmental factors contributing to food addiction and obesity. Collaborating with local businesses to improve healthy food availability and reduce unhealthy product marketing can create healthier food environments [5]. Advocating for policy changes supporting healthy eating and physical activity can create systemic change [33]. Ongoing program evaluation and refinement are essential. Collecting data on participation, outcomes, and community impact can inform program improvements [34]. Sharing best practices expands the reach of successful programs. The incentive sensitization theory may be relevant for problematic food consumption, particularly for individuals experiencing food addiction symptoms [6]. Current treatment approaches for addictive eating could incorporate individualized dietary advice targeting foods high in fat and refined carbohydrates [19]. The Yale Food Addiction Scale (YFAS) has been associated with obesity, eating-related problems, and problematic consumption of highly processed foods [18].

Conclusion

This review explored the complex interplay of food affordability, addictive processed foods, and obesity among Hispanic young adults, examining sociocultural factors influencing dietary habits, the neurobiological mechanisms of food addiction, and the public health implications.

Summary of Key Findings

The literature consistently shows a disproportionate obesity burden among Hispanic populations [15], [9], [35]. Acculturation shifts dietary patterns toward increased consumption of processed foods and sugary beverages [9], accompanied by reduced intake of fruits, vegetables, and whole grains [15]. Highly processed foods, often more affordable, may trigger addictive-like responses,

contributing to problematic eating behaviors [6]. The incentive sensitization framework, where "wanting" drives compulsive consumption [6], may be relevant. Craving and liking are distinct in relation to processed foods [6]. Craving is associated with addictive-like eating and cognitive restraint, while liking is linked to BMI. Food addiction prevalence varies across populations [18], [8], [20]. In African American adolescents with obesity, food addiction is linked to binge eating and processed food consumption [18]. Foods high in fat and refined carbohydrates are commonly associated with addictive eating [19]. Processed food intake is linked to short-term alterations in emotions [24]. Early life experiences and environmental factors shape eating behaviors and obesity risk [3], [12], [26]. The transition to young adulthood, especially college, is a critical period for developing unhealthy habits [3]. Food insecurity is linked to increased reliance on energy-dense, nutrient-poor foods [10]. The COVID-19 pandemic exacerbated childhood obesity challenges [4].

Implications for Future Research

Future research should include longitudinal studies on the long-term effects of processed food consumption on emotional regulation and eating behaviors [24]; research on the relationship between food addiction and other mental health conditions [12]; culturally tailored interventions addressing sociocultural factors influencing dietary habits among Hispanic young adults [27]; studies on the effectiveness of the trust model of feeding in diverse populations [26]; and research on the impact of social networks and social media on food choices [25]. Further investigation is needed to understand the interplay of genetic, environmental, and psychosocial factors in shaping food preferences. Studies examining marketing's influence on food choices, particularly among vulnerable populations [3], are needed. Research exploring the long-term effects of early life experiences, like ACEs and childhood eating environments, on food addiction and obesity is warranted [12]. Evaluating the effectiveness of dietary and lifestyle interventions, including technology-based approaches [25], is essential.

Call to Action for Policy Changes and Community Initiatives

This review highlights the need for multi-level interventions to address obesity among Hispanic young adults. Policy changes improving food affordability and accessibility, like subsidies for healthy foods and taxes on sugary beverages, are needed [15]. Community initiatives promoting healthy eating habits, such as nutrition education programs and cooking classes, could empower individuals [16]. Collaborations between healthcare providers, schools, and community organizations could facilitate comprehensive and culturally tailored interventions. Reducing the marketing of unhealthy foods, especially to children and adolescents, is crucial [3]. Community initiatives promoting access to healthy, affordable food are needed. Increasing public awareness about the health risks of processed foods and the potential for food addiction could motivate

change. Supporting research on the neurobiological mechanisms of food addiction and developing effective interventions is essential.

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