LEARNING OBJECTIVES

1. Understand for whom and under what circumstances food environments are likely to influence diet; 2. Understand how to derive innovative measures of the food environment from a geographic information system (GIS).

MODERATING ROLE OF NUTRITION KNOWLEDGE ON THE ASSOCIATION BETWEEN RESIDENTIAL FAST-FOOD RESTAURANT EXPOSURE AND DIET AMONG URBAN-DWELLING OLDER ADULTS

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CONTEXT

Changes associated with aging may accentuate reliance on immediate residential neighborhood resources for food provision. Thus, older adults may be more vulnerable to the negative impact of an unhealthful food environment. However, not all seniors exposed to such environments necessarily adopt a poor diet. The conceptual model of neighborhood effects on aging[1] posits that neighborhood factors can create environmental pressors (i.e., obstacles) or buoys (i.e., supports) that interact with personal competencies to render behavioral responses either adaptive or maladaptive for health. As population studies on the association between neighborhood exposure to fast-food outlets and diet quality have produced mixed results[2], the search for moderators of such associations may increase our understanding of the processes linking the food environment to diet and allow for implementation of more effective public health interventions[3]. We hypothesized that greater nutrition knowledge (i.e. a personal competency) would temper the effects of an unhealthful food environment on diet quality.

OBJECTIVE

To assess the moderating role of nutrition knowledge on the relation between the availability of residential-area fast-food restaurant and healthful diet among seniors in Montreal.

METHODS

Cross-sectional analyses. Data from 748 urban dwellings older adults living in the Montreal metropolitan area (Canada) at year 1 of the Quebec Longitudinal Study on Nutrition and Healthy Aging[4] were linked with geographic information system (GIS)5 data on food source availability and area -level social composition.

Participants'profile

Mean age was 75y; 52% female; 80% born in Canada; 55% married; 40% with 14y ≥ formal education; 15% with family income < low-income cut-off; physical health status similar to elderly population in Canada.

Measures

Diet quality: Standardized "prudent diet" score (range: -2.87 to 2.99), estimated from categorical principal components analysis (CATPCA) applied to food frequency questionnaire data. Higher scores indicate high consumption of fruits, vegetables, fish, and yogurt as well as low consumption of refined grains and sweetened beverages, thus reflecting Canadian dietary guidelines[6].

Proportion of fast-food outlets (%FFO): Proportion of overall restaurant density classified as fast-food (chain and independent restaurants) relative to all restaurants within 500m of participants' residence (mean: 21%; SD: 11%).

Knowledge of diet-health relationships: Aggregate of answers to nine items requiring responses on 5-point Likert scales; general item format was: 'Have you heard or read about any effects on health of … (name of food, nutrient or food component) ?'. Internal consistency was α=0.82. Principal Components Analysis confirmed the unidimensionality of the scale with 42% of total variance explained. Tertiles of scores expressed as low, intermediate, and high knowledge were used in analyses.

Covariates: *Socio-demographic characteristics* (sex, marital status, place of birth, educational level, and annual family income), *health* (SF-36 Physical Component Score and Social Functioning subscale, Geriatric Depression Scale and the System for Measuring Functional Autonomy Scale), *social network* (nb participants' adult children living in the neighborhood and presence of social support), *participants' residential environment* (% of healthful food stores, % residents in households below the low-income cut-off, % households speaking neither French nor English at home, reflecting ethnic diversity, and % residents with a university degree).

Analyses

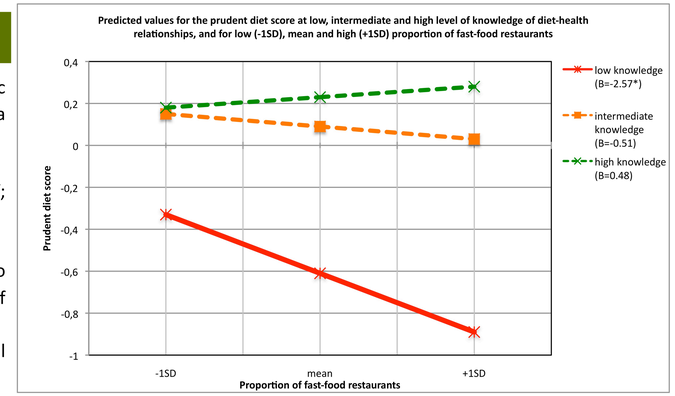
Main and interactive effects of knowledge and %FFO on prudent diet score were tested using linear regression analyses accounting for individual- and area-level covariates. %FFO and other continuous covariates were mean centered around the sample mean.

RESULTS

	MODEL 1				MODEL 2			
	B	SE	β	P	B	SE	β	P
Intercept	0.17	0.11		0.13	0.18	0.11		0.12
Proportion FFO	-0.96	0.44	-0.10	0.03	-0.12	0.66	-0.01	0.86
Low knowledge	-0.51	0.09	-0.24	<.01	-0.50	0.09	-0.24	<.01
Intermediate knowledge	-0.21	0.09	-0.10	0.02	-0.22	0.09	-0.10	0.01
High knowledge (Ref)	-	-	-	-	-	-	-	-
Low knowledge x FFO					-1.76	0.81	-0.11	0.03
Intermediate knowledge x FFO					-0.61	0.80	-0.04	0.45
High knowledge x FFO (Ref)					-	-	-	-

- In the first model (see Table 1), the main effects of %FFO, intermediate, and low diet-health knowledge were associated with lower prudent diet scores.
- In the second model which added the moderating effect of %FFO by knowledge about diet-health associations, greater %FFO was no longer associated as a main effect with prudent diet score but was associated with lower prudent diet scores only among participants in the low knowledge category.

Table 1. Parameter estimates for main and moderating effects of fast food outlet exposure and knowledge about diet-health relationships on prudent diet score, adjusted for other covariates among 748 older adults participating in the VoisiNuAge study.
B: unstandardized coefficient; SE: standard error; β: standarized coefficient; *P*: P-value



- As plotted in Figure 1 and further analyzed through regression analysis, the association between residential fast-food outlets exposure and prudent diet score was negative only for those in the lowest tertile of knowledge about diet-health relationships (B: -2.57; 95% CI: -4.10, -1.05; *P* =0.001). Associations were not statistically significant for those in the intermediate and highest tertiles of knowledge.
- The slope was steeper for participants with lower knowledge and showed a decrease of -0.56 on prudent diet score, between those exposed to lower (-1SD) versus higher (+1SD) %FFO.

Predicted values from the resulting linear regression model are a senior aged 75 year old married man, born in Canada, with high education level, and income above low-income cut-off with presence of social support and no adult children living nearby, and average health status and exposure to area-level covariates.
SD, standard deviation

CONCLUSION

Although participants in this cohort were found to have higher SES than other senior Quebecers, older adults with lower knowledge of diet-health relationships may be more vulnerable to unhealthful food environments. Strategies to improve dietary practices and reduce access to fast-food outlets should be considered as viable intervention approaches.

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