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Economic Inequality in Healthy and Junk Foods Consumption and its determinants in Children and Adolescents: the CASPIAN-IV Study

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Abstract

Background: Nutritional habits and its determinants, especially in children and adolescents have recently turned into the one of the major concerns of health researches. We examine the diet contribution inequality in according to socio-demographic factors, age, gender, physical activity and body image to alleviate this gap in Iranian children and adolescents.

Materials and Methods: Study sample was comprised of 14,880 students aged 6-18 years who selected from urban and rural districts of 30 provinces of Iran via stratified multi-stage sampling method. A short food frequency questionnaire was used for estimating the food group consumption. The Blinder-Oaxaca method was applied to investigate the inequality in the prevalence of healthy and junk foods consumption between the first and fifth socio-economic status (SES) quintiles.

Results: The frequency of healthy and junk foods consumption showed considerable differences between the SES quintiles. The highest differences were found in the frequency of fresh fruit (25.38%), vegetable (12.92%), and milk (10.74%) consumption, respectively. The daily consumption of vegetables, and fresh and dried fruits increased linearly by increasing the SES quintiles. The highest absolute difference was seen in the frequency of fresh fruit consumption between the bottom and top of the socioeconomic groups (SII value=-32%). The estimated SII was statistically significant for the consumption of all healthy and junk foods except for fast foods and milk consumption. The estimated C index for consumption of healthy and junk foods was positive and negative, respectively.

Conclusion: This study provides the considerable information on the consumption of healthy and junk foods and its determinants among Iranian children and adolescents for better programming, developing health policies, and future complementary analyses.

Key Words: Adolescents, Children, Inequality, Healthy foods, Junk foods.

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1- INTRODUCTION

Inequalities in health have attracted much interest in the public health issues over the last decades (1). Socioeconomic inequality in nutrition is well established, which helps to explain some of the observed social inequalities in health (2). In high-income countries, high socioeconomic status (SES) is generally associated with a healthier diet; however, whether social differences in dietary intake are also found in low- and middle-income countries (LMICs) remains to be documented. In a review study on the socio-economic determinants of dietary patterns, high SES or living in urban areas was related to overall healthier dietary patterns in LMICs. However, it was also associated with higher energy, cholesterol, and saturated fat intakes (3). A survey in Lithuania revealed that family socio-economic position plays a major role in fresh fruit and soft drinks consumption among the primary school age children (4).

In Chinese and Vietnamese adolescents, high SES and urban residence were positively associated with the intake of high-energy foods such as foods of animal origin, western style foods and dairy products (5-6). However, adolescents of low SES in north Gaza Strip had the lower intake of many nutritious foods like animal food items, fruits, vegetables, and dairy products (7). In situations where there is a gap in the mean outcome of between two or more groups, it is interested to examine how much of the gap can be explained by differences in the observable characteristics. Blinder-Oaxaca decomposition method helps to distinguish between explained and unexplained components (8). Racial/ethnic and socio-economic inequalities in food insufficiency (9), malnutrition (10-12), and the role of socio-economic factors in health behavior (13-14), especially higher intake of (10-11) fruits and vegetables in Iranian adolescents (15-16), have been assessed before. In the analysis on inequalities in risk factors for non-communicable diseases in low-income and middle-income countries using the world health survey, data of Iran was not included (17); yet there is no overview of the variation in nutrition and diet by socioeconomic factors among the Iranian children, adolescents and adults. To the best of our knowledge this is the first study assessing socio-economic inequality in the consumption of healthy and junk food and its determinants in Iranian children and adolescents using the Blinder-Oaxaca decomposition method. The counterfactual decomposition technique popularized by Blinder and Oaxaca is widely used to study mean outcome differences between groups; for example, it is often used to analyze wage gaps by gender, SES, or race (18).

2- MATERIALS AND METHODS

2-1. Methods

This national level cross-sectional study was performed as the fourth survey of the school-based surveillance system, entitled "Childhood and Adolescence Surveillance and Prevention of Adult Non-communicable diseases (CASPIAN-IV) study", which was conducted in 2011-2012 in Iran. The total sample size was calculated as 14,880 students- aged between 6–18 years, living in the urban and rural areas of 30 provinces of Iran. Details on the study protocol have been described before (19-20); here we report it in brief.

2-1. Ethical considerations

Approval for the study was granted from the Ethical Committee of Isfahan University of Medical Sciences (IUMS), Tehran University of Medical Sciences (TUMS), and other relevant regulatory organizations at national and provincial levels. The Data and Safety Monitoring Board of the project closely supervised the quality control and quality assurance of the

survey at national level (21). The project team obtained written informed consent from the parents and oral consent from the students.

2-2. Sampling

The school students, were selected from the urban and rural areas of different cities in 30 provinces of the country. Stratification was executed in each province according to the residence area (urban/rural) and school grade (elementary/intermediate/high school). The sampling was proportional to size with equal sex ratio; i.e. boys and girls from each province were equal number and the ratios in the urban and rural areas were balanced to the population of the urban and rural students. In this way, the number of samples in rural/urban areas and in each school grade was divided equivalently to the population of students in each grade.

Cluster sampling with equal clusters was used in each province to scope the required sample size. Each cluster included 10 sample units (students and their parents). The maximum sample size that could give a good estimate of all risk factors of interest was selected. Thus, the sample size was calculated as 480 students in each province (48 cluster of 30 provinces). Accordingly, a total of 48 clusters of 10 subjects in each of the provinces and a total of 14,880 students were selected.

With the participation of trained teams of expert healthcare providers, all processes of examinations and inquiry were followed under standard protocols of the World Health Organization global school-based student health survey. The data entry staff entered the data from all forms and questionnaires twice, and checked for completeness and inconsistencies. The data checking process was conducted first at the district and then at the national level. A short food frequency questionnaire was used for estimating food group consumption. Foods with high nutritional value including fresh and dried fruits, vegetables and milk were considered as healthy food groups. Foods with a high content of sugar, salt, saturated fats and trans fats, and low content of nutrients including salty snacks (chips, cheese curls, popcorn, and pretzels), sweets (biscuits, cookies, cakes, chocolate, and candies), sweetened beverages (soda, soft drinks), and fast foods (hot dogs, hamburgers, cheeseburgers, fried chicken, and pizza) were placed in the junk food group. Subjects reported how many times they had consumed each item (daily, weekly, seldom and never) (22).

For statistical analysis, the consumption of healthy and junk foods was categorized into two groups: daily and non-daily. Baseline characteristics including age, gender, residence area, family-based characteristics, family history of chronic diseases, parental level of education, possessing a family private car, type of home etc. were completed for all participants through an interview with the parents or the child. Some complementary questions on screen time, physical activity, and many other components of life style were also asked.

For assessing family SES, we followed the approved approach of "Progress in the International Reading Literacy Study" (PIRLS) for Iran (23). Using Principle Component Analysis (PCA) variables including parents' education, parents' job, possessing private car, school type (public/private), type of home (private/rented), and having personal computer in home were summarized in one main component SES (24). The SES was categorized into 5 quintiles from "the lowest SES" in the first quintile, to "the highest SES "in the fifth quintile.

2-3. Statistical analysis

Frequency of healthy and junk foods consumption across quintile of SES was reported with 95% confidence interval

(CI). Association of independent variables with healthy and junk foods consumption was assessed using univariate and multivariate logistic regression analysis. Results of logistic regression analysis are presented as odds ratio (OR), and 95% CI. SES inequality in healthy and junk foods consumption was estimated by calculating the frequency of healthy and junk foods consumption across quintiles of SES, the concentration index (C), and slop index of inequality (SII). The Blinder-Oaxaca method was used to identify variation in the consumption of healthy and junk foods by SES levels. To assess the association of consumption of healthy and junk foods across SES quintiles, focusing on the basis of the distribution of target variables against the distribution of the SES variable, we used the C. The C was estimated using the following formula:

$$C = \frac{2}{n\mu} \sum_{i=1}^{n} hiRi - 1$$

In this formula hi is the amount of each healthy and junk foods for the $i-th$ individual, Ri is the relative rank of the $i-th$ individual in the distribution of the SES quintile, and μ is the mean value of the each healthy and junk foods. The negative and positive values of the C show that inequality was in favor of high and low SES groups of the SES respectively (25-27). Using the SII, through a regression analysis of the frequency of consumption of healthy and junk foods on the cumulative relative position of each SES quintiles, we assessed the linear regression coefficient showing the relationship between the level of frequency of consumption of healthy and junk foods in socioeconomic levels. In this approach, different socioeconomic categories driven from a series of values are assigned to all participants (28). Decomposition of the gap in consumption of healthy and junk foods between the first and fifth quintiles of SES as counterfactual decomposition technique was used to study mean outcome differences between the groups (29-31). Through this method, the gap between the mean of an interested outcome variable was divided into two components: 'explained or endowment' and 'unexplained or coefficient'. The first arises from differences in the groups' characteristics, whereas the 'unexplained' component is extracted from the differential effects of these characteristics (23). All statistical analyses were performed using programs available in the STATA package, version 11.1 (Stata Corporation, College Station, TX, USA). P<0.05 was considered as statistically significant. Missing data of were imputed missing values of these variables using Amelia package version 1.7.3 in R statistical package.

3- RESULTS

From the 14,880 invited students, 13,486 completed all required data of the study (participation rate: 90.6%). The average age of participants was 12.47 ±3.36 years, without any significant difference between girls and boys (P<0.05). 50.8% and 75.6% of the participants were boys and urban areas residents, respectively (P<0.05). The frequency of healthy and junk foods consumption had considerable differences between the SES quintiles. The highest difference belonged to the consumption of fresh fruits (25.38%), vegetables (12.92%), and milk (10.74%), respectively. The daily consumption of vegetables, dried and fresh fruits increased linearly with increasing the SES quintiles. On the other hand, the daily consumption of sweetened beverages, salty snacks, and sweets decreased linearly with increasing the SES quintiles (P<0.001). Although the daily consumption of milk increased with increasing the SES, it was not statistically significant. In addition, association of fast foods consumption with

SES was not statistically significant. According to the estimated SII values, the highest absolute difference was seen in the frequency of fresh fruit consumption between the bottom and top of the socioeconomic groups, which was -32% (-0.48,-0.17). The estimated SII was statistically significant for the consumption of all healthy and junk foods except for fast foods and milk consumption (P<0.001). The estimated C index for consumption of healthy and junk foods was positive and negative, respectively. This indicates that in the high SES groups, the consumption of healthy foods was high and in the low SES groups, the consumption of junk foods was high (P<0.001) (**Table.1**) (*Please see the table at the end of paper*).

In multivariate analysis, individuals in the high SES groups (quintile 5) had significantly higher odds of daily consumption of milk (OR: 1.74, 95%CI: 1.50-2.01), vegetables (OR: 1.63, 95%CI: 1.41-1.89), dried (OR: 1.33, 95%CI: 1.10-1.62), and fresh fruits (OR: 2.31, 95%CI: 1.99-2.68) compared to those in the low SES groups (P<0.001) (quintile 1). In addition, students with high SES had lower odds of daily consumption of fast foods, sweetened beverages, salty snacks and sweets compared to those with low SES (P<0.001). The effects of other independent variables on the daily consumption of healthy and junk foods are presented in **Table.2** (*Please see the table at the end of paper*).

Table.3 reveals that the highest gap between the first and fifth quintiles of socioeconomics was for the frequency of daily consumption of fresh fruits; 40.72% of the low SES groups, and 66.09% of the high SES groups consumed fresh fruits daily, which accounts to 25.37% gap in the favor of the high SES groups. Of this, 8.21% was attributed to the different effects of the independent variables studied (explained component), and 17.7% was attributed to the differences of the coefficients of regression models (unexplained component) in the two groups. It means that the difference in the frequency of daily consumption of fresh fruits between the low and high SES groups would decrease from 25.37% to 17.7% if the low SES groups were similar to the high SES groups in term of all studied independent variables. In the explained part of the daily consumption of fresh fruits, 5.93% (95%CI: 4.39-7.48%) of gap between the low and high SES groups was attributed to living area (region), showing that living area is the most effective variable responsible for the SES gap of fresh fruits consumption. In the unexplained part, family size was observed to make the highest contribution to the gap between the two SES groups. The detailed results of decomposition of the gap between the first and fifth quintiles of SES of other healthy and junk foods are presented in **Table.3** (*Please see the table at the end of paper*).

4- DISCUSSION

We examine the diet contribution inequality in according to socio-demographic factors, age, gender, physical activity and body image to alleviate this gap in Iranian children and adolescents. In the present study, considerable differences were found in the consumption frequency of healthy (vegetables, and fresh and dried fruits) and junk foods (sweetened beverages, salty snacks and sweets) between the SES quintiles. Therefore, the consumption of healthy and junk foods was high in the high and low SES groups, respectively. In the high SES groups, the likelihood of consumption of milk and vegetables, as well as dried and fresh fruits increased compared with their counterparts in the low SES groups. In contrast, consumption of fast foods, sweetened beverages, salty snacks and sweets decreased in the higher SES students

compared to the low SES ones. The highest gap between the first and fifth quintiles of SES was found for frequency of the daily consumption of fresh fruits. Most of this gap was attributed to the different effects of the independent variables studied (explained component), and the differences of the coefficients of regression models (unexplained component) in the two groups, respectively. In the explained part of the daily consumption of fresh fruits, 5.93% of gap between the low and high SES groups was attributed to living area (region), showing that living area is the most effective variable responsible for the SES gap in the consumption of fresh fruits. In the unexplained part, family size was observed to make the highest contribution to the gap between the two SES groups. In the study of Kell et al. on U.S.A black and white adults, for, higher SES was associated with greater adherence to plant-based and alcohol/salads patterns, but lower adherence to sweets/fats and southern patterns based on all the three measures of SES (individual education, household income and community-level SES) (33).

In spite of the differences between age group, race, and analysis of food patterns between the present study and the US study, there are some consistencies in the findings of both studies such as higher consumption of plant-based foods in high SES groups and lower consumption of sweets in low SES groups. Similar socio-economic disparities were found in Scottish diet; daily consumption of fruits and vegetables, brown/whole meal bread, breakfast cereals, and oil-rich and white fish was the lowest, and that of total bread was the highest in the most deprived compared with the least deprived households, respectively, for the period 2007–2009. Intake of non-milk extrinsic sugar and energy density were significantly higher in the most deprived households, too (12, 34). Studies from other countries show that children and adolescents from lower socio-economic background consume less fresh fruits and vegetables (35-37). In a study on the determinants of fruit and vegetable intake among 11-year-old schoolchildren in Iceland (a country of traditionally low fruit and vegetable consumption), gender and the father's socioeconomic status contributed significantly to the explanation of variance of vegetable intake, while socio-economic status of the parents did not affect the fruit intake in children (38). Other study in adolescents from 31 public middle and high schools in Minnesota, which used structural equation modeling for model testing, found that the strongest correlates of fruit/vegetable intake were home availability and taste preferences of fruits/vegetables fruits/vegetables. One of the most important correlates of home availability was household socio-economic status (39). High SES groups in Gaza city consume more sugary food items such as soft drinks and cookies (7).

Two reviews of determinants of fruit and vegetable consumption among children and adolescents revealed gender, age, race/ethnicity, socioeconomic position, preferences, parental intake and home availability/accessibility as the determinants most consistently supported by evidence. Girls and younger children tend to have a higher or more frequent intake than boys and older children. Socioeconomic position, preferences, parental intake, and home availability/accessibility are all consistently and positively associated with intake (40-41). Review of qualitative studies identified the following potential determinants for fruit and vegetable (FV) intake, which supplement the quantitative knowledge base: time costs, lack of taste guarantee, satiety value, appropriate time/occasions/settings for eating FV, sensory and physical aspects, variety,

visibility, methods of preparation, access to unhealthy food, the symbolic value of food for image, gender identity and social interaction with peers, and short-term outcome expectancies (35). In a qualitative study among adolescents (in Tehran city, Iran), availability and accessibility of fruits and vegetables in home, availability of unhealthy options in the environment, socioeconomic status, advertising about unhealthy options, subjective norms, reinforcement, and modeling were explored as environmental factors (42). As countries get richer, they show a tendency to transition from higher to lower socioeconomic groups in adopting risky health behaviors. Higher socioeconomic groups who adopt new behaviors earlier though they abandon such behaviors after learning the associated detrimental health effects (e.g. due to health promotion efforts). This is while, lower socio-economic groups are engaged in risky health behaviors during this course (43).

Consumption of healthy and junk foods has shown regular inequality, with consistently higher prevalence among the lower SES groups. Considering the low consumption of fruits and vegetables requires population-wide interventions, and regular inequality necessitates the need for equity-based approaches, which target lower socioeconomic groups. Due to dearth of data on the consumption of healthy and junk foods in many low and middle income countries (17), we need additional research at national and international levels to characterize these trends, together with attempting to collect these data with the highest possible across all socio-economic strata.

It is worth mentioning that causal association of independent variables with consumption of healthy and junk foods is required to do these interpretations; this is not concordant with the nature of cross-sectional surveys. However, the methodological approach used in the present work involves decomposing differences in the distribution of healthy and junk foods with the Blinder-Oaxaca and decomposition method in a large sample of Iranian children and adolescents (44). Our analysis showed that living area and family size are much important in explaining the gap in consuming foods. There is a need for internationally comparative, longitudinal, theory-based and multi-level studies considering both socioeconomic and environmental factors. Furthermore, mechanisms behind gender, age and socioeconomic differences in the consumption of healthy and junk foods are suggested which should be tested quantitatively in order to better targeting interventions to vulnerable groups. There is a need to conduct education-based campaigns aiming to reducing poverty and improve conditions for better health outcomes at a population level (45).

High-risk strategies can impede risk distribution via targeting resources to high-risk individuals as these people are very susceptible to commit a risky health behavior; this will enhance the cost-effectiveness of preventive health programs, improve the benefit to risk ratio, and increase the likelihood for appropriate interventions. For instance, low daily consumption of fruits and vegetables are indicative of regular inequality, and emphasizes the importance of adopting equity-focused policy and program interventions. Integrating equity components into monitoring and surveillance is one way to ensure that interventions reach and benefit high-risk population (17).

5- CONCLUSIONS

This study provides the considerable information on the consumption of healthy and junk foods and its determinants among Iranian children and adolescents for better programming, developing health policies, and future complementary analyses. On

the other hand, the daily consumption of sweetened beverages, salty snacks, and sweets decreased linearly with increasing the SES quintiles. The frequency of healthy and junk foods consumption had considerable differences between the SES quintiles.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

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Table-1: Socioeconomic inequality in healthy and junk foods consumption frequency in Iranian children and adolescents: the CASPIAN IV study.

Outcome	Q1 [95% CI]	Q2 [95% CI	Q3 [95% CI]	Q4 [95% CI]	Q5 [95% CI]	Total [95% CI]	SII [95% CI]	C (SD)
Fast Foods	3.54	2.32	2.34	3.30	2.69	2.82	0.004	-0.02
	[2.80,4.29]	[1.77,3.04]	[1.81,3.03]	[2.61,4.16]	[2.04,3.33]	[2.51,3.18]	[-0.03,0.04]	0.03
Milk	42.65	44.31	44.99	45.7	53.39	46.23	-0.11	0.04
	[40.66,44.65]	[42.08,46.57]	[42.66,47.34]	[43.35,48.06]	[51.40,55.38]	[44.85,47.62]	[-0.23,0.01]	0.01
Vegetables	29.01	32.03	35.42	40.59	41.93	35.78	-0.17	0.08
	[27.18,30.84]	[30.02,34.10]	[33.40,37.50]	[38.49,42.72]	[39.96,43.90]	[34.71,36.87]	[-0.22,-0.12]*	0.01
Dry fruits	18.16	18.64	24.23	23.64	25.25	21.92	-0.10	0.07
	[16.53,19.79]	[16.88,20.53]	[22.25,26.34]	[21.73,25.66]	[23.44,27.06]	[20.84,23.03]	[-0.18,-0.02]*	0.01
Fresh fruits	40.72	49.81	59.62	63.31	66.09	55.87	-0.32	0.09
	[38.73,42.71]	[47.49,52.14]	[57.43,61.78]	[61.18,65.38]	[64.20,67.99]	[54.61,57.13]	[-0.48,-0.17]*	0.004
Sweetened beverages	8.58	7.75	7.81	6.74	7.04	7.62	0.02	-0.05
	[7.45,9.71]	[6.74,8.89]	[6.77,8.98]	[5.74,7.89]	[6.02,8.06]	[7.09,8.18]	[0.001,0.04]*	0.02
Salty snacks	17.21	13.80	12.27	11.54	8.34	12.71	0.11	-0.13
	[15.69,18.74]	[12.36,15.39]	[10.96,13.71]	[10.25,12.97]	[7.24,9.44]	[11.96,13.50]	[0.06,0.15]*	0.01
Sweets	35.34	35.02	34.67	32.60	32.74	34.18	0.04	-0.02
	[33.42,37.27]	[32.89,37.20]	[32.60,36.79]	[30.59,34.67]	[30.87,34.61]	[33.03,35.35]	[0.01,0.07]*	0.01

* Statistically significant.
CI: Confidence interval; Q: quantile; SII: Slope index of inequality; C: Concentration index; SD: Standard deviation.

Table-2: Association of independent variables with healthy and junk foods consumption in multivariate logistic regression model.

Variables	Fast Foods Adjusted OR (95% CI)	Milk Adjusted OR (95% CI)	Vegetables Adjusted OR (95% CI)	Dry fruits Adjusted OR (95% CI)	Fresh fruits Adjusted OR (95% CI)	Sweetened beverages Adjusted OR (95% CI)	Salty snacks Adjusted OR (95% CI)	Sweets Adjusted OR (95% CI)
SES(Q1)								
Q2	0.64 [0.45,0.91]*	1.06 [0.94,1.20]	1.13 [0.99,1.28]	1.00 [0.85,1.17]	1.34 [1.18,1.51]*	0.87 [0.70,1.09]	0.78 [0.66,0.92]*	0.98 [0.87,1.10]
Q3	0.59 [0.41,0.85]*	1.12 [0.98,1.28]	1.28 [1.12,1.46]*	1.34 [1.14,1.57]*	1.89 [1.67,2.15]*	0.81 [0.65,1.02]	0.71 [0.59,0.84]*	0.95 [0.84,1.08]
Q4	0.73 [0.51,1.06]	1.28 [1.11,1.48]*	1.55 [1.35,1.78]*	1.24 [1.04,1.48]*	2.16 [1.89,2.48]*	0.63 [0.49,0.80]*	0.61 [0.50,0.74]*	0.87 [0.76,0.99]*
Q5	0.62 [0.42,0.89]*	1.74 [1.50,2.01]*	1.63 [1.41,1.89]*	1.33 [1.10,1.62]*	2.31 [1.99,2.68]*	0.66 [0.51,0.84]*	0.46 [0.37,0.57]*	0.89 [0.77,1.03]
Physical Activity (Mild)								
Moderate	0.92 [0.71,1.19]	1.24 [1.12,1.37]*	1.15 [1.04,1.28]*	1.07 [0.94,1.21]	1.09 [0.99,1.21]	0.96 [0.81,1.14]	0.82 [0.71,0.94]	0.90 [0.81,0.99]*
Vigorous	0.84 [0.61,1.15]	1.36 [1.22,1.53]*	1.38 [1.23,1.55]*	1.21 [1.05,1.39]*	1.33 [1.18,1.49]*	1.00 [0.83,1.21]	0.90 [0.77,1.05]	1.00 [0.94,1.13]
Gender (Boy)								
Girl	0.64 [0.50,0.83]*	0.85 [0.77,0.94]*	1.19 [1.08,1.31]*	1.05 [0.92,1.19]	1.25 [1.13,1.39]*	0.71 [0.61,0.83]*	1.17 [1.01,1.35]*	1.13 [1.02,1.25]*
Screen Time (<=2h)								

>2h	1.85 [1.42,2.41]*	0.95 [0.85,1.06]	1.00 [0.90,1.11]	1.16 [1.02,1.32]*	1.00 [0.89,1.11]	1.83 [1.55,2.17]*	1.80 [1.55,2.08]*	1.35 [1.22,1.49]*
Region (Urban)								
Rural	0.81 [0.59,1.10]	1.21 [1.05,1.40]*	0.88 [0.77,0.99]*	0.85 [0.70,1.02]	0.74 [0.64,0.85]*	1 [0.81,1.22]	1.27 [1.07,1.51]*	1.08 [0.94,1.24]
Living parents (None)								
One of them	1.89 [0.61,5.90]	1.47 [0.90,2.39]	0.77 [0.48,1.24]	0.56 [0.32,0.98]*	0.91 [0.55,1.51]	1.51 [0.66,3.46]	1.98 [0.94,4.16]	0.92 [0.59,1.43]
Both of them	0.94 [0.34,2.54]	1.81 [1.19,2.73]*	1.26 [0.88,1.82]	0.68 [0.44,1.05]	1.15 [0.76,1.75]	0.92 [0.44,1.91]	1.24 [0.65,2.38]	1.09 [0.77,1.54]
Body image (thin)								
Normal	0.79 [0.62,1.01]	1.10 [1.01,1.20]*	1.13 [1.03,1.23]*	1.06 [0.95,1.19]	1.04 [0.95,1.13]	0.84 [0.72,0.98]*	0.84 [0.74,0.95]*	0.91 [0.83,0.99]*
Obese	1.06 [0.78,1.43]	0.88 [0.79,0.99]*	1.10 [0.99,1.22]	0.99 [0.86,1.14]	0.98 [0.88,1.09]	0.94 [0.78,1.14]	1.04 [0.89,1.22]	0.78 [0.69,0.87]*
Family size (number)	1.12 [0.88,1.42]	0.93 [0.86,1.01]	0.99 [0.91,1.08]	0.92 [0.83,1.02]	0.81 [0.74,0.88]*	0.87 [0.75,1.01]	1.23 [1.08,1.39]*	0.98 [0.90,1.07]
Age (year)	1.12 [1.07,1.17]*	0.86 [0.84,0.87]*	1.02 [1.01,1.03]*	0.99 [0.97,1.01]	0.98 [0.97,0.99]	1.10 [10.7,1.13]*	1.03 [0.99,1.05]*	0.98 [0.97,0.99]*
*Statistically significant.								

Table-3: Decomposition of the gap in healthy and junk foods consumption frequency between the first and fifth quintiles of socioeconomics.

Variables	Fast Foods	Milk	Vegetables	Dry fruits	Fresh fruits	Sweetened beverages	Salty snacks	Sweets
Prevalence in first quintile	3.54 [2.80,4.29]*	42.65 [40.66,44.65]*	29.01 [27.18,30.84]*	18.16 [16.53,19.79] *	40.72 [38.73,42.71] *	8.58 [7.45,9.71] *	17.21 [15.69,18.74] *	35.34 [33.42,37.27]*
Prevalence in fifth quintile	2.69 [2.04,3.33]*	53.39 [51.40,55.38]*	41.93 [39.96,43.90]*	25.25 [23.44,27.06] *	66.09 [64.20,67.99] *	7.04 [6.02,8.06] *	8.34 [7.24,9.44] *	32.74 [30.87,34.61] *
Differences (Total gap)	0.86 [-0.13,1.84]*	-10.74 [-14.52,-7.87]*	-12.92 [-15.61,-10.24]*	-7.09 [-9.52,-4.65]*	-25.38 [-28.13,-22.62] *	1.54 [0.02,3.06] *	8.87 [6.99,10.75] *	2.60 [-0.08,5.29]
Due to endowments (explained)[1]								
Gender	-0.02 [-0.06,0.02]	-0.08 [-0.21,0.05]	0.10 [-0.06,0.27]	0.01 [-0.03,0.06]	0.11 [-0.06,0.27]	-0.04 [-0.11,0.03]	0.01 [-0.03,0.05]	0.05 [-0.04,0.14]
Age	-0.04 [-0.09,0.02]	0.50 [-0.16,1.15]	-0.08 [-0.20,0.04]	0 [-0.06,0.07]	0.05 [-0.04,0.14]	-0.10 [-0.22,0.03]	-0.03 [-0.09,0.03]	0.09 [-0.04,0.23]
Region	-0.33 [-0.87,0.21]	0.62 [-0.87,2.11]	-2.29 [-3.73,-0.85]*	-1.72 [-3.07,-0.37]*	-5.93 [-7.48,-4.39]*	0.37 [-0.49,1.24]	0.94 [-0.17,2.4]	0.95 [-0.52,2.42]
Family size	0.07 [-0.35,0.49]	-0.72 [-1.95,0.50]	-0.32 [-1.51,0.88]	0.72 [-0.41,1.85]	-1.91 [-3.14,-0.68]*	-0.38 [-1.09,0.33]	0.99 [0.15,1.84]*	0.39 [-0.80,1.59]
Screen Time	-0.35 [-0.65,-0.04]*	0.05 [-0.64,0.74]	-0.04 [-0.74,0.67]	-0.65 [-1.32,0.02]	-0.12 [-0.83,0.59]	-1.31 [-1.81,-0.82]*	-1.50 [-2.04,-0.96]*	-2.04 [-2.78,-1.30]*
Physical Activity	0.02 [-0.04,0.08]	-0.17 [-0.39,0.05]	-0.23 [-0.46,-0.01]*	-0.17 [-0.35,0.02]	-0.25 [-0.47,-0.02]*	-0.04 [-0.12,0.06]	-0.08 [-0.20,0.04]	-0.08 [-0.25,0.08]
Living parents	0.02 [-0.04,0.07]	-0.19 [-0.37,0.00]*	-0.06 [-0.20,0.07]	0.12 [-0.02,0.27]	0.04 [-0.10,0.17]	0 [-0.07,0.08]	-0.02 [-0.10,0.06]	-0.01 [-0.14,0.13]
Body image	0.02 [-0.16,0.20]	0.46 [-0.02,0.94]	-0.46 [-0.93,0.02]	-0.01 [-0.45,0.42]	-0.19 [-0.66,0.29]	0.20 [-0.07,0.47]	0.25 [-0.10,0.60]	0.18 [-0.28,0.64]
Subtotal gap	-0.61 [-1.35,0.13]	0.46 [-1.68,2.60]	-.3.38 [-5.31,-1.45]*	-1.69 [-3.50,0.12]	-8.21 [-10.27,-6.15]*	-1.29 [-2.46,-0.10]*	0.56 [-0.85,1.97]	-0.47 [-2.45,1.52]

Due to coefficients (unexplained)[2]								
Gender	-1.68 [-4.68,1.32]	2.32 [-5.95,10.60]	0.75 [-7.35,8.86]	-1.47 [-8.89,5.96]	6.57 [-1.64,14.78]	-8.88 [-13.46,-4.30]	-1.46 [-7.13,4.21]	-1.46 [-9.55,6.63]
Age	-2.60 [-6.26,1.05]	4.18 [-5.64,14.01]	4.31 [-5.32,13.95]	-7.96 [-16.82,0.89]	-0.37 [-10.26,9.51]	-3.77 [-9.39,1.84]	-4.21 [-10.77,2.35]	-17.77 [-27.60,-7.93]*
Region	-0.45 [-3.70,2.79]	2.17 [-8.01,12.34]	-11.09 [-21.42,-0.76]*	-15.40 [-25.89,4.90]	-6.13 [-16.65,4.40]	-0.98 [-6.85,4.90]	3.91 [-2.23,10.04]	-0.12 [-10.21,9.97]
Family size	0.51 [-2.77,3.79]	3.01 [-6.36,12.38]	2.19 [-6.92,11.31]	-7.12 [-15.72,1.48]	-12.36 [-21.75,-2.97]*	-3.88 [-9.34,1.58]	-2.75 [-9.28,3.78]	-0.70 [-9.91,8.51]
Screen Time	0.31 [-0.24,0.86]	-0.20 [-1.29,0.90]	0.70 [-0.40,1.81]	1.47 [0.40,2.54]*	0.74 [-0.40,1.87]	0.46 [-0.36,1.28]	0.06 [-0.86,0.97]	0.47 [-0.66,1.61]
Physical Activity	0.79 [-0.76,2.34]	-0.13 [-4.65,4.40]	3.54 [-0.85,7.93]	1.41 [-2.66,5.47]	-1.10 [-5.55,3.35]	1.07 [-1.46,3.61]	0.16 [-2.96,3.28]	0.68 [-3.73,5.09]
Living parents	-0.06 [-0.25,0.13]	0.27 [-0.19,0.72]	0.39 [-0.06,0.84]	-0.01 [-0.44,0.45]	0.56 [0.04,1.07]*	0.12 [-0.16,0.39]	-0.14 [-0.49,0.20]	-0.22 [-0.67,0.23]
Body Image	-1.63 [-4.00,0.73]	-0.38 [-6.09,5.33]	-1.93 [-7.79,3.93]	-5.26 [-10.4,0.12]	-8.68 [-14.73,-2.62]*	-3.38 [-6.73,-0.03]*	-3.86 [-8.20,0.49]	-4.51 [-10.27,1.24]
Constant	6.28 [-0.90,0.13]	-22.43 [-42.13,-2.74]*	-8.41 [-28.12,11.31]	28.93 [10.50,47.36]*	3.61 [-16.66,23.88]	22.06 [10.88,33.23]*	16.61 [3.27,29.95]*	26.70 [6.93,46.46]*
Subtotal gap	1.47 [0.18,2.76]*	-11.19 [-14.52,-7.87]*	-9.54 [-12.87,-6.21]*	-5.40 [-8.56,-2.23]*	-17.17 [-20.62,-13.72]*	2.83 [0.88,4.77]*	8.31 [6.03,10.59]*	3.07 [-0.23,6.38]

*Statistically significant.
[1]Part of gap that related to differences in independent variables between the two groups.
[2]Part of gap that related to differences of coefficients (b) of regression models in the two groups.