

Comparison of fat intake between patients with stroke and normal population

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Background: Stroke happens when blood flow to parts of brain stops. Stroke is sometimes called “brain attack.” Risk factor is something that increases the chance of getting a disease. Some risk factors for stroke cannot be changed, but some can be altered. The chance of stroke is higher in people who live an unhealthy lifestyle by: Being overweight as a result of over-eating, eating too much fat, smoking, etc., Therefore, we compared the fat intake between patients with stroke and normal population. **Materials and Methods:** Sixty nine patients with stroke (46 men and 23 women) as cases and 60 subjects (30 men and 30 women) as controls during April 2009 and May 2010 from Alzzahra hospital, Isfahan, Iran were evaluated. Dietary intakes were collected using a food frequency questionnaire (FFQ) through their close relatives such as spouse, daughter or mother. Also, anthropometry measurements such as weight, height and waist extracted from their medical files, however, body mass index (BMI) and waist to hip ratio (WHR) were calculated. **Result:** The intake of saturated fatty acids (SFA) and monounsaturated fatty acids (MUFA) both in men and women with stroke were significantly higher than controls ($P = 0.04$ and $P = 0.03$ for men and $P = 0.05$ and $P = 0.02$ for women, respectively). Also, the mean intake of hydrogenated fats, butter, cream, mayonnaise sauce and nuts were higher in men with stroke with respect in control group; while, women with stroke consumed more hydrogenated fats, vegetable oils, cream and mayonnaise sauce than controls. **Conclusion:** Increased fat intake was observed in patients with stroke compared with normal population.

Key words: Butter, cream, fat, polyunsaturated fatty acids, stroke, saturated fatty acids, monounsaturated fatty acids

INTRODUCTION

Stroke is the rapid loss of brain functions due to difficulty in the blood flow to the brain. This can be result from an ischemia caused by blockage, or a hemorrhage. A stroke is a medical emergency and can cause permanent neurological harm, involvements, and death.^[1] Stroke was the second most common cause of death worldwide in 2004, resulting in 5.7 million deaths. About nine million people had a stroke in 2008 and 30 million people have previously had a stroke. It is ranked after heart disease and before cancer. Geographic dispersion in stroke incidence have been observed, but causes of these disparities have not been explained.^[1,2]

Some of modifiable risk factors for stroke include intake of high fat diets, especially saturated fats such as butter, cream, mayonnaise, high salt diets, lack of physical activity and obesity. International dietary guidelines recommend decrease of saturated fats and cholesterol intake for vascular disorders risk reduction such as cardiovascular diseases and stroke.^[3,4] Some of studies have found conflicting association between intake of specific types of fat (saturated, monounsaturated, and polyunsaturated fat) and stroke incidence or mortality.^[5-12] However, some studies only assessed cerebral infarction^[6,11] or hemorrhagic stroke.^[9]

In the present study, we compared the intake of total fats, SFA, MUFA, PUFA and hydrogenated fats, oils, butter, cream, mayonnaise sauce and nuts consumption in patients with stroke and healthy controls in previous year before stroke.

MATERIALS AND METHODS

In this hospital-based case-control study, 69 stroke patients (46 male, age = 56 ± 18 and 23 female, age = 52 ± 7) that admitted to Alzzahra hospital during April 2009 and May 2010 were evaluated. The cases were matched for age and sex with 60 controls (30 male and 30 female) from the normal population without any history of cerebrovascular diseases. Informed consent was obtained from all stroke patients or their families and all controls.

Dietary intake was assessed with a validated self-administered semi-quantitative food frequency questionnaire that included 168 food items. FFQ was collected by face-to-face interview with one of their close relatives.^[13] Participants were asked to report their average consumption and portion size for each food/dish as a regular diet. Frequencies were reported as the number of times per month, week, or day. The daily intakes for food items were converted to grams by implying the common measures of portion sizes. Sum

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up the all food consumptions were calculated as the total daily intake. The large imbalance of the food items and the number of participants caused that we defined various food groups based on the nutrients similarity of food items and food pyramid. Intake of nutrients was calculated by use of Nutritionist IV software. Food frequency questionnaire categorized the food items into six food groups: 1 - Breads and grains 2 - meat and protein (meat, fish, turkey, legumes and eggs); 3 - dairy products (milk, yogurt, cheese, kashk); 4 - fruits and vegetable (fresh, boiled, juices, dried); 5 - fats and oils (hydrogenated fats, oils, butter, cream, mayonnaise sauce and nuts) 6 - miscellaneous food items and beverages (including sweets, desserts and beverages). We excluded the participants who reported an energy intake outside of 800-3500 kcal and those who had left more than 70 items black on their food frequency questionnaire (FFQ). Also, anthropometry measurements such as weight, height and waist extracted from their medical files, however, BMI and WHR were calculated (BMI was calculated as dividing weight (in kg) by height (in square of height)).

The statistics in this study were done by SPSS (version 16.0) software. Result are expressed as mean \pm SD. Student *t*-tests were performed to compare the means of two groups. Statistical significance was defined as $P < .05$.

RESULT

Males

Mean age of participants with stroke were 52 ± 7 years old. The anthropometric characteristics of subjects were 25.5 ± 3.5 kg/m², 92 ± 8 cm and $0/9 \pm 0/1$ cm/cm for BMI, WC, WHR, respectively. Daily intake of total fat, SFA, MUFA and PUFA in patients with stroke were 99 ± 34 g, 51 ± 21 g, 15 ± 11 g and 24 ± 14 , respectively [Table 1], whereas in controls were 86 ± 23 g, 41 ± 15 g, 22 ± 14 g and 22 ± 11 g, respectively. The intake of SFA and MUFA in men with stroke were significantly higher than controls ($P = 0.04$ and $P = 0.03$, respectively). On the other hand, the mean daily intake of hydrogenated fats, vegetable oils, olive oil, butter, cream, mayonnaise sauce and nuts in patients with stroke were 22 g, 5.5 g, 2.5 g, 11.5 g, 8.5 g, 15 g and 8.5 g, respectively [Table 2], while controls consumed these items as 10.5 g, 8.5 g, 3 g, 3.2 g, 5.2 g, 6.5 g and 6 g, respectively.

Females

Consumption of total fat, SFA, MUFA and PUFA in stroke patients were as 72 ± 16 g, 38 ± 19 g, 13 ± 9 g and 17 ± 12 , respectively [Table 2], but the controls consumed 66 ± 18 g, 33 ± 12 g, 21 ± 12 g and 14 ± 10 g, respectively. The intake of SFA and MUFA in women with stroke were significantly higher than controls ($P = 0.05$ and $P = 0.02$, respectively). However, the mean daily intake of hydrogenated fats, vegetable oils, olive oil, butter, cream, mayonnaise sauce and nuts in patients with

stroke were 6 g, 7.5 g, 3 g, 2 g, 4 g, 4.3 g and 12 g, respectively, whereas these food items were consumed as 10.5 g, 8.5 g, 3 g, 3.2 g, 5.2 g, 6.5 g and 6 g by controls, respectively.

DISCUSSION

The present study revealed that intake of SFA and MUFA both in men and women with stroke were significantly higher than controls. In addition, the findings of this study showed that the mean intake of hydrogenated fats, butter, cream, mayonnaise sauce and nuts were higher in men with stroke; whereas women with stroke consumed more hydrogenated fats, vegetable oils, cream and mayonnaise sauce than controls.

Our result on the associations between intakes of total, saturated, monounsaturated, and polyunsaturated fat and stroke risk are consistent with some previous studies and are inconsistent with some others. In contrast to our findings,

Table 1: Daily intake of energy and fats in subjects

Gender	Energy (Kcal)	Total fat (Gram)	SFA (Gram)	MUFA (Gram)	PUFA (Gram)
Men with stroke	2845 \pm 920	99 \pm 34	51 \pm 21	15 \pm 11	24 \pm 14
Controls	2360 \pm 465	86 \pm 23	41 \pm 15	22 \pm 14	22 \pm 11
<i>P</i> value	0.04	0.07	0.04	0.03	0.19
Women with stroke	2235 \pm 440	72 \pm 16	38 \pm 19	13 \pm 9	17 \pm 12
Controls	2185 \pm 525	66 \pm 18	33 \pm 12	21 \pm 12	14 \pm 10
<i>P</i> value	0.23	0.06	0.05	0.02	0.11

Means \pm SD; SFA=Saturated fatty acids; MUFA=Monounsaturated fatty acids; PUFA=Polyunsaturated fatty acids; WHR

Table 2: Different sources of fat consumption across all population

Food items	Female with stroke	Female with stroke	Control males	Control male
Fats and oils				
Hydrogenated fat (gram)	22 \pm 12	134 \pm 22	10.5 \pm 2	65 \pm 13
Vegetable oils (gram)	5.5 \pm 1.2	48 \pm 13	8.5 \pm 1.4	75 \pm 12
Olive oil (gram)	2.5 \pm 0.9	23 \pm 11	3 \pm 1.3	26 \pm 14
Butter (gram)	11.5 \pm 3	83 \pm 14	3.2 \pm 1.4	23 \pm 13
Cream (gram)	8.5 \pm 2.1	29 \pm 13	5.2 \pm 1.1	18 \pm 10
Mayonnaise sauce (gram)	15 \pm 7	34 \pm 13	6.5 \pm 0.8	15 \pm 13
Nuts (gram)	8.5 \pm 0.9	14 \pm 3	6 \pm 0.7	10 \pm 1.3
	Male with stroke	Male with stroke	Control males	Control male
Fats and oils				
Hydrogenated fat (gram)	6 \pm 3	37 \pm 13	4.2 \pm 1.2	26 \pm 9
Vegetable oils (gram)	7.5 \pm 2.1	65 \pm 14	6.2 \pm 2	55 \pm 16
Olive oil (gram)	3 \pm 1.01	26 \pm 13	4 \pm 1.05	35 \pm 13
Butter (gram)	2 \pm 0.7	13 \pm 0.6	10 \pm 1.3	7 \pm 1.2
Cream (gram)	4 \pm 1.3	13 \pm 11	2.5 \pm 0.9	9 \pm 1.4
Mayonnaise sauce (gram)	4.3 \pm 1.1	10 \pm 3	2 \pm 0.4	5 \pm 0.8
Nuts (gram)	12 \pm 1.3	20 \pm 11	15.5 \pm 10.1	26 \pm 13

one meta-analysis of eight prospective studies assessing the association between saturated fat intake and risk of stroke found no association.^[13] On the other hand; similar to our study, monounsaturated fat intake was inversely associated with risk of stroke in the Framingham Heart Study.^[6] Other studies have not showed any significant association between intake of monounsaturated fat or total polyunsaturated fat and stroke risk.^[7-12] Also, some studies have assessed the association between alpha linolenic acid and linoleic acid with the risk of stroke.^[5,8,14,15] On the other hand, two nested case-control studies found inverse associations between serum linoleic acid^[8] or serum α -linolenic acid^[5] and risk of stroke. Similar to our study that showed high intake of saturated fats from foods such as butter and cream by patients in the previous year, a case-control study in Australasia found that frequent intake of fat from meat was associated with a significant increased risk of subarachnoid hemorrhage.^[16-17]

It should be mentioned that the role of various fatty acids source is affected by nutrient replacements. The effects of SFA vary depends on the kinds of fat or macronutrients that substitute in daily energy intake in both study groups.

Strengths of this study include the hospital-based case-control design and accurate filling of the questionnaires by trained dietitians. Moreover, this study included both genders and last for about one year. A limitation of this study is that food items intake calculations were based on the mean and not mean \pm SD, due to lack of proper software for this purpose. Although, the classification of food groups may be according to taste.

CONCLUSION

In summary, increased fat intake was observed in patients with stroke compared with normal population. Prospective studies are needed to confirm these findings in Iranian population.

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