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Economic inequality in nutritional knowledge, attitude and practice of Iranian households: The NUTRI-KAP study

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Abstract

Background: Improper nutritional knowledge is one of the most important causes of nutritional problems, which can affect practice and cause more complications. The aim of this study was to assess the association between nutritional knowledge, attitude and practice (KAP) of Iranian households with socioeconomic status (SES).

Methods: The study population was 14,136 households (57 clusters of 8 individuals in each province) who lived in urban and rural regions of 31 provinces of Iran. The sample size of the study was selected using multistage cluster sampling technique. A structured questionnaire and interview with the qualified person in each family was used to collect data. The questionnaire included demographic, SES and nutritional KAP questions. Using principle component analysis, some variables including household assets, occupation and education level of the heads of the families and respondents and the number of family members were used to construct family SES. The SES was categorized as good, moderate and weak. Pearson's Chi-square test was used to analyze categorical variables.

Results: The percentage of knowledge about growing up, acquiring energy and being healthy as reasons for eating food was 24.1%, 44.8% and 54.7%, respectively. Only 69.7%, 60.5% and 52.5% of the participants had knowledge of identification of meat and legumes, grain and dairy group, respectively. More than 97% of the participants had a favorable attitude toward importance of nutrition in health. The nutritional knowledge linearly increased with increasing SES. Families with good SES significantly consumed more fruit, vegetable, dairy group, red meat, chicken and poultry, fish and egg while sugar consumption was significantly higher in families with weak SES ($p<0.05$).

Conclusion: SES can influence the rate of nutritional KAP. Some policies should be considered to increase nutritional KAP especially in lower SES group in the society.

Keywords: Knowledge, Attitude, Practice, Socioeconomic Status, Nutrition.

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Introduction

Improper nutritional knowledge is one of the most important causes of nutritional problems, which can affect practice and cause more complications. It has been recommended that food choices and dietary behaviors can be impressed by knowledge about diet (1). To effectively improve healthy eating, it is necessary to understand the nutritional attitudes and beliefs of the general community (2).

Age, education level, gender and marital status can influence nutritional knowledge, attitude and practice (KAP) (3). The association of socioeconomic status (SES) with nutrition knowledge and beliefs has been confirmed (4). Many studies have found that nutrient intakes and dietary patterns of people in low SES groups threaten the general health and raise the risk of nutritional disease (5,6). People in Low SES group, due to lack of access to health care, improper living conditions, less knowledge and greater psychological stress, may be at a higher risk of poorer health conditions more than others (7-10). With respect to the association of SES index with health behaviors (11) and undesirable health consequences, it is of prime importance to evaluate the effect of SES index on health-related behaviors.

In this study, the association between nutritional KAP with SES was assessed among the Iranians in urban and rural regions of 31 provinces of Iran.

Methods

The study population consisted of 14,136 Iranian households who lived in urban and rural regions of 31 provinces, selected by multi-stage cluster sampling. Non-Iranian households were not included in the survey, and the households who were absent for tree times at the time of the interview were also excluded. The method of study has been published in a previous survey (12).

Mothers or any over 15-year old member of the households, who were in charge of cooking for the entire family, were considered as statistical units of the study. A structured questionnaire and interview with a qualified person in families was used to collect data. The questionnaire included demographic, SES and nutritional KAP questions. Nutritional knowledge questions inquired about main food groups, causes of consuming food, role of main food groups, sources of protein intake, and role of dietary fiber as well as nutritional attitude toward health-related behaviors and food choices. To assess the practice of the households, the household members were asked about the frequencies of different consumed foods.

SES was defined as good, moderate and weak. SES was an index that included household assets (house ownership, number of rooms in the house, having such equipment as TV, cell phone, car, freezer, washing machine, dish washing machine, phone, microwave, access to internet), occupation and education level of the heads of the families and the respondents and number of family members.

Statistical Analysis

Data were analyzed using the STATA Version 11.0 (STATA Corp, College Station, Tex.) (Survey analysis). The Pearson's Chi-square test was used to analyze categorical variables. P-value less than 0.05 was considered as statistically significant.

Results

Table 1 demonstrates the nutritional knowledge of households based on SES. The percentage of nutritional knowledge was significantly higher in families with good SES and it linearly increased with family SES. Most people consumed food to prevent disease and be healthy (54.7%, 95% CI: 53.5, 56.0). More than half percent of households were aware of grain, meat and legumes, and dairy group (60.5%, 69.7%, and 52.5%, respectively). The percentage of knowledge about identification of fruit, vegetable and fat groups was less than half percent. About 73.1% of the households (95% CI: 71.9, 74.3) were familiar with the role of dairy group (growing

Table 1. Nutritional Knowledge of the Households according to Socioeconomic Status: The NUTRI-KAP Survey

Nutritional knowledge		SES			Total	p
		Good	Moderate	Weak		
Knowledge about the reason for eating food						
Growing up		29.4 (27.7,31.2)	22.7 (21.2,24.3)	20.1 (18.5,21.7)	24.1 (23,25.2)	<0.001
Acquiring energy		51.6 (49.6,53.6)	42.8 (40.9,44.6)	39.9 (37.9,41.9)	44.8 (43.4,46.1)	<0.001
Being healthy and preventing disease		60.2 (58.3,62.1)	56.3 (54.5,58.1)	47.6 (45.5,49.7)	54.7 (53.5,56)	<0.001
Knowledge about Identification of Food Group						
Grain, bread and pasta		69 (67.2,70.8)	58.8 (56.9,60.6)	53.7 (51.6,55.8)	60.5 (59.2,61.8)	<0.001
Meat, legumes and egg		80.7 (79.2,82.2)	70.7 (69,72.4)	57.6 (55.6,59.7)	69.7 (68.5,71)	<0.001
Dairy group		65.6 (63.7,67.4)	54.1 (52.29,55.99)	37.6 (35.8,39.5)	52.5 (51.2,53.7)	<0.001
Fruits		55.2 (53.2,57.1)	41.2 (39.4,43)	28.4 (26.7,30.2)	41.6 (40.3,42.9)	<0.001
Vegetables		62.7 (60.8,64.5)	49.9 (48,51.7)	35.4 (33.5,37.4)	49.4 (48,50.7)	<0.001
Butter and cream belong to fat group		36.3 (34.3,38.3)	26.5 (24.7,28.4)	25.7 (23.9,27.7)	29.5 (28.2,30.9)	<0.001
Knowledge about the Role of Main Food Group						
Acquiring energy from grain group		39.8 (37.9,41.7)	31.7 (30,33.5)	30.8 (29,32.7)	34.1 (32.9,35.4)	<0.001
Acquiring protein from meat, legumes and egg to grow		58.7 (56.8,60.5)	39.5 (37.7,41.3)	24.5 (22.9,26.3)	40.9 (39.6,42.2)	<0.001
Consuming dairy group to grow and strengthen teeth and bones		84.4 (82.9,85.8)	73.1 (71.5,74.7)	61.6 (59.6,63.6)	73.1 (71.9,74.3)	<0.001
Consuming Fruit Because of	Acquiring any kinds of vitamins	76.01 (74.3,77.7)	62.3 (60.5,64.1)	47.2 (45.1,49.8)	61.9 (60.5,63.2)	<0.001
	Acquiring minerals	22.2 (20.5,24)	13.5 (12.2,14.9)	7 (6.1,8)	14.2 (13.3,15.2)	<0.001
	Acquiring dietary fiber	15.7 (14.4,17)	6.2 (5.5,7)	3.9 (3.3,4.5)	8.6 (7.1,9.2)	<0.001
vegetables	Acquiring any kinds of vitamins	67.8 (66,69.6)	54.2 (52.3,56.1)	42.9 (40.9,44.9)	54.1 (53.6,56.3)	<0.001
	Acquiring minerals	30.3 (28.4,32.2)	22.4 (20.8,24.1)	11.1 (10.9,13.1)	21.6 (20.5,22.7)	<0.001
	Acquiring dietary fiber	24.8 (23.2,26.6)	13.8 (12.6,15)	7.6 (6.8,8.6)	15.4 (14.5,16.4)	<0.001
Knowledge about Other Sources of Protein Except Meat						
Soy		51.4 (49.4,53.4)	39.6 (37.8,41.5)	29.3 (27.4,31.3)	40.1 (38.8,41.5)	<0.001
Legumes		54.5 (52.6,56.4)	44.6 (42.8,46.5)	37.3 (35.3,39.22)	45.5 (44.2,46.8)	<0.001
Egg		35.8 (34,37.7)	29.9 (28.2,31.7)	22.6 (21,24.3)	29.5 (28.3,30.7)	<0.001
Dairy group		22.8 (21.8,24.5)	17.5 (16,19)	16.8 (15.4,18.3)	19.02 (18,20.1)	<0.001
Knowledge about Dietary Fiber						
Concept of fiber		20.7 (19.2,22.3)	6.8 (6.1,7.6)	2.8 (2.3,3.3)	10.1 (9.4,10.9)	<0.001
The role of fiber	Preventing cancer	29.8 (26.3,33.6)	26.1 (20.6,32.4)	12 (6.4,21.1)	27.6 (24.6,30.7)	<0.001
	Preventing disease	26.8 (23.2,30.6)	30.2 (24.5,36.7)	15.6 (9.6,24.4)	26.6 (23.6,29.8)	0.03
	Help with bowel movement	70.6 (67,74)	59.7 (53.3,65.8)	47.9 (38.2,57.8)	66.3 (63.2,69.3)	<0.001
	Preventing obesity and overweight	28.9 (25.5,32.6)	30.4 (24.6,36.9)	16.5 (10,25.9)	28.2 (25.3,31.2)	0.04

*(%(95% CI)), p<0.05, SES; Socioeconomic Status

and strengthen teeth and bones), although less than 10% of them were aware of the role of fruit groups in providing dietary fiber (8.6%, 95% CI: 7.1, 9.2). The percent of participants' knowledge about legumes and soy, another source of protein, was 45.5% (95% CI: 44.2, 46.8) and 40.1% (95% CI: 38.8, 41.5), respectively. Only 10.1% of the participants were familiar with the concept of dietary fiber; among

Table 2. Nutritional Attitude of the Households according to Socioeconomic Status SES: The NUTRIKAP Survey

Attitude		SES			Total	p
		Good	Moderate	Weak		
The importance of nutrition and diet in health	Agree	99.3 (98.8,99.5)*	98 (97.3,98.5)	95.1 (94,95.9)	97.4 (96.9,97.9)	<0.001
	No idea	0.4 (0.2,0.8)	0.5 (0.3,0.8)	2.6 (2.2,3.1)	1.2 (1,1.4)	
	Disagree	0.3 (0.2,0.6)	1.6 (1.1,2.2)	2.4 (1.7,3.3)	1.4 (1.1,1.9)	
Importance of nutritional requirements of children rather than adults	Agree	92.1 (91,93)	90.2 (89.1,91.2)	88.5 (87.2,89.8)	90.3 (89.5,91)	<0.001
	No idea	1.4 (1.1,1.9)	0.8 (0.6,1.1)	4.2 (3.4,5.1)	2.1 (1.8,2.5)	
	Disagree	6.5 (5.7,7.5)	9 (8.1,10.1)	7.3 (6.4,8.4)	7.6 (7,8.3)	
Necessity of equal food intake in both gender when there is few food	Agree	80.1 (78.5,81.6)	70.3 (68.6,72)	60.6 (58.6,62.5)	70.4 (69.2,71.5)	<0.001
	No idea	2.2 (1.8,2.7)	3.3 (2.7,4)	3 (2.5,3.6)	2.8 (2.5,3.2)	
	Disagree	17.7 (16.3,19.2)	26.4 (24.9,28)	36.4 (34.6,38.3)	26.8 (25.7,28)	
Preferring fruit consumption than bread at time of hunger	Agree	39.8 (38,41.6)	50.8 (48.9,52.7)	58.5 (56.6,60.4)	49.7 (48.4,51)	<0.001
	No idea	3.2 (2.5,4)	2.8 (2.2,3.5)	3.3 (2.7,4.1)	3.1 (2.7,3.6)	
	Disagree	57.1 (55.2,58.9)	46.4 (44.5,48.3)	38.2 (36.3,40.1)	47.2 (46,48.5)	
Preferring to consume steam cooked rice in cooked	Agree	68.2 (66.5,69.9)	64 (62.2,65.7)	63.2 (61.3,65.1)	65.1 (64,66.3)	<0.001
	No idea	2.5 (2,3)	3.2 (2.6,3.9)	3.8 (2.9,4.8)	3.1 (2.7,3.7)	
	Disagree	29.4 (27.7,31.1)	32.8 (31.2,34.5)	33 (31.3,34.8)	31.7 (30.6,32.9)	
Preferring consumption of fishes on tuna	Agree	86.3 (84.9,87.7)	82 (80.7,83.3)	73.1 (71.5,74.7)	80.5 (79.5,81.5)	<0.001
	No idea	1.6 (1.2,2.1)	2.1 (1.6,2.6)	2.9 (2.4,3.5)	2.2 (1.9,2.5)	
	Disagree	12.1 (10.8,13.4)	15.9 (14.6,17.2)	24 (22.5,25.6)	17.3 (16.4,18.3)	
Necessity of daily consumption of vegetables or salad	Agree	95.3 (94.5,95.9)	92.9 (91.9,93.8)	87.8 (86.3,89.1)	92 (91.2,92.7)	<0.001
	No idea	0.9 (0.7,1.2)	1 (0.7,1.3)	3.2 (2.5,4.1)	1.7 (1.4,2.1)	
	Disagree	3.8 (3.2,4.5)	6.2 (5.3,7.1)	9 (8,10.2)	6.3 (5.8,7)	
Need for milk consumption in any age besides children	Agree	93.1 (92,94.1)	87.8 (86.5,89)	83.3 (81.8,84.8)	88.1 (87.2,89)	<0.001
	No idea	0.4 (0.2,.6)	0.6 (0.4,0.9)	1.4 (1,1.8)	0.8 (0.6,1)	
	Disagree	6.5 (5.5,7.6)	11.6 (10.5,12.9)	15.3 (13.9,16.8)	11.1 (10.3,12)	
Preferring whole meal bread on other kinds of breads	Agree	22.6 (21,24.2)	31.1 (29.3,33)	44.2 (42,46.3)	32.6 (31.3,34)	<0.001
	No idea	3 (2.4,3.7)	2.6 (2.1,3.3)	6.1 (5.1,7.1)	3.9 (3.4,4.4)	
	Disagree	74.5 (72.8,76.1)	66.3 (64.4,68.2)	49.8 (47.7,51.9)	63.5 (62.1,64.9)	
Drinking water in middle of eating food is undesirable because of lowering Performance of digestive system	Agree	73.5 (71.7,75.2)	68.5 (66.8,70.2)	57.6 (55.8,59.4)	66.5 (65.3,67.8)	<0.001
	No idea	7.6 (6.6,8.7)	9.6 (8.5,10.8)	13 (11.6,14.5)	10.1 (9.2,10.9)	
	Disagree	19 (17.5,20.5)	21.9 (20.5,23.3)	29.4 (27.8,31.1)	23.4 (22.4,24.4)	

them, the most percentage of knowledge belonged to bowel movement.

The percentage of attitude is shown in Table 2. More than 97% of the participants had a favorable attitude towards the importance of nutrition and diet in health. Respectively, 90.3%, and 70.4% of the participants had a favorable attitude toward importance of nutritional requirements of children rather than adults and the necessity of equal food intake in both genders when there is few food. The percentage of a

Table 2. Cntd

Necessity of keeping body fitness in girls in puberty age	Agree	69.1 (67.4,70.7)	52.9 (51,54.7)	46.1 (44.3,47.9)	56.1 (54.8,57.3)	<0.001
	No idea	5 (4.3,5.9)	9.9 (8.8,11.1)	16.4 (15,17.9)	10.4 (9.6,11.3)	
	Disagree	25.9 (24.3,27.5)	37.3 (35.5,39.1)	37.5 (35.7,39.4)	33.5 (32.4,34.7)	
The nutrition fact of mushrooms and meat is different	Agree	22.6 (21,24.3)	24.2 (22.6,25.7)	29.5 (27.7,31.4)	25.4 (24.3,26.5)	<0.001
	No idea	7.8 (6.9,8.8)	10.2 (9.2,11.2)	14.8 (13.4,16.3)	10.9 (10.2,11.7)	
	Disagree	69.6 (67.8,71.3)	65.7 (63.9,67.4)	55.7 (53.6,57.8)	63.7 (62.4,64.9)	

*(%(95% CI)), p <0.05, SES; Socioeconomic Status

favorable attitude of the family with good, moderate and weak SES about preferring fruit consumption than bread at time of hunger was 39.8%, 50.8% and 58.5%, respectively. The percentage of participants who disagreed with consuming steam cooked rice was significantly higher in families with weak SES. About 80.5% of the participants had a favorable attitude toward preferring consumption of tuna fish and the lowest percentage was related to weak SES families. Households with good SES had a more favorable attitude about the necessity of daily consumption of vegetables or salad and the need for milk consumption in any age besides childhood period (95.3%, and 93.1%, respectively). The families with weak SES had the highest favorable attitude about preferring whole meal bread on other kinds of breads. The percentage of favorable attitude toward drinking water in the middle of eating food and the necessity of keeping body fitness in girls at puberty was 66.5% and 56.1%, respectively. When the participants were asked about the difference between nutrition fact of meat and mushrooms, only 25.4% agreed.

Table 3 demonstrates the practice of households based on SES. Most households consumed fruit, vegetable, milk, yoghurt, cheese and sugar daily. Consumption of

Table 3. Nutritional Practice of the Households according to Socioeconomic Status: The NUTRI-KAP Survey

Frequency of food consumption		SES			Total	p
		Good	Moderate	Weak		
Rice	Daily	55.9 (53.7,58)*	47.9 (45.9,49.9)	39.4 (37.2,41.6)	47.7 (46.2,49.2)	<0.001
	weekly	42.4 (40.2,44.5)	51.3 (49.2,53.3)	58.6 (56.4,60.8)	50.7 (49.2,52.2)	
	Rarely /Never	1.8 (1.2, 2.6)	0.9 (0.6, 1.2)	2 (1.6,2.5)	1.6 (1.3,1.9)	
Red meat	Daily	14.1 (12.7,15.6)	10.1 (9.1,11.3)	5.9 (5.2,6.8)	10.1 (9.3,10.9)	<0.001
	weekly	76.7 (75,78.3)	73 (71.4,74.6)	63.4 (61.6,65.2)	71.1 (69.9,72.2)	
	Rarely /Never	9.2 (8.2,10.3)	16.9 (15.5,18.3)	30.7 (28.8,32.6)	18.9 (17.9,2)	
Viscera	Daily	1.4 (1,2.1)	0.5 (0.31,0.8)	0.4 (0.2,0.6)	0.8 (0.6,1)	<0.001
	weekly	16 (14,17.5)	19.9 (18.4, 21.5)	18.6 (17.1, 20.2)	18.2 (17.2, 19.2)	
	Rarely /Never	82.5 (81,84)	79.6 (78,81.1)	81.1 (79.5,82.6)	81.1 (80,82.1)	
Chicken and poultry	Daily	11.2 (10,12.5)	14.5 (13.1,16.1)	10.7 (9.5,11.97)	12.1 (11.2,13.1)	<0.001
	weekly	82.5 (80.9,83.9)	75.5 (73.8,77.1)	77.3 (75.6,78.9)	78.4 (77.3,79.5)	
	Rarely /Never	6.3 (5.6,7.2)	10 (9,11)	12.1 (10.9,13.4)	9.5 (8.8,10.2)	
Fish	Daily	1.6 (1.3,2.1)	2.5 (1.9,3.14)	1.4 (1,2.1)	1.8 (1.5,2.3)	<0.001
	weekly	48.1 (46.2,50.1)	41.7 (39.8,43.6)	31 (28.9,33.2)	40.3 (38.9,41.6)	
	Rarely /Never	50.3 (48.3,52.2)	55.8 (53.9,57.7)	67.6 (65.3,69.8)	57.9 (56.5,59.3)	

Table 3. Cntd

Tuna	Daily	1.3 (0.8,1.9)	1.3 (0.9,1.8)	1.3 (0.9,1.8)	1.3 (1,1.6)	<0.001
	weekly	17.3 (16,18.5)	21.9 (20.4,23.4)	23.8 (22.3,25.4)	21 (20,22)	
	Rarely /Never	81.5 (80.1,82.8)	76.8 (75.3,78.3)	74.9 (73.3,76.4)	77.8 (76.7,78.7)	
Egg	Daily	27.7 (25.9,29.5)	24.1 (22.5,25.8)	22.1 (20.5,23.9)	24.7 (23.5,25.8)	<0.001
	weekly	63.9 (61.9,65.9)	67 (65.2,68.7)	65.8 (63.9,67.6)	65.6 (64.3,66.8)	
	Rarely /Never	8.4 (7.3,9.6)	8.9 (7.9,10)	12.1 (11,13.3)	9.8 (9.1,10.5)	
Legumes	Daily	21.6 (20,23.3)	20 (18.5,21.6)	17.7 (16.2,19.4)	19.8 (18.7,20.9)	0.0017
	weekly	71.27 (69.35,73.13)	71.52 (69.79,73.18)	74.38 (72.57,76.12)	72.39 (71.17,73.57)	
	Rarely /Never	7.1 (6.2,8.2)	8.5 (7.5,9.6)	7.9 (7,8.9)	7.8 (7.2,8.5)	
Fruit	Daily	86.7 (85.2,88)	72.2 (70.4,74)	52 (49.8,54.1)	70.3 (68.9,71.7)	<0.001
	weekly	11.4 (10.2,12.7)	24.2 (22.5,26)	39.1 (37.1,41)	24.9 (23.6,26.1)	
	Rarely /Never	2 (1.5,2.6)	3.6 (3,4.4)	9 (8,10.1)	4.8 (4.4,5.4)	
Vegetable and salad	Daily	67 (65.1,68.9)	56.2 (54.3,58.1)	37.9 (35.8,40.1)	53.7 (52.3,55.2)	<0.001
	weekly	30 (28.2,31.9)	36.5 (34.7,38.4)	48.8 (46.7,50.8)	38.4 (37.1,39.7)	
	Rarely /Never	3 (2.4,3.7)	7.3 (6.4,8.3)	13.4 (12.1,14.7)	7.9 (7.2,8.6)	
Milk, yoghurt and cheese	Daily	90.8 (89.6,91.8)	84.3 (82.8,85.7)	72.5 (70.4,74.5)	82.5 (81.4,83.6)	<0.001
	weekly	7.4 (6.5,8.5)	13.3 (12.1,14.6)	23.2 (21.3,25.2)	14.6 (13.6,15.7)	
	Rarely /Never	1.8 (1.4,2.4)	2.4 (1.8,3.2)	4.3 (3.7,5.1)	2.9 (2.5,3.3)	
Butter and cream	Daily	31.6 (29.9,33.5)	31.9 (30.2,33.6)	23.4 (21.8,25)	29 (27.9,30.1)	<0.001
	weekly	39.9 (38.1,41.8)	36.2 (34.5,37.9)	37.8 (36,39.6)	38 (36.8,39.1)	
	Rarely /Never	28.4 (26.7,30.3)	31.9 (30.2,33.7)	38.9 (37,40.8)	33.1 (31.9,34.3)	
Sugar	Daily	80.7 (79.1,82.3)	82.3 (80.7,83.8)	88.24 (87,89.4)	83.8 (82.8,84.7)	<0.001
	weekly	7.6 (6.7,8.6)	7.8 (6.8,8.9)	5 (4.3,5.8)	6.8 (6.2,7.4)	
	Rarely /Never	6.8 (5.9,7.9)	10 (8.8,11.2)	11.7 (10.5,13)	9.5 (8.8,10.3)	
Nuts	Daily	18.3 (16.9,19.8)	17.3 (15.8,18.8)	13.9 (12.6,15.3)	16.5 (15.6,17.5)	<0.001
	weekly	40.1 (38.3,42)	31.3 (29.7,33)	27.2 (25.5,28.9)	32.9 (31.8,34.1)	
	Rarely /Never	41.6 (39.7,43.5)	51.4 (49.5,53.3)	58.9 (57,60.8)	50.6 (49.3,52)	
Synthetic juice	Daily	8.1 (7.1,9.2)	9.7 (8.7,10.9)	6.1 (5.3,7.1)	8 (7.3,8.6)	<0.001
	weekly	21.9 (20.5,23.4)	24.6 (23.2,26.1)	32.6 (30.9,34.4)	26.4 (25.3,27.4)	
	Rarely /Never	70.1 (68.3,71.8)	65.7 (64,67.3)	61.3 (59.4,3.2)	65.7 (64.5,66.8)	
Dough	Daily	39.9 (37.8,42)	43.5 (41.6,45.3)	41.5 (39.5,43.6)	41.6 (40.2,43)	<0.001
	weekly	48.5 (46.5,50.5)	46.1 (44.3,47.9)	43.7 (41.8,45.7)	46.1 (44.8,47.4)	
	Rarely /Never	11.6 (10.5,12.9)	10.4 (9.4,11.6)	14.8 (13.4,16.2)	12.3 (11.5,13.1)	

*(%(95% CI)), p<0.05, SES; Socioeconomic Status

foods such as rice, red meat, butter, cream, egg, legumes, dough, chicken and poultry was weekly in most participants. The other items such as viscera, tuna, nuts and synthetic juice were rarely or never consumed. Families with good SES significantly con-

sumed more fruit, vegetable, dairy group, red meat, chicken and poultry, fish and egg, while sugar consumption was significantly higher in families with weak SES.

Discussion

The aim of this study was to assess the association between nutritional KAP with SES among Iranian households. Our results revealed that SES could impress nutritional KAP. The best knowledge in all items was seen in families with good SES index and it linearly increased with family SES.

Households with weak SES had the best favorable attitude toward the difference between mushroom and meat nutrition fact, preferring whole meal bread on other kinds of breads and preferring fruit consumption than bread at time of hunger. The consumption of food items such as red meat, chicken and poultry, fish, egg, dairy group, fruit, vegetable and nuts was significantly higher in households with good SES index while the other items including rice, tuna, legumes and sugar were consumed the most in weak families.

These findings are supported by other surveys that have shown that more intake of fruit and vegetable are related to more diet costs, and diet rich in fat and sugar is contributed to lower costs (13,14). Findings from a survey on 4,356 US adults suggested that better SES index independently promotes the possibility of adequate fruits and vegetables intake and overall diet quality. They also reported that nutritional knowledge and belief can affect the positive association between SES and diet quality indicators(4). As it is confirmed in other studies, the socio-demographic variation in intake can be associated with nutritional knowledge as a partial mediator in improving diet. The result of this study also revealed that healthy eating was significantly associated with knowledge and possibility of meeting current recommendations for fruit, vegetable and fat intake (15). The association of SES and dietary knowledge or income and diet is supported by other studies (16-19). Another way that SES can influence diet is related to food purchasing differences. A study on Australians in 2000 showed that food purchasing differences due to household income is related to diet via food-cost concern (20). Food purchase decisions due to a person's attitude toward food price can influence diet quality. Based on this survey, people who care about food price were more likely to live in low-income, food-insecure households, they had low education, were tenants and did not own homes, and were service workers. They were more susceptible to diseases such as overweight, high blood pressure, heart disease and diabetes than the others (21).

Our results showed higher consumption of food items such as sugar, tuna and lower consumption of nuts and protein sources such as meat, fish, egg and dairy product in families with weak SES, which can be associated with an increased rate of some diseases. Thus, implementing measures to guide people in the line of healthier nutrition is necessary and it can help decrease the rate of diet-related diseases, especially in low SES households.

Conclusion

With respect to the increasing nutritional disease and the important role of dietary behaviors, increasing nutritional KAP may be a way to change life style and health related behaviors, but it is not enough. Therefore, targeted policies should be coupled with efforts to promote diet and nutritional KAP for those people with unfavorable socio-economic status. Some cost-effective strategies should be presented for the low-income groups in the society to neutralize the negative effect of income on food purchasing patterns and health related life style.

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Conflict of interests

There was no conflict of interest in this survey.

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