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Unhealthy Diets among Adult Populations in Sleman Districts, Yogyakarta: Pattern and Related Sociodemographic Determinants, Findings from Sleman HDSS

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ABSTRACT

Background: In Yogyakarta Province, the Sleman Regency has the second-highest life expectancy at birth and a high prevalence of non-communicable diseases (NCDs). One of the common NCD risk factors is an unhealthy diet. Thus, it is important to understand the factors that influence an unhealthy diet.

Objective: This study aimed to determine sociodemographic factors associated with an unhealthy diet intake in the Sleman Regency population.

Materials and Methods: Cross-sectional data from 4,963 adult respondents of the Sleman Health and Demographic Surveillance System was analyzed. A Descriptive test was done to measure the consumption frequency of sweet food and beverages, salty food, high-fat food, and food with monosodium glutamate (MSG). Generalized logistic regression was used to determine socioeconomic factors (residential area, age, gender, education level, marital status, and household wealth) that were associated with a higher frequency of unhealthy food consumption.

Results: The majority of respondents reported frequent consumption of sweet food and beverages (82.4%), food that contains high fat (62%), and MSG (75.5%). About 46% of respondents reported frequent consumption of salty food.

Conclusion: Education level, sex, age, household wealth status, and residential area are important determinants of a healthy diet.

Keywords: Eating habits, Non-communicable diseases, Risk factors, Sociodemographic

BACKGROUND

Non-communicable diseases (NCDs) are no longer an "affluent countries' problem". Low-income and middle-income countries (LMICs) are facing an increase in NCDs while still struggling to control infectious diseases and malnutrition-related problems. According to the World Health Organization report, 71% of global deaths (40.5 million people) in 2016 were attributable to NCDs[1]. Over 75% of NCDs-related deaths occurred in LMICs, and NCDs were also the cause of almost half of premature deaths in ~~these~~ this countries[2].

In 2016, NCDs caused 73% of mortality among Indonesians, mainly due to cardiovascular diseases[3]. In 2019 the estimated six of the top ten causes of death in Indonesia was NCDs[4]. The Indonesia Basic Health Research (RISKESDAS) reported that the prevalence of NCDs among adults in Indonesia has increased between 2013-2018, with increased cases of high blood pressure from 25.8% to 34.1%, stroke from 7.0 per thousand to 12.1 per thousand, and diabetes mellitus from 1.5% to 2.1%[5,6].

The high prevalence of NCDs undoubtedly put a heavy economic burden on the health and social system, especially in LMICs[7]. Premature mortality and needs for long-term care[8], due to NCDs, increased the burden on the universal health system, and loss of productivity could hamper the LMCs' future economic growth[9]. Therefore, NCDs prevention measures are urgently needed in LMICs, especially primary prevention programs that target risk factors to prevent these diseases before they occur. NCDs have been known to have common risk factors, such as elevated blood pressure, high blood total cholesterol, obesity, and lifestyle-related factors e.g., such as low physical activity, tobacco use, excessive alcohol consumption, and unhealthy diets[10]. Unhealthy diets or diets that are associated with a higher risk of NCDs are diets high in sodium, fats, and sugar[10,11].

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In order to develop a successful intervention, it is important to identify characteristics of sub-population with higher NCD risk factors. For instance, a previous study showed that NCD risk factors were more prevalent in the older age group[12]. In Indonesia, Sleman Regency, Daerah Istimewa (DI) Yogyakarta Province, is among the regencies with the highest life expectancy at birth in Indonesia in 2015 (74.57 years old[13,14]. Consequently, Sleman's older population is increasing[15] and so does the prevalence of NCDs. The 2013 and 2018 RISKESDAS reported that Sleman regency had a relatively higher prevalence of cancer (6.1 per thousand in 2013) and diabetes mellitus (3.1% in 2013, 2.47% in 2018) with an increasing incidence of coronary heart disease (0.7% in 2013)[5,6].

As for the risk factors of NCDs, Sleman had a lower number of active smokers (around 19% in 2013 and 2018) compared with other regencies in Yogyakarta. However, inadequate physical activity was high (79.5% in 2013) and the consumption of adequate fruits and vegetables (6.8% in 2013, 9.3% in 2018) was low[5]. Most people in Sleman Regency had a frequent consumption of sweet food (77.6%) and high-fat food (53.3%). On the other hand, a lower percentage of the Sleman population had a frequent consumption of salty food (14.5%) and food with monosodium glutamate (MSG; 72.1%)[5]. These findings show that an unhealthy diet is one of the major NCDs risk factors in Sleman Regency. However, research on the factors associated with unhealthy diets, especially in LMICs, is scarce[16]. Thus, the present study used data from the Sleman Health and Demographic Surveillance System (HDSS) Wave Two to describe the patterns of unhealthy diets in the Sleman adults and to determine the sociodemographic factors associated with the frequent consumption of unhealthy food.

MATERIALS AND METHODS

Data Source

The present study used data from the Sleman HDSS Wave two (Release 8-0-0). The Sleman HDSS is a population-based survey that gathers data on demographic dynamics and changes in various health problems, including NCDs, infectious diseases, reproductive health, and access to health services. Its first data collection was conducted in 2015, and by 2019, five waves of data collection have been completed. Details concerning the survey methods employed in Sleman HDSS have been described elsewhere[17]. Sleman HDSS data is available for the scientific community upon application for secondary data analysis. More details on data access are available in https://hdss.fk.ugm.ac.id/

Study Sample

There were 4,996 households (20,450 persons) participated in the second wave of Sleman HDSS. Questions regarding the frequency of unhealthy food consumption were asked to the main respondents (head of household or their spouse) in each Sleman HDSS household. A total of 4,965 respondents answered the unhealthy food questionnaire. However, two respondents did not have data on education level; thus, only 4,963 respondents were included in the analysis.

Main Outcomes

In this study, an unhealthy diet was defined as a diet high in sugar, fat, and sodium. The questionnaire used to assess unhealthy diets was adapted from RISKESDAS 2013. Respondents were asked about how often they consumed sweet food and beverages, salty food, and high-fat food on an average per day, week, month, or year. Their answers were converted into frequency per week, assuming 1 week = 7 days, 1 month = 4 weeks, and 1 year = 48 weeks. The respondents were then divided into three groups according to the frequency of food and beverage consumption: <1/week as rarely (R), 1≤-<4/week as occasionally (O), and 4≤/week as frequently (F) consumption groups.

The four types of food were defined as follows: (i) Sweet food and beverages are high in sugar contain, e.g., pastries, candies, cookies, cakes, *dodol* (traditional confection made from sticky rice and palm sugar), *gudeg* (shredded young jackfruits stewed in spices, palm sugar, and coconut milk, canned fruits, processed juice, and syrup-based beverages). Fresh fruit juice, soft drinks, and other beverages labeled as zero-calorie or low sugar were not included in this group. (ii) Salty foods are high in sodium content, e.g., salty snacks and salted food such as salted fish, salted duck eggs, and food that contains soy sauce and shrimp paste. (iii) Food with MSG is any food that contains MSG as a flavor enhancer. (iv) High-fat food includes organ meats (e.g., liver, heart, and brain), egg yolk, shrimp, and coconut milk, as well as assorted fritters (e.g., *tempe* fritters and tofu fritters)[18].

Covariates

The residential areas were classified as urban and rural, as defined by Statistics Indonesia. Sex was dichotomized as men and women. Highest education attainment was categorized as low (never schooled or primary education), middle (middle and high school), and high (college and university)[19]. Marital status was categorized as married (currently married) and not married (single or divorced). Household wealth status was derived using principal component analysis based on landholding, durable good ownership (e.g., refrigerator, television, bicycle, motorcycle, and car), and house characteristics (the type of floor, roof, and wall)[20]. The PCA analysis resulted in 5 household wealth quintiles from the highest to the lowest. In this study, we re-categorised them into three household wealth groups, i.e., low/lower-middle, middle, and middle-high/high.

Statistical Analysis

A total of 4,963 respondents were included in the analysis. Descriptive analysis was conducted to examine the pattern of unhealthy food consumption. Then generalized ordered logistic regression tests were used to determine socioeconomic determinants of higher frequency of unhealthy food consumption[21,22]. This test was used as some of our independent variables violated parallel regression model assumptions, which were tested using the Brant test. Our logistic model, first, was built by regressing each of the food groups in each sociodemographic variable. Then, independent variables found to be significant were entered into the multivariable model. We used post-stratification weighting in both descriptive and inferential tests to reduce sampling error and potential nonresponse bias. Stata 13.1 (StataCorp LLC., Texas, USA) was used to perform all analyses.

Ethics Approval and Consent to Participate

Sleman HDSS received ethical approval from the Medical and Health Research Ethics Review Committee of the Medical Faculty, Universitas Gadjah Mada (KE/FK/842/EC). Written consent was obtained from Sleman HDSS' respondents after they received an explanation regarding the objectives, design, and procedure of the study. They were also informed that their responses are confidential and that they could withdraw their participation from this study anytime.

RESULTS

Table I. Sociodemographic Characteristics of Respondents

Sociodemographic variables	Weighted proportion (%)	Number of observations (n)
Gender		
Men	50.1	1,791
Women	49.9	3,174
Age group (years)		
18–49	72.4	2,563
50+	27.6	2,402
Education level		
Low	19.0	1,483
Middle	62.9	2,679
High	18.3	801
Marital status		
Not married	34.5	1,033
Married	65.5	3,932
Household wealth		
Low/lower-middle	39.2	2,015
Middle	20.5	977
Middle-high/high	40.3	1,973
Residential area		
Rural	16.5	828
Urban	83.5	4,137

Table I present the weighted proportion of respondents' sociodemographic characteristics. The proportion of men and women in this study was in balance. Most of them were aged 18 to 49 years (72%), had middle-level education (63%), were married (65%), lived in urban areas (83%), and from a household with higher economic status (40%).

More than half of the respondents reported that they frequently consumed food and beverages that contain high sugar (82.4%), as well as food with high-fat content (62%) and MSG (75.5%), and around 46% reported frequent consumption of salty food (Figure 1).

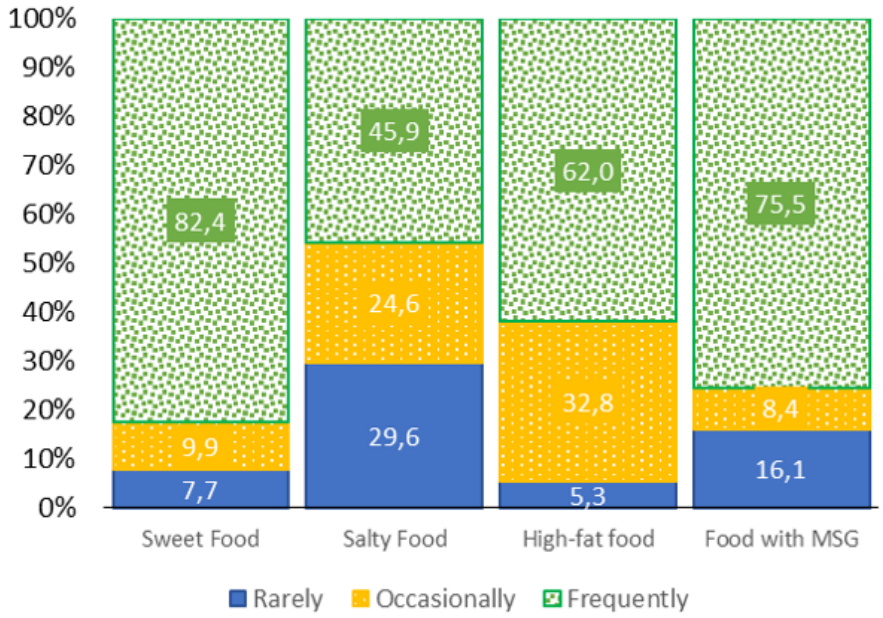

Figure 1. The Distribution of Categorical Response to Each Food/Beverage Type

Results from multivariable generalized ordered logistic regression tests are shown in Table II. We found some covariates tested did not meet the parallel regression assumption. For age group and education (salty and MSG models) and sex (sweet and high-fat food models), the odds ratios (OR) that describe the relationship between the lowest versus all higher categories of the covariates were not the same as those that describe the relationship between the next lowest category and all higher categories.

Our results showed that women and people with higher education levels are less likely to have frequent consumption of sweet food and beverages. The OR for women was less than one and decreased across outcome categories (R vs. O&F, OR=0.7 95% confidence interval [CI]=0.5–0.9; R&O vs. F, OR=0.5 95%CI=0.4–0.7), which showed that women were more likely to consume sweet food and beverages occasionally compared to men. The opposite effect was observed for household wealth. Higher household wealth was associated with 1.4 times higher frequency of sweet food and beverage consumption (Table 2) and predicted probability of the outcome is available in the appendix.

Similarly, women consumed salty food more frequently compared to men (OR=1.2 95%CI=1–1.4). People with a higher education level had 1.5 times higher odds of consuming salty food occasionally or frequently (R vs. O&F, OR=1.5 95%CI=1.1–2.1). On the other hand, being older (more than 50 years) was associated with less frequent consumption of food with high salt content (R vs. O&F, OR=0.6 95% CI=0.5–0.7; R&O vs. F, OR=0.8 95% CI=0.7–0.9).

Concerning the consumption of high-fat food, people who lived in urban areas (OR=1.4 95%CI=1.1–1.7) and those from households with higher socioeconomic status (OR=1.4; 95%CI=1.1–1.8) consumed fatty food more frequently. On the contrary, older people consumed this food group less frequently (OR=0.7 95%CI=0.6–0.9). Sex was only significant when comparing the frequency of unhealthy consumption with a combination of rarely and occasionally (R&O vs. F, OR=1.3 95%CI=1.1–1.6). Indicating that the odds of having frequent or occasional instead of rare consumption were not different between men and women. However, women significantly had a higher OR of reporting frequent high-fat food consumption.

As for food with MSG, older age (R vs. O&F, OR=0.5 95%CI=0.4–0.6; R&O vs. F, OR=0.6 95%CI=0.5–0.7), higher household wealth (OR=0.6; 95%CI=0.5–0.8), and higher education level (R vs. O&F, OR=0.4 95%CI=0.3–0.6; R&O vs. F, OR=0.5 95%CI=0.4–0.7) were associated with less frequent consumption of food with MSG.

Table 2. Multivariate Logistic Regression of The Association Between Sociodemographic Factors Among Sweet Food, Salty Food, High-Fat Food, and Food Containing MSG

	Sweet food				Salty food				High-fat food				Food containing MSG			
	OR	***p-value***	**95% CI**		**OR**	***p-value***	**95% CI**		**OR**	***p-value***	**95% CI**		**OR**	***p-value***	**95% CI**	
Combined model																
Residential area (vs. rural)																
Urban	0.84	0.26	0.62	1.14	0.96	0.73	0.76	1.21	1.35	0.01	1.06	1.72	0.77	0.05	0.60	1.00
Sex (vs. Men)																
Women					1.18	0.05	1.00	1.39					0.86	0.14	0.70	1.05
Age group (vs. <50 years)																
50+	0.94	0.55	0.77	1.14					0.74	0.00	0.64	0.86				
Wealth status (vs. low)																
Middle	0.97	0.88	0.70	1.36	1.00	0.96	0.79	1.28	1.05	0.74	0.80	1.37	1.10	0.49	0.83	1.48
Higher middle/high	1.4	0.04	1.02	1.91	1.08	0.51	0.86	1.34	1.42	0.00	1.12	1.80	0.64	0.01	0.49	0.84
Education (vs. low)																
Middle	0.86	0.30	0.66	1.13					0.81	0.04	0.66	0.99	0.93	0.53	0.73	1.18
High	0.56	0.01	0.37	0.84					0.88	0.42	0.65	1.19				
Marital status (vs. not married)																
Married	1.14	0.32	0.88	1.49	0.89	0.26	0.73	1.09	0.94	0.61	0.75	1.18	0.95	0.69	0.74	1.22
Unique model: Rarely vs. Occasionally and Frequently																
Sex (vs. men)																
Women	0.72	0.04	0.52	0.99					0.81	0.29	0.56	1.19				
Age group (vs. <50 years)																
50+					0.62	0.00	0.53	0.73					0.49	0.00	0.40	0.59
Education (vs. low)																
Middle					1.17	0.15	0.94	1.45								
High					1.51	0.01	1.11	2.05					0.42	0.00	0.30	0.59
Unique model: Rarely and Occasionally vs. Frequently																
Sex (vs. Men)																
Women	0.54	0.00	0.42	0.69					1.34	0.00	1.11	1.61				
Age group (vs. <50 years)																
50+					0.80	0.00	0.68	0.93					0.58	0.00	0.48	0.69
Education (vs. low)																
Middle					0.96	0.69	0.77	1.18								
High					1.01	0.94	0.74	1.38					0.50	0.00	0.36	0.70

Note: Combined model is for covariates that follow parallel regression assumption; MSG, monosodium glutamate; OR, odds ratio; CI, confidence interval.

DISCUSSION

The present research aimed to describe patterns of unhealthy food consumption in Sleman Regency, DI Yogyakarta Province, and to determine sociodemographic factors associated with frequent consumption of unhealthy food. We found mixed association between sociodemographic factors and each food group assessed.

In our study, the older Sleman population consumed salty, fatty, and food with MSG less frequently. Studies have shown that older populations tend to make food choices based on health considerations[23–26]. However, there was no significant difference in frequency of sweet food and beverages consumption by age group, around 82% of younger adults and 83% of older adults in this study reported frequent consumption of sweet food and beverages (data not shown). These findings seem to indicate that older adult in Sleman put more consideration on health value when deciding whether to consume food contains high sodium and fat but not for food and beverages with high sugar content.

Contextual factor e.g., culture, may have a significant influence on sweet food consumption in our population. Yogyakarta's cuisine is characterized by its sweet taste. Approximately 75% of Yogyakarta's traditional dishes require sugar[27]. Most of the traditional beverages also contain palm sugar or lump sugar. However, we suspect that the high frequency of sweet food and beverages consumption was related to the majority of Javanese people who drink traditional tea daily, which is called *teh nasgitel*. *Nasgitel* is an abbreviation of the Javanese words for *panas* means hot, *legi* means sweet, and *kenthel* means thick.

The importance of sugar in Javanese diets can be traced back to the Dutch colonization era. Between 1830 and 1940, *Tanam Paksa* ("Enforcement Planting") policy was implemented in Indonesia. In Java, export crops, such as sugarcane, had to be grown instead of rice. Thus, sugar became an energy source that was easily accessible by Javanese people[27]. As food and beverages with a sweet taste have always been part of their habitual food selection, adults in Sleman, especially older adults, may persist in their sweet food preference even when changes in their health required the opposite.

Our findings also showed that women and people with a high education level were more likely to consume sweet food and beverages less frequently. Higher education level was also associated with less frequent consumption of food with MSG and fatty food. Previous studies have reported that women have a healthier diet and they are more likely to take up and adhere to healthy behavior. Similarly, education level is also a known factor associated with dietary change in adulthood[26]. Adults with higher education have a better comprehension and uptake of health education or advice from health professionals[26,28].

Surprisingly, we also found that adult women in our population consumed salty and fatty food more frequently. Similar findings were reported by RISKESDAS 2018. That is more women reported frequent consumption of salt (30.5% vs. 28.9%) and fatty (42.8% vs. 40.7%) food compared to men[6]. On contrary, a study conducted on university students from 23 countries in Europe and Asia reported that women were more likely to report consumption of fruits and restrict intake of high-fat foods and salt[29].

Snacking habits might contribute to the sex-difference in fatty and salty food intake. Ovaskainen et al.[30] reported that a "snack-dominating meal pattern" was observed in 19% of men and 24% of women among a sample of 2,007 Finnish adults (25–64 years old)[30]. Kuczmarski et al. reported that 86% of African-American women prefer snacking[31]. The most frequently consumed snack groups are salty snacks (16.4%), grain-based desserts (14.8%), and then sweetened beverages (10.7%). A recent qualitative study from the World Food Program involving adolescents in Indonesia showed that the most favorite snack foods among the adolescents are meatball soup (*bakso*; 54%), fried snack (fritters; 53%), steamed fish dumplings with vegetables and peanut sauce (*siomay*; 46%), instant noodles (39%), and beverages and dessert (37%)[32]. These various foods contain a high fat and high salt content.

In our study, adults from the more affluent households reported more frequent consumption of food with high sugar and fat content but less frequent consumption of food with MSG. Household wealth and education level are resources that influence food choices. In making food selections, people are aware of their available resources[33]. In this study, having more economic resources allowed adults in Sleman to have more food or snack choices that have a high sugar and fat content. As mentioned before, the popular snacks in Indonesia are likely to have a high content of fat, salt, and sugar. Similar findings have been reported before, showing that the higher socioeconomic status was related to high energy and saturated fat consumption[34].

On the other hand, being from a wealthy household gave them more decision-making power to choose food with no MSG. There is common knowledge that MSG is associated with harmful health effects and that several previous studies also support this claim[35,36]. Still, MSG is a popular flavor enhancer used by

food producers. The increasing demand for food without MSG increases its price. Radam reported that respondents are willing to pay more for food that has the label "No Added MSG"[37]. Therefore, the association between high household wealth and less consumption of food with MSG is more likely because they could afford to buy food without MSG.

In our study, frequent consumption of high-fat food was also associated with living in urban areas. One possible explanation is that modern/fast food is more available in urban areas and is characterized by its high-fat content. The differences in nutritional intake between people in urban and rural areas have already been reported. The 2011 China Health and Nutrition Survey found that children (4–17 years old) living in urban and rural areas have similar total energy intake, but children from urban areas have the highest consumption of fat and animal source (40% of daily energy intake)[38]. The urban population tends to consume more high-fat food because they are more exposed to easier access to cheap energy-dense food, higher-quality food, high-fat food availability, supermarket existence, and lower food prices[34,39,40].

One strength of this study is related to the used of data from a population survey, the Sleman HDSS, making our findings more representative of the adult Sleman population in general. Additionally, we adopted an instrument used to measure our main outcomes from a National Survey (RISKESDAS), thus ensuring the comparability of our findings to other areas in Indonesia. However, we also acknowledge that because of the nature of the self-reporting instrument, our findings may overestimate or underestimate the true frequency of consumption. Also, we can not objectively define "unhealthy" diet in this study as there was no information about the amount of food or beverages consumed. Thus, future studies are needed to evaluate further examine sociodemographic factors associated with the actual salt, sugar, and fat intake in LMICs.

CONCLUSION

Majority of adults in Sleman regency frequently consumed foods or beverages that high in sugars, fats, and contain MSG. Education level, sex, age, household wealth status, and residential areas are important determinants of a healthy diet in the Sleman adult population. These findings support the need for health intervention programs that target changes in food preference and consumption in Sleman adults' populations. These programs should be designed by considering targets' health and sociodemographic profiles.

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Appendix

Table A1. Predicted probability of Sweet Food, Salty Food, High-Fat Food, and Food Containing MSG consumption, overall and by covariate

		Sweet food			**Salty food**			**High-fat food**			**Food containing MSG**		
		Predicted probability	95% CI		Predicted probability	95% CI		Predicted probability	95% CI		Predicted probability	95% CI	
Rarely	*Overall*	0.08	0.07	0.09	0.32	0.31	0.34	0.06	0.05	0.07	0.18	0.17	0.19
Occasionally	*Overall*	0.11	0.09	0.12	0.23	0.21	0.25	0.33	0.31	0.34	0.09	0.08	0.1
Frequently	*Overall*	0.82	0.8	0.83	0.45	0.43	0.47	0.62	0.6	0.63	0.73	0.72	0.75
Rarely	*Residential area*												
	Rural	0.07	0.05	0.09	0.31	0.27	0.36	0.07	0.05	0.09	0.15	0.12	0.18
	Urban	0.08	0.07	0.09	0.32	0.3	0.34	0.05	0.04	0.06	0.19	0.17	0.2
Occasionally	*Residential area*												
	Rural	0.1	0.07	0.12	0.23	0.21	0.25	0.37	0.33	0.41	0.08	0.06	0.09
	Urban	0.11	0.09	0.12	0.23	0.21	0.25	0.32	0.3	0.34	0.09	0.08	0.1
Frequently	*Residential area*												
	Rural	0.84	0.8	0.87	0.46	0.41	0.51	0.56	0.51	0.61	0.77	0.73	0.81
	Urban	0.81	0.8	0.83	0.45	0.43	0.47	0.63	0.61	0.65	0.73	0.71	0.74
Rarely	*Sex*												
	Men	0.06	0.05	0.08	0.34	0.32	0.37	0.05	0.04	0.06	0.17	0.15	0.19
	Women	0.09	0.07	0.1	0.31	0.29	0.33	0.06	0.05	0.07	0.19	0.17	0.21
Occasionally	*Sex*												
	Men	0.07	0.05	0.08	0.23	0.22	0.25	0.38	0.35	0.41	0.08	0.07	0.09
	Women	0.13	0.11	0.15	0.23	0.21	0.25	0.3	0.28	0.32	0.09	0.08	0.1
Frequently	*Sex*												
	Men	0.87	0.85	0.89	0.42	0.39	0.45	0.57	0.54	0.6	0.75	0.72	0.78
	Women	0.78	0.76	0.8	0.46	0.44	0.49	0.64	0.62	0.66	0.72	0.7	0.74
Rarely	*Age group*												
	18-49	0.08	0.06	0.09	0.27	0.25	0.3	0.05	0.04	0.06	0.13	0.12	0.15
	50+	0.08	0.07	0.09	0.37	0.35	0.39	0.06	0.05	0.08	0.24	0.22	0.26
Occasionally	*Age group*												
	18-49	0.1	0.09	0.12	0.25	0.23	0.28	0.3	0.28	0.32	0.08	0.07	0.1
	50+	0.11	0.09	0.12	0.21	0.19	0.23	0.35	0.33	0.38	0.09	0.07	0.1
Frequently	*Age group*												
	18-49	0.82	0.8	0.84	0.48	0.01	0.5	0.65	0.63	0.67	0.78	0.76	0.8
	50+	0.81	0.79	0.83	0.42	0.4	0.44	0.58	0.56	0.6	0.68	0.66	0.7
Rarely	*Wealth status*												
	Low	0.09	0.07	0.11	0.33	0.3	0.36	0.06	0.05	0.08	0.16	0.13	0.18
	Middle	0.09	0.07	0.11	0.33	0.29	0.37	0.06	0.05	0.08	0.14	0.12	0.17
	Higher middle/high	0.06	0.05	0.08	0.31	0.28	0.34	0.05	0.04	0.06	0.22	0.2	0.25
Occasionally	*Wealth status*												
	Low	0.12	0.1	0.13	0.23	0.22	0.25	0.35	0.32	0.38	0.08	0.07	0.09
	Middle	0.12	0.09	0.14	0.23	0.21	0.25	0.35	0.31	0.38	0.07	0.06	0.09
	Higher middle/high	0.09	0.07	0.11	0.23	0.21	0.25	0.29	0.26	0.32	0.1	0.09	0.12

		Sweet food			Salty food			High-fat food			Food containing MSG		
		Predicted probability	95% CI		Predicted probability	95% CI		Predicted probability	95% CI		Predicted probability	95% CI	
Frequently	*Wealth status*												
	Low	0.8	0.77	0.83	0.44	0.41	0.47	0.58	0.55	0.62	0.76	0.73	0.79
	Middle	0.79	0.75	0.83	0.44	0.4	0.49	0.59	0.55	0.64	0.78	0.74	0.82
	Higher middle/high	0.84	0.82	0.87	0.46	0.42	0.49	0.66	0.63	0.7	0.68	0.65	0.71
Rarely	*Education level*												
	Low	0.07	0.05	0.08	0.35	0.32	0.39	0.05	0.04	0.06	0.15	0.13	0.18
	Middle	0.08	0.06	0.09	0.32	0.29	0.34	0.06	0.05	0.07	0.16	0.14	0.18
	High	0.11	0.08	0.15	0.27	0.22	0.31	0.06	0.04	0.07	0.29	0.25	0.34
Occasionally	*Education level*												
	Low	0.09	0.08	0.11	0.19	0.17	0.22	0.3	0.27	0.33	0.08	0.07	0.1
	Middle	0.1	0.09	0.12	0.24	0.21	0.26	0.34	0.32	0.36	0.09	0.07	0.1
	High	0.14	0.11	0.17	0.28	0.23	0.33	0.32	0.28	0.37	0.08	0.06	0.1
Frequently	*Education level*												
	Low	0.84	0.81	0.87	0.45	0.41	0.49	0.65	0.61	0.68	0.76	0.73	0.8
	Middle	0.82	0.8	0.84	0.44	0.42	0.47	0.6	0.57	0.62	0.75	0.73	0.77
	High	0.75	0.69	0.8	0.46	0.4	0.51	0.62	0.57	0.67	0.62	0.57	0.68
Rarely	*Marital status*												
	Not married/ divorced	0.18	0.15	0.2	0.3	0.27	0.34	0.05	0.04	0.07	0.18	0.15	0.2
	Married	0.18	0.17	0.2	0.33	0.31	0.34	0.06	0.05	0.07	0.18	0.17	0.2
Occasionally	*Marital status*												
	not married/ divorced	0.08	0.07	0.1	0.23	0.21	0.24	0.32	0.28	0.35	0.08	0.07	0.1
	Married	0.09	0.08	0.1	0.23	0.22	0.25	0.33	0.31	0.35	0.09	0.08	0.1
Frequently	*Marital status*												
	not married/ divorced	0.74	0.7	0.78	0.47	0.43	0.51	0.63	0.58	0.67	0.74	0.7	0.78
	Married	0.73	0.71	0.75	0.44	0.42	0.46	0.61	0.6	0.63	0.73	0.71	0.75