

Perceived Food Swamp Exposure Predicts Self-reported Diet Quality: Implications for Public Policy



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BACKGROUND

- Food deserts, defined as residential areas with limited access to affordable and nutrition food, were associated with obesity epidemic^{1,2}
- Unlike food deserts, food swamps have been described as neighborhoods where unhealthy food options inundate healthier alternatives^{3,4}
- Little is known about the effect of food retail environments on self-reported health quality, diet quality and weight status, particularly for historically marginalized groups.

STUDY OBJECTIVE

- The purpose of this study is to examine the relationship between food swamp exposure and self-reported health quality, diet quality, and weight status.

METHODS

- A national, racially/ethnically diverse sample of U.S. adults (N=6357) completed an online survey.
- Exclusion criteria: 1. wrongly answered red herring questions; 2. response time < 397s.
- Retail Food Environment Index (RFEI) and modified Retail Food Environment Index (mRFEI) were created to measure self-reported food swamp exposure.
- If RFEI > median, it is a food swamps area, if not, it is a non-food swamps area
- If mRFEI = 0, it is a food desert area, if 0 < mRFEI <= median, it is a food swamps area, else, a non-food swamps area.
- Self-reported diet quality was measured in a question asking participants the frequency they engaged in the following diet related behaviors: eat dairy, 5 servings of fruits/vegetables each day, dessert or indulgent snacks, at a fast-food restaurant, organic food, whole grain, sugar-sweetened beverages, at a full-service/sit-down restaurant, and cook at home. Frequency was measured in a 6-point scale ranging from never, rarely, sometimes, often, most of the time, and always. We then created composite score and collapsed categories including high, medium and low.
- Self-reported health quality was measured in a question asking participants say their health quality in 5 different levels including poor, fair, good, very good, and excellent.
- Self-reported weight status was measured in a question asking participants how they described their weight in four levels including slightly underweight, about right, slightly overweight, and very overweight.
- Predicted probabilities of three outcomes variables were calculated using the the ordinal logistic regression models.
- All regression models controlled for socio-demographic factors such as age, gender, income, education level, race, car ownership, family structure, and region, together with food swamp (measured with mRFEI).
- The interaction effect between income and race was also explored.

RESULTS

Characteristic	Mean (SD) or %
Age	41.31 (14.3)
Male	38%
Income (low)	30.8%
Race (White)	70.3%
Black/African American	22.4%
Hispanic	3.8%
Have access to a vehicle	58.4%
Rural	22.4%
Health quality (good and above)	72.6%
Diet quality (high)	18.9%
Weight status (overweight and above)	55.8%
Living in food swamp based on RFEI	34.5%
Living in food dessert based on mRFEI	4.3%
Living in food swamp based on mRFEI	32.4%

Table 2: Regression Results

Predictor (reference group)	Diet Quality OD			
	All (N=4183)	White (N=2952)	Black (N=930)	Hispanic (N=159)
Food desert areas ¹	.671*	.662	.806	.490
Food Swamps areas ¹	.760**	.849	.665*	1.521
Middle or high income (low income)	1.401***	1.396**	1.624*	.984
Black ²	.572***	-	-	-
Asian ²	.366	-	-	-
Other ²	1.079	-	-	-
Some high school or less ³	.192***	.130***	.464	.113
High school diploma/GED ³	.379***	.335***	.633	.085
Associates degree/vocational training ³	.783	.781	.757	.721
Some college ³	.653	.608	.734	.250
Bachelor's degree ³	.894	.887	1.005	.273
Master's or Professional ³	1.020	.953	.998	1.456
Single with children ⁴	1.017	.963	1.020	1.486
Single without children ⁴	.931	.844	1.045	1.683
Married without children ⁴	1.759*	1.671	1.714	5.398
Married with children ⁴	1.395	1.275	1.445	1.067
Life partner without children ⁴	1.818	1.741	1.941	5.834
Own a car or someone in my house own a car (do not own a car)	.983	1.048	.987	.863
Hispanic (not Hispanic)	.964	-	-	-
Male (female)	.703***	.726***	.680*	.539
Midwest ⁵	.637***	.641***	.933	.972
Northeast ⁵	.921	.968	.937	.869
Southeast ⁵	.672***	.793	.556*	1.116
Southwest ⁵	.718*	.831	.571	1.209
Urban ⁶	.819	.976	.473	1.782
Suburban ⁶	.882	.898	.761	1.673
Age	1.009***	1.007*	1.014*	1.031
Middle or high income* Black/African American ⁷	1.121	-	-	-
Middle or high income * Asian ⁷	1.929	-	-	-
Middle or high income * other races ⁷	1.247	-	-	-

1. Reference group is non-food swamps areas; 2. Reference group is White; 3. Reference group is Doctorate degree; 4. Reference group is life partner with children; 5. Reference group is West; 6. Reference group is rural; 7. Reference group is low income * White

DISCUSSION

- For the total population: Residents of food dessert areas (OR=.671, p<.05), and food swamps areas (OR=.760, p<.01) had a lower diet quality than those living in non-food swamp areas. Individuals from middle or high-income levels had a higher quality diet (OR=1.401, p<.001) than those with low-income levels.
- For White: Individuals from middle or high-income levels had a higher quality diet (OR=1.396, p<.01) than those with low-income levels.
- For Black: Residents of food swamps areas (OR=.665, p<.05) had a lower diet quality than those living in non-food swamp areas. Individuals from middle or high-income levels had a higher quality diet (OR=1.624, p<.05) than those with low-income levels.
- For all population (OR=.703, p<.001), White (OR=.726, p<.001), and Black Americans (OR=.680, p<.05), males tended to have a lower quality diet than females.
- There were no statistically significant differences in self-reported health quality and weight status by food swamp residential status.
- There were no significant findings for Hispanics.
- Lack of acculturation/country of origin is one limitation of the study.

CONCLUSION

These findings suggest that an individual's perceptions of the built food environment may play an important role in determining diet quality, weight, and health status. Future municipal policy efforts to simultaneously promote access to healthy food and disincentivize unhealthy food retailers should maximize resident engagement during the policy development stage.

1. Ver Ploeg, Michele, et al. *Access to affordable and nutritious food: measuring and understanding food deserts and their consequences: report to congress*. No. 2238-2019-2924. 2009.
 2. Morland, Kimberly, Ana V. Diez Roux, and Steve Wing. "Supermarkets, other food stores, and obesity: the atherosclerosis risk in communities study." *American journal of preventive medicine* 30.4 (2006): 333-339.
 3. Rose, Donald, et al. "Deserts in New Orleans? Illustrations of urban food access and implications for policy." *Ann Arbor, MI: University of Michigan National Poverty Center/USDA Economic Research Service Research* (2009).
 4. Cooksey-Stowers, K., Schwartz, M. B., & Brownell, K. D. (2017). Food swamps predict obesity rates better than food deserts in the United States. *International journal of environmental research and public health*, 14(11), 1366.