DHR Proceedings

Special Edition: Advanced Clinical Research Internship Session III (2024), Vol. 4 No. S2
https://doi.org/10.47488/dhrp.v4iS.2

MANUSCRIPT

Monosodium Glutamate Exposure in Fast Food and Its Contribution to Obesity Risk Among College-Aged Hispanics on the Texas-Mexico Border

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Received: July 3, 2024
Accepted for publication: January 24, 2025

Introduction

This literature review examines the potential link between monosodium glutamate (MSG) exposure through fast food consumption and obesity risk among college-aged Hispanics residing on the Texas-Mexico border. The high prevalence of obesity and related comorbidities among US Hispanics/Latinos necessitates investigation into various contributing factors, including dietary habits and the consumption of processed foods often containing MSG.[1] While research directly linking MSG to obesity in humans remains inconclusive, several studies suggest potential mechanisms and indirect associations warranting further exploration, especially within specific at-risk populations.[2] This review will synthesize existing research on MSG's effects, dietary patterns of border Hispanics, and the role of the food environment in shaping health outcomes.

Monosodium Glutamate (MSG): A Review of Potential Health Implications

MSG, a flavor enhancer widely used in processed foods, including many fast-food items, is the sodium salt of glutamic acid.[2-3] While generally recognized as safe (GRAS) by regulatory bodies, concerns persist regarding its potential long-term health effects.[4-5] Animal studies have demonstrated MSG's neurotoxicity, particularly when administered neonatally.[2-3,6-7] These studies report various adverse effects including weight gain, obesity, and changes in behavior and memory.[2-3] However, the extrapolation of these findings to human populations, especially with regards to oral consumption at levels typically found in food, remains a significant challenge.[8] Furthermore, the mechanisms through which MSG might contribute to obesity are not fully understood.[2,9] Some research suggests that MSG may influence leptin resistance, inhibit growth hormone, and increase central adiposity.[2] Other studies point to MSG's potential role in disrupting the hypothalamic-pituitary-gonadal (HPG) axis, affecting reproductive function and potentially influencing metabolic processes.[9] A recent study even suggests a link between MSG exposure and cardiovascular disease risk, highlighting the need for further investigation into its multifaceted effects on health.[5] The inconsistencies between animal and human studies concerning the dosage and effects of MSG necessitate caution in interpreting the results.[4] Several studies have focused on the development of methods for measuring MSG in various matrices, including food products and biological samples.[10-11] This development is crucial for accurate assessment of MSG exposure and its potential health consequences. The development of accurate and reliable methods for measuring MSG in different food matrices is crucial for understanding actual exposure levels and their potential implications.[10-11] Further research is needed to clarify the specific mechanisms by which MSG might influence metabolic processes and contribute to obesity.

Dietary Habits and Obesity among College-Aged Hispanics on the Texas-Mexico Border

The Texas-Mexico border region presents a unique context for studying obesity and dietary habits. This area is characterized by a high prevalence of obesity among Hispanic populations, influenced by a confluence of factors including acculturation, socioeconomic status, and access to healthy food options.[12-15] Studies have shown that acculturation to American culture is often associated with shifts in dietary patterns, increasing the consumption of processed foods, sugary drinks, and fast food.[14,16] The transition to a "Westernized" diet, often high in saturated fats, refined carbohydrates, and sodium, is a significant contributor to obesity risk.[13-17] Moreover, limited access to fresh produce and healthy food options, particularly in low-income communities, creates a "food desert" effect, exacerbating the issue.[12] The complex interplay between acculturation, socioeconomic factors, and the food environment makes it challenging to isolate the specific contribution of MSG to obesity risk within this population. A significant portion of the diet among this population consists of prepared foods, some of which are processed at high temperatures, potentially altering the MSG content and bioavailability.[18] The high consumption of prepared foods across both rural and urban regions of this area necessitates further investigation into the role of MSG and other food additives in shaping dietary patterns and obesity risk.[18] Furthermore, the role of cultural norms and food preferences in shaping dietary choices should be considered in future interventions aiming to improve dietary quality among Hispanic groups.[14]

MSG Exposure from Fast Food and Obesity Risk: Connecting the Dots

While no studies directly address the specific contribution of MSG exposure from fast food to obesity risk in college-aged Hispanics on the Texas-Mexico border, several lines of evidence suggest potential indirect associations. The high consumption of fast food, often rich in MSG and other unhealthy ingredients, is a well-established risk factor for obesity.[12,15,19] The potential mechanisms by which MSG might contribute to obesity, such as its influence on leptin resistance and growth hormone, as discussed earlier, could be particularly relevant in a population already at high risk due to other dietary and lifestyle factors.[2] Moreover, the prevalence of emotional eating, a behavior linked to increased fast food consumption, could further exacerbate the impact of MSG exposure.[19] The high prevalence of overweight and obesity among this population highlights the need for further research in this area.[1,20-21] The high prevalence of obesity among college-aged females in Saudi Arabia, as well as the significant correlation between perceived body size and BMI, suggests a similar trend that might be applicable to college-aged Hispanic women on the Texas-Mexico border.[21] The impact of psychosocial factors should be considered in future research, as these factors may influence body image perception and dietary choices.[21] Additionally, the effect of racial/ethnic discrimination as a psychosocial stressor on BMI and other CVD risk factors among college students of color suggests that these factors should also be taken into account when studying obesity in this specific population.[22]

Research Gaps and Future Directions

Several critical research gaps need to be addressed to fully understand the contribution of MSG exposure from fast food to obesity risk among college-aged Hispanics on the Texas-Mexico border. Firstly, longitudinal studies are needed to track MSG intake and its association with weight change over time within this specific population.[13] Cross-sectional studies, while providing valuable insights, cannot establish causality.[23] Secondly, more research is required to assess MSG exposure levels from fast food specifically consumed by this demographic. This would require detailed dietary assessments and analysis of MSG content in commonly consumed fast-food items within the region.[18] Thirdly, studies should investigate the interaction between MSG exposure and other dietary and lifestyle factors that contribute to obesity risk in this population.[12,14-15] This includes examining the impact of acculturation, socioeconomic status, access to healthy food, and physical activity levels.[16-17] Fourthly, research should investigate the potential mediating role of emotional eating and other psychological factors in the relationship between MSG exposure and obesity.[19] Finally, culturally relevant interventions are needed to address dietary habits and promote healthier eating behaviors within this community.[14,24] Furthermore, the role of food marketing and its impact on the consumption of MSG-containing fast food, particularly among youth, needs further investigation.[24]

Conclusion

While the direct link between MSG exposure from fast food and obesity risk in college-aged Hispanics on the Texas-Mexico border is not definitively established, several indirect associations exist. The high prevalence of obesity in this population, coupled with the widespread consumption of fast food and the potential mechanisms through which MSG might contribute to obesity, warrants further investigation. Future research should address critical research gaps through longitudinal studies, detailed dietary assessments, and consideration of the interaction between MSG exposure and other relevant factors. Such research is critical for developing effective interventions to address the significant public health challenge of obesity in this vulnerable population. The development of culturally sensitive interventions that address the complex interplay between food environment, dietary habits, and psychosocial factors is essential for promoting healthy eating behaviors and reducing obesity risk within this population. Furthermore, the potential impact of MSG on the reproductive system and the long-term health consequences of MSG consumption warrant further investigation. The potential for MSG-induced genotoxic effects also needs further study in human populations. The role of genetic factors in taste perception and food preferences should also be taken into account, as these factors could influence the consumption of MSG-containing foods. Finally, the influence of food insecurity on dietary choices and obesity risk in this population should be considered. The high prevalence of food insecurity among college students suggests that this factor could further exacerbate the risk of obesity. Addressing the multifaceted issues of food insecurity, dietary habits, and the impact of MSG requires a comprehensive approach that combines scientific research with culturally sensitive interventions.

Acknowledgements

Nori Zapata, MSN, RN, Senior Vice President of Education and Career Development, Vanessa Vera, MS, Senior Manager of High School and Community Outreach, Anisa Mirza, Intern Program Coordinator.

Funding:

Funded by DHR Health High School and Community Outreach; DHR Health; South Texas Independent School District.

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