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Factors Affecting Frequency of Fast Food Consumption

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Abstract

Progress in science, technology, and industry has changed human lifestyle and especially food consumption habits. For many families, especially in large urban centers, fast food consumption has become routine. To determine factors affecting the frequency of fast food consumption, this study surveyed 396 families using Poisson and negative binomial regression models. The main reasons that households consume fast food are a shortage of time and for entertainment. Policy makers could use social marketing tools to control the growing trend of fast food consumption.

Keywords: consumption, fast food, health, marketing tools, nutrition

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Introduction

All societies, especially in urban areas, face changes in transportation, communication, nutrition, and health that affect lifestyle and eating habits. Since the 1950s—when fast food entered markets—hamburgers, pizza, french fries, and other foods that can be prepared and served quickly at relatively low prices have become more and more popular (Song, 2016).

Fast food consumption has the potential to be harmful to human health. Afolabi, et al. (2013) showed that fast foods are concentrated sources of energy, low in fiber and high in dietary cholesterol, and could significantly contribute to dietary cholesterol intake, with implications for cardiovascular health. In addition, the amount of salt in fast food increases the risk of heart attacks, and consumption of fast food and high-calorie condiments such as carbonated beverages and sugary sauces double the effects of such foods.

A report by the World Health Organization (WHO)'s International Agency for Research on Cancer (WHO, 2015) indicated that there was enough evidence to consider processed meats to be group 1 carcinogens because of a causal link with colon cancer. The IARC's experts concluded that each 50 g (1.8 oz) portion of processed meat eaten daily increased the risk of colorectal cancer by 18%.

The labels people attach to fast food are always “high in calories,” “low in nutritional value,” “obesity,” and “additives” (Song, 2016). Despite widespread knowledge about the harmful effects of fast food on human health, the demand for fast food restaurants is still growing.

Many studies have investigated factors that affect people's tendency to consume fast food (Park, 2004; Sahagun and Vasquez-Parraga, 2014, Song, 2016). Given the important role of fast food consumption on obesity, cardiovascular problems, and other related diseases, this study attempts to investigate the main factors affecting the frequency of fast food consumption by households in a month in the city of Mashhad in Iran.

Literature Review

Even though some consumers are aware of the consequences of consuming fast food, fast food consumption is increasing around the world (Xue et al., 2016). Hearst et al. (2013) showed that frequent consumption of fast food menu items high in fat, sugar, and sodium contribute to poor dietary quality, increasing individuals' risk for diet-related chronic diseases. Consumption of fast food has been associated with food safety problems in some developing countries (Omari and Frempong, 2016). Socioeconomic and demographic variables such as age, education, income, hours spent at work, and the number of household members have significant effects on the probability of consuming fast food (Fanning, Marsh, and Stiegert, 2002). Fast food is relatively cheap, less time consuming, and tasty, and these advantages incentivize consumers to increase consumption.

Austin et al. (2005) showed that fast food sales increased 900% between 1975 and the mid-2000s: from \$16 billion to \$153 billion. Advertising and branding are powerful tools that affect food choices (Christian and Gereffi, 2010); children are often targeted by fast food marketing

messages. Lee and Lien (2015) concluded that fast food advertising and other marketing tools positively influence fast food consumption and that fast food advertisers make profits at the expense of children's health.

Social marketing—the application of marketing principles, tools, and techniques to influence socially desirable behaviors in a target audience—is one potential solution for controlling the growing consumption of fast food (Lee and Kotler, 2015). Carins and Rundle-Thiele (2014) showed that social marketing can promote healthy eating and the effectiveness of social marketing on healthy eating could be enhanced.

Few studies have addressed consumers' preferences for fast food consumption in developing countries such as Iran. This research analyzes factors affecting the frequency of fast-food consumption of products like hamburger and sausage in Mashhad, the capital of Iran's Khorasan Razavi province. Mashhad is the second largest city in Iran, with a population of around 3.2 million in 2016. We hypothesize that socioeconomic and marketing factors contribute to the frequency of fast food consumption. This study investigates the consumption frequency of fast food among Mashhadi households over the course of a month using Poisson and negative binomial regression models and considers the effects of marketing tools on consumption frequency.

Methodology

This research investigates the factors affecting frequency of monthly fast food consumption among Mashhadi households. Hence, the dependent variable is a count variable showing the number of times each household purchases and consumes fast food. The use of linear regression models for count outcomes can result in inefficient, inconsistent, and biased estimates (Long and Freese, 2001), but there are models that deal explicitly with properties of count outcomes such as the Poisson regression model. With this model, a Poisson distribution determines the probability of a count, and the mean of the distribution is a function of the explanatory variables. The conditional mean of the outcome is equal to the conditional variance. If conditional variance exceeds the conditional mean, then the negative binomial regression (NBR) model is used (Long, 1997). This method can be used when the objective is the description of a count variable with some explanatory variables.

After some assumptions and calculations, the NBR model can be estimated by maximum likelihood (ML) method. The likelihood equation is

$$(1) \quad L(\beta | y, X) = \prod_{i=1}^N \Pr(y_i | x_i) = \prod_{i=1}^N \frac{\Gamma(y_i + \alpha^{-1})}{y_i! \Gamma(\alpha^{-1})} \cdot \left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu_i} \right)^{\alpha^{-1}} \left(\frac{\mu_i}{\alpha^{-1} + \mu_i} \right)^{y_i},$$

where $\mu = \exp(x\beta)$, $v_i = \alpha^{-1}$ for $\alpha > 0$, and v_i is the mean of the gamma (Γ) distribution for δ_i . After taking logs, the log-likelihood equation can be maximized using numerical methods (Long, 1997). The NBR model is one of a class of models constructed by mixing the Poisson distribution with a second distribution (Γ), while other distributions and mixtures can also be

used. Finally, we use factor change to interpret the results of the Poisson regression model (PRM) or the NBR model.

The data used in this study were collected through field study in 2016. The sample size was determined and stratified random sampling was used to sample 13 regions of Mashhad, based on the classification of urban areas by the Municipality of Mashhad.

Results

The dependent variable is the frequency of fast food consumption by households in a month. The explanatory variables and their description are listed in Table 1.

Table 1. Model Variables and Descriptions

Variable	Description
Gender of household head	Women =0, men=1
Education level	Years education of household head
Income	Household's monthly income
Composition awareness	Awareness about composition, nutritional value, production methods, and ingredients of fast food (aware=1, not aware=0)
Spouse occupation	Employed =1, not employed=0
Other meat consumption	Amount of other meat consumption in a month
Availability	Effect of availability on consumption (low=0, high=1)
Quality	Effects of quality on consumption (low=0, high=1)
Age	Age of respondent
Advertising	Effects of advertising (low=0, high=1)
Informative label	Effect of label on consumption (low=0, high=1)
Price	Effect of price on consumption (low=0, high=1)

Table 2 presents the main reasons and priorities that households gave for consuming fast food products (sausages, salami, and hamburgers). Entertainment was listed as the main reason (first and second priority) for 52% of respondents. Shortage of time was listed as the main reason by 50% of respondents. Hence, the most common cause of fast food consumption—such as sausages and hamburgers—by Mashhadi households are entertainment and shortage of time.

The results of Poisson regression and NBR models are shown in Table 3. Comparing the goodness-of-fit measures, the NBR model performs better than the Poisson model. Considering that the variance of consumption frequency is larger than its average, the NBR model is selected and hence, only the coefficients of the NBR model are interpreted.

Table 2. Main Reason for Fast Food Consumption by Households

Main Reason	Priority	1	2	3	4	Other
Shortage of time	Frequency	147	52	34	39	124
	Percentage	37%	13%	9%	10%	31%
Taste and flavor	Frequency	77	78	65	46	130
	Percentage	19%	20%	16%	12%	33%
Habit	Frequency	6	45	60	59	226
	Percentage	1.5%	11.3%	15.1%	15%	57%
Child penchant	Frequency	30	36	50	47	233
	Percentage	8%	9%	12.6%	11.9%	59%
Entertainment	Frequency	131	75	55	25	110
	Percentage	33%	19%	14%	6%	28%

Table 3. Main Factors Affecting Fast Food Consumption Frequency

Variable	Poisson Regression Model			NBR Model		
	Coefficient	Standard Error	Z stat.	Coefficient	Standard Error	Z stat.
Constant	1.083**	0.54	2	0.984*	0.595	1.65
Gender	0.053	0.104	0.51	0.066	0.1	0.66
Education	-0.041*	0.024	-1.7	-0.052***	0.021	-2.47
Income	-0.151**	0.073	-2.07	-0.141*	0.077	-1.82
Spouse occupation	0.233**	0.119	1.95	0.264**	0.119	2.2
Other meat	-0.191***	0.076	-2.5	-0.21***	0.082	-2.6
Age	-0.019	0.034	-0.58	-0.016	0.034	-0.48
Composition awareness	-0.0065**	0.003	-2.15	-0.006**	0.003	-2.03
Quality index	0.0004	0.003	0.12	0.0001	0.037	0.05
Availability	0.075	0.051	1.49	0.084*	0.050	1.68
Advertising	0.045*	0.026	1.73	0.043*	0.024	1.79
Label	-0.12	0.17	-0.7	-0.14	0.18	-0.77
Price	-0.053	0.046	-1.16	-0.048	0.046	-1.05
Alpha stat.				0.5757***	0.06	9.4
Pierson stat	-1,351.8***					
Deviance stat	1,318.3***					
-2log likelihood	2,435.8			2,002.76		
McFadden R ²	0.031			0.011		
Cragg–Uhler R ²	0.18			0.054		
AIC	6.24			5.15		
BIC	157.8			-569.9		

Notes: Single, double, and triple asterisks (*, **, ***) indicate significance at the 10%, 5%, and 1% level, respectively

According to Table 3, the education level of household head, income, spouse occupation, other meat consumption, awareness about composition of fast food, availability of fast food, and advertising have significant effects on the amount of fast food consumed by households. The results show that for a unit change in income, the expected count of fast food consumption decreases by a factor of $\exp(-0.141)$, or 0.87 units, holding other variables constant.

Higher education levels, other meat consumption, awareness about the composition of fast food, and income all have a negative and significant effect on the frequency of fast food consumption, while spouse occupation and availability of fast foods have a positive effect on the frequency of fast food consumption. Finally, by advertising fast food, the expected frequency of fast food consumption increases by 4% compared to the case where there is no advertising, holding other variables constant. Moreover, the results in Table 3 show that variables such as price do not have any significant effect on the frequency of fast food consumption by a household. Fast food is available in the market at a wide variety of price and quality points, but price and quality do not seem to influence consumption frequency.

Conclusions

Given changes in food consumption behaviors, there is a considerable need to identify the determinants of fast food consumption. This research analyzed factors affecting the frequency of fast food consumption among households in Mashhad, Iran. The top reasons for consuming fast food by households in a month in Mashhad were entertainment and lack of time to prepare food at home. The results of estimating negative binomial regression (NBR) model show education, income, spouse occupation, other meat consumption, awareness about composition of fast food, availability of fast food restaurants, and advertising variables have significant effect on the consumption frequency of fast food by households.

Consumer awareness about the composition of fast food has a negative effect on the frequency of consumption. Therefore, it is recommended that fast food suppliers be proactive and provide healthier fast food as a strategic response to consumers' concerns in order to increase sales and profits. Quality assurance provisions through social media could increase population awareness and demand for healthy foods. Policy makers could use social marketing tools to create incentives for households to eat more healthy products. It is also recommended that traditional Iranian foods, which have high nutritional values and are quick to prepare, to be added to the menus of fast food restaurants.

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