



Cooking Pattern and Eating Behaviors in Association with Socioeconomic Status among Iranian Households: The NUTRI-KAP Survey

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Abstract

Background: Disparities in health may relate to differences in nutrition. Among dietary determinants, Socioeconomic Status (SES) plays an important role. Therefore, this study was aimed to investigate the association between SES and cooking pattern and consumed food among rural and urban Iranian households.

Methods: Overall, 14,136 households were selected through single-stage cluster sampling methods from urban and rural regions of 31 provinces of Iran in 2011-2012. Demographic, SES, cooking pattern and consumed food data were obtained through valid structured questionnaires by interviewing between trained interviewers with qualified people in households. Data were analyzed using STATA software ver. 11.0 (STATA Corp, College Station, Tex.)

Results: In households with weak SES background, 70.4% of households cooked separately for any meal. The healthy cooking method for red meat and chicken, fish, celery, vegetables stew, onion and green bean was significantly higher in good SES ($P<0.001$). Households with good SES had higher intake low fat dairy, liquid oil and iodized salt ($P<0.001$) compared with families with weak SES. Most consumed bread in three groups was Lavash (Local name).

Conclusion: Pattern of cooking and the type of consumed foods among different SES group and their relationship with each other. So based on this information will be facilitated for interventions and training for better nutrition pattern in society.

Keywords: Socioeconomic Status, KAP, Cooking pattern, Consumed food

Introduction

Incongruence in population health has been in associated with differences in nutrition. Very large diversities are observed between people in amount and type of consumed food (1). There are various factors that affect food consumption such as nutritional knowledge, socioeconomic Status (SES),

food availability, and lifestyle variables (2, 3). Previous studies assessed the relation between consumed food and SES in different societies (1, 4-6). People with higher SES consumed more vegetables and fruit in Europe (1). In Australian population with lower SES at a greater proportion of

their energy from refined sugars (7) and fat, lower in fiber and micronutrients (8). In three cross-sectional studies in the Netherlands was found people in the low SES reported consuming more of potatoes, meat, visible fats, coffee and soft drinks. Higher intake of vegetables, cheese and alcohol was seen in subjects with high SES (5). The effects of different cooking methods on various diseases and antioxidant activity have been assessed. Due to the important role of antioxidants against free radicals such as reactive oxygen species in the human body (9) and fruits and vegetables as good source of antioxidants (10, 11), the cooking of methods of this food group is considerable. Compared with frying, the methods of boiling and baking have a small effect on the antioxidant contents of tomatoes (ascorbic acid, total phenolic, lycopene) (11). Frying (with oil) changes in the fatty acids of food increase of the energy density, and decrease of the water content (12). The consumption of fried foods, because of fat content (13) and energy density (14), can cause obesity. Heterocyclic amine (HCA) compounds found in grilled meat are carcinogenic (15). However, as far as we are aware, study about the association SES with preparing and cooking method is not conducted.

According to authors' knowledge, no study has been assessed association between SES with cooking methods and eating behavior among Iranian households. Therefore, goal of our study was to investigate this association among Iranian households in urban and rural regions. Our hypothesis was that households with higher SES background consumed more healthy food and prepared food through healthy methods compared with households with lower SES.

Materials and Methods

Target population

The study population was 14, 136 Iranian households who lived in urban and rural areas that were selected by single-stage cluster (2011-12). Respondents were the mother of household or each household member above 15 years old (male or female) who was responsible of purchasing food

and cooking meal. The methodology of this study was described previously (16).

Tools for data gathering

Structured questionnaires were completed by interviewing between the trained interviewers with the qualified people in households. The validity and reliability of questionnaire was tested in pilot study (16). Reliability was assessed using Cronbach's alpha and a value of 0.79 was gained. Validity of questionnaire was assessed using Spearman's correlation coefficients ($r = 0.83, P < 0.001$).

Demographic, SES, cooking pattern and consumed food data were obtained in our study. Cooking pattern was assessed by asking about cooking status in household, methods of cooking for meat, vegetables, type of cooked chicken, and method of vegetable washing. Methods of food cooking were assessed for meat and vegetables. Grilling, boiling, baking and steaming were defined as a healthy method, and frying as an unhealthy method. Also for vegetables, roasting as a healthy method and frying as an unhealthy method. Usual type of bread, dairy, oil for cooking and frying, and salt was questioned. Different kinds of breads included Lavash, Taftoon, Sangak, Barbari, French and toast, and traditional breads. The first four breads were Iranian breads that have different baking methods and fiber content. In our study, vegetable oil, olive oil and special oil for frying were defined as a liquid oil, and animal oil, animal butter, margarine, and suet as others.

The SES of households was determined using principle component analysis (PCA) method and including "parents' education, parents' occupation, type of home and having the asset" variables. SES was categorized into tertiles. The first tertile was defined as a weak SES, second tertile as a moderate and third tertile as a good.

Statistical analysis

Data were analyzed by STATA version 11.0 (STATA Corp, College Station, Tex.). The qualitative variables were reported as percentages and 95% confidence interval (CI). The Pearson's Chi-square test was used to analyze categorical variables P value less than 0.05 was considered as statistically significant.

Results

This study included 64.9% households in urban and 35.1% in urban areas. Totally, 14, 136 people in all of country were completed questionnaire with a mean age of 39.7 ± 14.4 years. The majority were woman (94%). Respectively, 33.3%, 33.3%, and 33.4% of households had weak, moderate and good SES. Totally, person who decided mostly about purchasing food, were mother (63.1%), the head of family (26.8%), respondent (7.4%), and other (2.7%) ($P < 0.001$). In group with weak SES, the head of family as the determinant person about purchasing food was 33.4% (more than the other two groups). Totally, 66.9 percent of Iranian households cooked separately for any meal. Families with weak SES significantly cooked separately for any meal more than households with good SES (70.4% vs. 63.2%) (Table 1).

Table 2 is showed food cooking methods based on SES. Families with good SES significantly used healthy cooking method for red meat and chicken. The unhealthy cooking methods of vegetables stew, onion and green bean were used more in lower SES levels ($P < 0.001$).

Totally, 5.3% (CI 95%: 4.8, 5.8) of households completed washing process for vegetable (Table 4). Households with good SES have done all washing process more than families with weak SES (9.1% vs. 2.7%).

According to table 5, households with good SES background significantly consumed Sangak and barbari more than families with weak SES (20.7% vs. 6.0%, and 9.5% vs. 8.2%, respectively). The consumption of low fat dairy, liquid oil for cooking and frying was significantly higher among households with good SES (54.3%, 75.1%, and 86.8%, respectively).

Table1: Cooking status in households based on SES: The NUTRI-KAP survey

	SES			Total	P _{value}
	Weak	Moderate	Good		
Separately for any meal	3247* 70.4 (68.5, 72.2)**	3090 67.0 (65.3, 68.7)	2911 63.2 (61.3, 65.1)	9248 66.9 (65.6, 68.1)	<0.001
One time for several meals	1328 28.8 (27.0, 30.7)	1484 32.2 (30.5, 33.9)	1649 35.8 (34.0, 37.7)	4461 32.3 (31.0, 33.5)	
Not cooking daily	39 0.9 (0.6, 1.2)	37 0.8 (0.6, 1.2)	47 1.0 (0.7, 1.4)	123 0.9 (0.7, 1.1)	

* Data are number, ** data are percent (95% CI), P -value<0.05

SES a composite of variables included parents' education, parents' occupation, type of home and having the asset

Table 2: The methods of food cooking based on SES: The NUTRI-KAP survey

	SES			Total	P _{value}
	Weak	Moderate	Good		
Red meat					
Healthy	3589* 77.8 (76.0, 79.5) **	3554 77.0 (75.2, 78.5)	3931 85.0 (83.5, 86.3)	11074 79.9 (78.7, 81.0)	<0.001
Unhealthy	947 20.5 (18.9, 22.3)	1013 21.9 (20.4, 23.6)	669 25.3 (23.6, 27.0)	2629 29.3 (28.0, 30.5)	
Not cooking	78 1.23 (0.81, 1.9)	54 1.7 (1.2, 2.2)	27 0.5 (0.4, 0.8)	159 1.1 (0.9, 1.5)	
Chicken					
Healthy	3149 68.2 (66.1, 70.2)	3080 66.4 (64.5, 68.2)	3439 74.2 (72.5, 75.8)	9668 69.6 (68.3, 70.8)	<0.001
Unhealthy	1412 30.6 (28.6, 32.6)	1482 32.0 (30.2, 33.8)	1172 25.3 (23.6, 27.0)	4066 29.3 (28.0, 30.5)	
Not cooking	57 1.2 (0.8, 1.9)	77 1.7 (1.2, 2.2)	25 0.6 (0.4, 0.8)	159 1.1 (0.9, 1.5)	
Fish					

Table 2: Cond....

Healthy	701	828	1074	2603	<0.001
	15.2 (13.8, 16.6)	17.9 (16.4, 19.3)	23.2 (21.6, 24.8)	18.7 (17.8, 19.8)	
Unhealthy	3160	3406	3402	9968	
	68.4 (66.3, 70.4)	73.4 (71.7, 75.1)	73.4 (71.7, 75.0)	71.8 (70.5, 72.9)	
Not cooking	757	405	158	1320	
	16.4 (14.7, 18.2)	8.7 (7.7, 9.8)	3.4 (2.8, 4.1)	9.5 (8.7, 10.4)	
Potato					
Healthy	1915	1789	1655	5359	<0.001
	41.7 (39.8, 43.6)	38.8 (36.9, 40.6)	35.7 (33.7, 37.6)	38.7 (37.4, 40.0)	
Unhealthy	2640	2764	2938	8342	
	57.5 (55.6, 59.4)	59.9 (58.0, 61.7)	63.3 (61.34, 65.2)	60.2 (59.0, 61.5)	
Not cooking	36	63	49	148	
	0.8 (0.5, 1.2)	1.3 (0.91, 2.04)	1.1 (0.72, 1.55)	1.1 (0.8, 1.4)	
Eggplant & Pumpkin					
Healthy	747	626	732	2105	
	16.3 (14.8, 17.7)	13.5 (12.3, 14.9)	15.8 (14.4, 17.2)	15.2 (14.3, 16.1)	<0.001
Unhealthy	3607	3800	3759	11166	
	78.1 (76.5, 79.6)	82.0 (80.4, 83.4)	81.1 (79.5, 82.6)	80.4 (79.3, 81.4)	
Not cooking	264	209	144	617	
	5.7 (4.9, 6.6)	4.5 (3.9, 5.3)	3.1 (2.4, 4.0)	4.4 (3.9, 5.0)	
Celery					
Healthy	1418	1950	2409	5777	
	31.5 (29.6, 33.4)	43.3 (41.4, 45.2)	55.4 (53.2, 57.5)	43.2 (41.82, 44.66)	<0.001
Unhealthy	765	871	741	2377	
	17.0 (15.5, 18.5)	19.3 (17.9, 20.9)	17.0 (15.5, 18.7)	17.8 (16.8, 18.9)	
Not cooking	2322	1684	1202	5208	
	51.5 (49.2, 53.9)	37.4 (35.4, 39.4)	27.6 (25.8, 29.6)	39.0 (37.4, 40.6)	
Vegetables stew					
Healthy	1809	2129	2398	6336	
	39.6 (37.6, 41.6)	46.5 (44.5, 48.6)	52.8 (50.6, 54.9)	46.3 (44.8, 47.7)	<0.001
Unhealthy	2525	2312	2083	6920	
	55.2 (53.2, 57.3)	50.5 (48.44, 52.61)	45.8 (43.7, 48.0)	50.5 (49.1, 52.0)	
Not cooking	235	135	65	435	
	5.1 (4.4, 6.1)	3.0 (2.3, 3.7)	1.4 (1.0, 2.0)	3.2 (2.76, 3.7)	
Onion					
Healthy	1209	1434	1686	4329	<0.001
	26.4 (24.7, 28.1)	31.1 (29.4, 32.8)	36.7 (34.7, 38.6)	31.4 (30.2, 32.6)	
Unhealthy	3268	3118	2877	9263	
	71.3 (69.5, 73.0)	67.6 (65.8, 69.2)	62.5 (60.6, 64.5)	67.1 (65.9, 68.3)	
Not cooking	109	64	37	210	
	2.4 (1.8, 3.2)	1.4 (1.0, 1.9)	0.8 (0.5, 1.2)	1.5 (1.3, 1.9)	
Green Bean					
Healthy	2136	2579	2827	7542	
	48.4 (46.3, 50.5)	59.5 (57.7, 61.4)	68.4 (66.4, 70.4)	58.6 (57.2, 59.9)	<0.001
Unhealthy	1481	1263	1065	3809	
	33.5 (31.6, 35.5)	29.2 (27.5, 31.0)	25.8 (23.9, 27.8)	29.6 (28.3, 30.8)	
Not cooking	799	490	240	1529	
	18.1 (16.4, 19.9)	11.3 (10.1, 12.6)	5.8 (5.0, 6.7)	11.9 (11.0, 12.8)	

* Data are number, ** data are percent (95% CI), P -value<0.05

SES a composite of variables included parents' education, parents' occupation, type of home and having the asset

Table 3: The type of cooked chicken based on SES: The NUTRI-KAP survey

		SES			Total	P value
		Weak	Moderate	Good		
Cooked	chicken	622*	465	359	1446	
with Skin		13.5 (11.9, 15.2) **	10.0 (9.0, 11.2)	7.7 (6.7, 8.9)	10.4 (9.6, 11.3)	<0.001
Cooked	chicken	3999	4165	4281	12445	<0.001
without Skin		86.5 (84.8, 88.1)	90.0 (88.8, 91.0)	92.3 (91.1, 93.3)	89.6 (88.7, 90.4)	

* Data are number, ** data are percent (95% CI), P -value<0.05

SES a composite of variables included parents' education, parents' occupation, type of home and having the asset

Table 4: The methods of vegetables washing based on SES: The NUTRI-KAP survey

	SES			Total	P value
	Weak	Moderate	Good		
1-Water (cleaning)	1454* 31.6 (29.5, 33.7) **	863 18.7 (17.3, 20.1)	676 14.6 (13.4, 15.8)	2993 21.6 (20.5, 22.7)	<0.001
2-Dishwashing liquid (removing parasite)	584 12.7 (11.3, 14.2)	632 13.7 (12.4, 15.1)	694 15.0 (13.4, 16.7)	1910 13.8 (12.8, 14.8)	
3- Perchlorine (disinfection)	66 1.4 (1.1, 1.9)	122 2.6 (2.1, 3.4)	170 3.7 (3.0, 4.4)	358 2.6 (2.2, 3.0)	
4-water (final washing)	95 2.1 (1.6, 2.7)	103 2.2 (1.7, 2.9)	101 2.2 (1.7, 2.8)	299 2.2 (1.8, 2.6)	
All of the mentioned method	126 2.7 (2.2, 3.4)	183 4.0 (3.3, 4.7)	421 9.1 (8.0, 10.3)	730 5.3 (4.8, 5.8)	
Some of the mentioned method	1683 36.5 (34.4, 38.7)	2066 44.7 (42.67, 46.72)	1966 42.4 (40.2, 44.6)	5715 41.2 (39.7, 42.7)	
Other methods	601 13.0 (11.7, 14.5)	654 14.2 (13.0, 15.4)	609 13.1 (11.8, 14.5)	1864 13.4 (12.6, 14.4)	

* Data are number, ** data are percent (95% CI), P-value<0.05/SES a composite of variables included parents' education, parents' occupation, type of home and having the asset

Table 5: The type of consumed food in households based on SES: The NUTRI-KAP survey

	SES			Total	P value	
	Weak	Moderate	Good			
Bread						
Lavash	2015* 43.8 (41.1, 46.5)**	2254 49.1 (46.9, 51.3)	2191 47.2 (44.8, 49.6)	6460 46.7 (44.9, 48.5)	<0.001	
Taftoon	540 11.7 (10.4, 13.3)	669 14.6 (13.1, 16.2)	536 11.6 (10.2, 13.1)	1745 12.6 (11.5, 13.8)		
Sangak	277 6.0 (5.2, 7.0)	443 9.6 (8.6, 10.8)	959 20.7 (18.8, 22.6)	1679 12.1 (11.2, 13.1)		
Barbari	379 8.2 (6.9, 9.8)	388 8.5 (7.3, 9.8)	439 9.5 (8.2, 10.9)	1206 8.7 (7.8, 9.8)		
French and toast	5 0.1 (0.0, .26)	8 0.2 (0.1, 0.4)	7 0.2 (0.1, 0.3)	20 0.2 (0.1, 0.2)		
Other traditional breads	1388 30.1 (27.6, 32.9)	831 18.1 (16.3, 20.0)	509 11.0 (9.6, 12.6)	2728 19.7 (18.2, 21.3)		
Dairy						
Low fat	1646 35.7 (33.5, 37.9)	1995 43.2 (41.2, 45.2)	2537 54.3 (52.8, 56.8)	6178 44.6 (43.1, 46.0)		<0.001
High fat	383 8.3 (7.2, 9.5)	562 12.2 (11.0, 13.4)	796 17.2 (15.7, 18.8)	1741 12.6 (11.7, 13.5)		
Ethnic	2584 56.0 (53.6, 58.4)	2065 44.7 (42.5, 46.9)	1294 28.0 (26.1, 29.9)	5943 42.9 (41.29, 44.47)		
Oil for cooking						
Solid oil	2194 47.6 (45.5, 49.6)	1515 32.7 (31.0, 34.4)	904 19.5 (18.1, 21.0)	4613 33.2 (32.0, 34.5)	<0.001	
Liquid Oil	2111 45.8 (43.8, 47.8)	2874 62.1 (60.2, 63.8)	3487 75.1 (73.5, 76.6)	8472 61.0 (59.7, 62.3)		
Others	306 6.6 (5.8, 7.6)	243 5.3 (4.6, 6.0)	254 5.5 (4.7, 6.3)	803 5.8 (5.3, 6.3)		
Oil for frying						
Solid oil	1642 35.7 (33.8, 37.6)	915 19.8 (18.4, 21.3)	491 10.6 (9.5, 11.7)	3048 22.0 (20.9, 23.1)	<0.001	
Liquid Oil	2794 60.7 (58.8, 62.7)	3606 77.9 (76.4, 79.4)	4035 86.8 (85.5, 88.0)	10435 75.2 (74.1, 76.3)		
Others	164 3.6 (2.9, 4.4)	106 2.3 (1.8, 2.9)	123 2.7 (2.1, 3.4)	393 2.8 (2.4, 3.3)		
Salt						
Iodized salt	4346 94.2 (93.3, 95.1)	4419 95.4 (94.7, 96.1)	4444 96.1 (95.4, 96.7)	13209 95.3 (94.7, 95.7)	0.0005	
Non-Iodized salt	93 2.0 (1.6, 2.6)	52 1.1 (0.9, 1.5)	53 1.1 (0.9, 1.5)	198 1.4 (1.2, 1.7)		
Others	173 3.8 (3.1, 4.6)	159 3.4 (2.8, 4.2)	128 2.8 (2.3, 3.4)	460 3.3 (2.9, 3.8)		

* Data are number, ** data are percent (95% CI), P-value<0.05/SES a composite of variables included parents' education, parents' occupation, type of home and having the asset

Discussion

This study assessed the association between SES with cooking pattern and consumed food among Iranian households. The findings of our study showed that SES plays an important role in food choice and preparing and cooking methods in Iranian households. It was observed that households with weak SES background cooked for any meal while families with good SES prepared food one time. Previous study showed that consumption of takeaway food is higher among population with good SES and it is maybe a reason that Iranian households with high SES cooked less than families with low SES background.

We found that households with weak SES cooked red meat, chicken, fish, and vegetables less than families with good SES. Meats and vegetables were prepared through healthy methods more among population with good SES in Iranian households except fish that frying is a common cooking method among Iranian population. The Dutch National Food Consumption Survey reported a higher consumption of potatoes, meat and meat products, fat, coffee and soft drinks in low SES group while people with high SES ate more vegetables, cheese and alcohol. Actually, a higher SES was associated with higher intake of vegetable protein, dietary fiber, most micronutrients and lower fat intake (5). In systematic review, eleven studies from seven countries in Europe, higher SES associated with a greater consumption of vegetables and fruits (1). A study among Australia population in urban and rural areas was concluded, lower SES people consumed more tropical fruits, protein foods, pasta and rice while population with high SES ate more breakfast cereal, whole meal bread and local vegetables (6).

The results of our study showed that the percentage of households never consumed red meat, chicken and fish is higher among families with weak SES. Iranian households with high SES prepared red meat and fish through frying (unhealthy method). Our finding showed that frying is common method for preparing food among Iranian households. Because of fat content (13) and ener-

gy density (14), this method can cause obesity. Prevalence of obesity among Iranian males and females are 12.4% and 26.5%, respectively (17), the need for training, in order to the use of other methods for cooking is necessary. About preparing food, with increasing of SES level in households increase using from cooking chicken without skin and all steps for washing vegetables.

In our study, the most consumed bread was Lavash. Families with good SES consumed more Barbari and Sangak more than they consumed people with low SES. Higher SES is associated with the consumption of low fat dairy, liquid oil (for frying and cooking) and iodized salt. In the Australian population and three studies in the Dutch National Food Consumption Survey concluded people with low SES had a diet higher in fat density (5, 8). In cross-sectional study in Costa Rica about association between socio-economic and lifestyle determinants with cooking oil choice, was showed that high SES is positively associated with the consumption of unsaturated oils, including soybean oil. The palm oil users were in lower SES especially in rural areas (18).

Conclusion

The using of healthier cooking methods, consumption of the healthier foods, such as low fat dairy, liquid oils and iodized salt, and the more diversity of foods, like meats and vegetables, is associated with higher SES households. Therefore, the developing of awareness level about proper cooking methods and healthier food choices especially among weak SES is necessary.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, and/or falsification, double publication) have been considered carefully.

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The authors declare that there is no conflict of interests.

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