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RELATIONSHIP BETWEEN FOOD INTAKE AND CARDIOVASCULAR DISEASE IN SOME PATIENTS IN ZAGAZIG, SHARKIA GOVERNORATE

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ABSTRACT: This study was carried out during 2010 -2014 years on 20 cardiac patient subjects. They were random selected from Zagazig University Hospitals in Sharkia Governorate. The patients agreed to participate in the controlled diet study. They were already hospitalized and offered the experimental diet and were followed up completely in the hospital. The experiment was planned in such a way that the daily food taken by patients would confirm to certain specifications. Thus the caloric content of the diet and total fat intake where reduced in addition to a considerable cut down of saturated fat, also the cholesterol content were reduced in the diet. The experimental period lasted 6 months with no dropouts. All patients were advised to avoid certain foods, and not allowed to consume any additional foods. Information on the dietary intake of all individuals collected every day. A follow up of the dietary of all individuals were undertaken for the period of the study in order to study the differences in attitude cards of food before and after the start of the study. The results show that reduce the amount of calories from 262.8 grams/day before the start of feeding to 225.4 grams/day after 6 months of feeding and reduce the amount of intake of animal fat and carbohydrates from 52.2 g/day to 38.6 g / day and 422.6 to 354.8 g/day, respectively, to reduce blood content of triglycerides , cholesterol , LDL and HDL from 240.20, 296.40, 128.30 and 114.20 mg/100 g, respectively, before the start of feeding to 158, 90, 239.25, 86.40 and 112.80 mg / 100 g, respectively. From the results conclude that heart disease linked to nutrition, where the increase in the amount of calories, animal fats saturated and sugar has a significant impact on increasing the concentration of lipids in the blood, and moderate food in the amount of calories and low intake in animal and content of fat on the appropriate amount of unsaturated oils have content a beneficial effect in reducing the proportion of fat in the blood. Saturated fats and oils are considered a serious contributing factor to heart disease.

Key words: Patients, cholesterol, heart disease, triglycerides, calories.

INTRODUCTION

Egypt is the largest Arab country by populations of passives and the second largest economy in the Arab world. The annual average population growth rate was 1.6% for the 2010-2014 period. The last three decades showed slow paced urbanization in comparison to the expected last pace for the following three decades. Thus dietary energy supplies will have to increase in the following years, as reported by United Nations Populations Statistical Division (UNPSD, 2014). The share of energy supply of both carbohydrates and proteins increased during the last two decades in comparison to the contribution of fats, which decreased gradually. The quail ability of major food groups has increased, while the past from supplies of vegetable oils and animal fats decreased gradually. Different surveys in Egypt concluded that primary nutritional problem for many Egyptian adults are a tendency towards obesity. The prevalence of overweight and obesity were 20% and 10.7% in Egypt, respectively (Talat and El-Shahat, 2016).

Cardiovascular risk is reduced simply because traditional high carbohydrate diets are low in fat, especially saturated fat, or because

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they promote satiety and thus protect against overweight and obesity. Indeed, it is conceivable that high carbohydrate diets simply act as a marker for some other protective factor (Mann *et al.*, 2007).

Dietary cholesterol recommendations were first promulgated, a large number of longitudinal observational studies and intervention trials have been published on the relation between cholesterol intake and cardiovascular outcomes. Some studies have reported dietary cholesterol increased cardiovascular diseases (CVD) risk (Keys and Parlin, 1998 ; Houston *et al.*, 2011), whereas others reported a decreased risk or no change with higher cholesterol intake (Iso *et al.*, 2001; Harman *et al.*, 2008).

The aim of the present study was planned to determine the potential effect of dietary cholesterol, carbohydrate and fat on incident CVD and on serum concentrations of total cholesterol, Low Density Lipoprotein (LDL) cholesterol, High Density Lipoprotein (HDL) cholesterol, and triglycerides in adults.

MATERIALS AND METHODS

Subjects

This study was carried out during 2010 -2014 years on 20 cardiac patient subjects aged from 45 to 60 years (Table 1). They were selected from Zagazig University Hospitals in Sharkia Governorate.

Dietary Study

Food consumption on pattern and dietary habits were studied as follows:

Food habits

Dietary history including the food habits was taken during an interview. Special confirm put the dietary habits before and after the diagnosis of the disease.

Daily Diet Intake

A seven day dietary intake using the recall method. Analysis of daily dietary intake: the average daily consumption was calculated. Nutritive value was determined by using Food Composition Tables of the Nutrient Institute (1996) .The diet was evaluated especially for

nutrients that could affect the health of patients. This included the caloric content, amount and type of fat, carbohydrate and protein (Table 2). The cholesterol content of the diet was also calculated .Since some of the cases were already admitted to the hospital, therefor; the prescribed diet was analyzed for its nutrient content.

Controlled Diet Study

The study sample comprised 10 males and 10 female aged 45 to 60 years old. The patients agreed to participate in the controlled diet study who were already hospitalized were offered the experimental diet and were followed up completely in the hospital .The experiment was planned in such a way that the daily food taken by patients would confirm to certain specifications. Thus the caloric content of the diet and the total fat intake were reduced in addition to a considerable cut down of saturated fatty acids. Thus the cholesterol content was also reduced in the diet .The hospital diet was modified in order to meet the above mentioned specifications. Showed the regular hospital diet and the modified diet used during the experiment, the experimental period lasted 6 months with no dropouts. The method of regular cooking for hospital patients was changed to baking. The type of cooking fat was changed from hydrogenated oil to corn oil. All patients were advised to avoid certain foods. The patient subjects were not allowed to consume additional foods. Information on the dietary intake of all individuals collected every day. A follow up of the dietary of all individuals was undertaken for the period of the study in order to see the differences in attitude card foods before and after the start of the study (Table 3).

Laboratory Investigations

Blood samples were collected from the subjects who agreed to participate in the controlled diet study. Two fasting blood samples were collected from each patients, one before starting the study and the second at the end of the study period. Serum was immediately separated after centrifugation and kept frozen until analyzed for total lipids, cholesterol, HDL, LDL, Sugar (glucose) and triglycerides. Total cholesterol was determined according to the method

Table 1. Description of patient samples

No.	Male	Female	Age	Marital status	Number of children	Occupation	Body weight (kg)	Tall (cm)
1	+		48	Married	3	Employee	87	179
2	+		60	Married	4	Free business	84	180
3	+		55	-	2	Employee	87	180
4	+		58	-	5	Farmer	72	175
5	+		54	Widower	3	Employee	87	174
6	+		47	Married	2	Free business	112	173
7	+		59	Divorcee	5	Farmer	104	176
8	+		55	Married	4	Employee	116	188
9	+		45	Widower	2	Free business	82	176
10	+		54	Married	3	-	84	171
11		+	54	Divorcee	5	Housewife	112	172
12		+	57	Widower	4	-	84	168
13		+	49	Married	4	-	84	167
14		+	57	Widower	5	-	95	164
15		+	58	Married	5	-	94	172
16		+	54	Divorcee	5	-	74	162
17		+	58	Widower	5	-	94	157
18		+	42	Married	2	Employee	74	168
19		+	45	-	3	-	84	172
20		+	51	-	3	-	93	162

Table 2. Change in dietary carbohydrate, animal fat and calories for patients before and after modification during study (intake g/day)

No.	Carbohydrate		Total fat intake		Animal fat		Total calories	
	Before	After	Before	After	Before	After	Before	After
1	348.0	325.0	84.6	74.5	44.0	38.2	2342	2265
2	362.0	312.2	86.4	61.2	60.0	27.4	2491	2026
2	518.2	462.4	56.5	40.1	33.2	26.8	2693	2454
4	492.4	344.3	96.8	67.4	78.4	42.2	3195	2275
5	432.2	321.5	74.6	82.2	28.0	34..6	2528	2456
6	362.5	312.2	72.2	65.6	51.6	35.2	2444	2118
7	438.2	456.4	98.2	52.8	78.2	35.0	2992	2426
8	292.6	272.5	65.4	56.6	42.6	30.2	1884	2074
9	424.8	322.4	98.4	82.4	56.8	28.6	2345	2198
10	452.3	326.3	62.8	80.6	44.2	56.8	2667	2752
11	498.2	337.6	60.6	75.2	46.4	37.4	2714	2294
12	382.4	348.2	80.2	58.3	38.6	32.6	2462	2174
13	373.1	356.4	88.4	86.5	52.8	58.4	2568	2568
14	426.4	407.6	82.2	60.2	64.7	28.2	2564	2464
15	428.5	322.4	78.6	82.4	38.2	58.6	2682	2782
16	422.6	343.4	82.2	66.2	62.8	32.4	2628	2262
17	395.2	320.2	78.4	62.4	52.2	34.5	2702	2538
18	442.7	454.6	82.0	74.6	35.4	42.6	2746	2476
19	418.6	312.5	94.2	78.2.	74.2	36.4	3042	2548
20	414.2	410.6	68.4	62.4	48.2	28.6	2578	2596
Mean	422.6	354.8	80.7	70.2	52.2	38.6	262.8	225.4

Table 3. Average daily food intake of patients (g/day)

Group	Bread	Rice and macaroni	Tubers	Sugars	Jam and Honey and molasses	Halva	Legumes	Vegetables		Fruits	Meat group	Egg	Milk and exchange	Fat	
								Fresh	Cooked					Animal	Vegetable
Male patients															
Before	612.4	54.0	44.8	70.6	15.6	20.4	52.0	85.4	176.5	58.2	52.6	24.8	43.2	12.0	24.0
After	482.0	72.0	62.6	78.3	3.2	9.8	40.2	74.6	122.3	72.4	88.4	12.4	52.6	18.0	13.0
Female patients															
Before	594.6	50.0	41.2	85.4	18.5	24.5	44.6	71.8	160.4	66.7	46.2	28.2	48.8	10.4	26.0
After	428.0	63.4	22.2	112.3	6.6	32.8	28.2	45.6	145.3	108.6	74.6	24.6	82.0	6.8	30.0

of Enzymatic Colorimeter, Young and Friedman (2001). HDL, LDL, VLDL were determined according to Young (2000). Total lipids and triglycerides were determined according to the method of Devi and Sharma, (2004). Blood glucose level was determined according to the method of Clinical Methods (Trinder, 1969).

Statistical Analyses

Data were analyzed by statistical analyses with procedures described by Steel and Torries (1980).

RESULTS AND DISCUSSION

Dietary Study

Table 4 shows the distribution of calories per day (%) among different nutrients of patient subjects.

Controlled Diet Study

Table 5 reveals the serum lipids pattern before and after the modified diet in patients with heart disease. It can be seen that the average values of cholesterol and triglycerides before starting the modified diet were 296.4 and 240.20 mg/dl, respectively. After 2 months following the experimental diet, cholesterol and triglycerides values were lowered to 280.05 and 216, 60 mg/dl, respectively while after 4 months they were lowered to 257.50 and 188.80 mg/dl. then they were reached to 239.25 and 158.90 mg/dl after 6 months, respectively. The obtained results are similar to that reported by Berger *et al*. (2015). When they studied the relationship

between dietary cholesterol and cardiovascular disease.

The significant differences between the values of cholesterol with advancing time became clear that there are statistically differences at the 0.05 level (Table 5a). These may be due to reducing of animal fat and calories in controlled diet study. The obtained results are similar to that reported by Berger *et al*. (2015). When they studied the correlation between dietary cholesterol and cardiovascular disease.

The significant differences between the three lipids with advancing time became clear that there are statistically differences at the 0.05 level (Table 5b). These may be due to reducing of animal fat and calories in controlled diet study. The obtained results are similar to that reported by Kumar (2014). When he studied the correlation between anthropometric measurement, lipid profile, dietary vitamins, serum antioxidants, lipoprotein and lipid peroxides in known cases of 345 elderly hypertensive in South Asian aged 56-64 years.

Table 6 shows LDL and HDL pattern before and after intake modified diet for patients with ischemic heart disease. It can be seen that the mean values of LDL and HDL before starting the modified diet were 128.3 and 114.2 mg/dl, respectively. After 2 months following the experimental diet, LDL and HDL values were lowered to117.0 and 112.25 mg/dl, respectively. After 4 months following the experimental diet, LDL and HDL values were again lowered to 104.85 and 112.90 mg/dl, respectively. After 6

Tables 4. Distribution of calories/day (%) among different nutrients

Group	Protein		Fat		Carbohydrates	
	Total	Animal	Total	Animal	Total	Animal
Male patients	12.5	3.4	20.6	11.8	67.8	15.4
Female patients	11.6	3.8	20.4	8.1	68.5	23.2

Table 5. Effect of modified diet on serum lipid levels of patients

No.	Total cholesterol (mg/dl)				Triglycerides (mg/dl)			
	Before	After 2 months	After 4 months	After 6 months	Before	After 2 months	After 4 months	After 6 months
1	263	212	190	154	136	138	113	121
2	265	254	278	284	314	270	192	194
2	245	216	194	216	182	131	136	140
4	260	245	216	168	182	164	141	130
5	220	208	200	194	317	260	163	119
6	312	270	202	236	229	264	168	136
7	314	300	276	240	210	162	140	132
8	194	165	216	186	240	192	166	140
9	274	256	220	190	205	140	132	127
10	267	184	168	195	194	129	110	132
11	274	242	294	270	213	219	272	197
12	297	300	276	207	195	216	276	198
13	317	285	206	185	265	190	104	160
14	262	258	270	263	185	174	164	179
15	362	275	310	220	180	140	150	205
16	318	305	272	240	250	212	140	170
17	322	384	269	274	274	264	174	190
18	274	243	220	184	192	164	133	142
19	264	248	224	210	185	165	140	132
20	297	300	284	243	184	182	164	137
Mean	296.4	280.05	257.50	239.25	240.20	216.60	188.80	158.90

Table 5a. Statistical analyses of the effect of modified diet on serum cholesterol levels of patients

Time	Mean	S. Deviation	F. test
Before starting	296.40 a	46.22	
After 2 months	280.05 b	38.42	4.467
After 4 months	257.50 c	49.10	
After 6 months	239.25 d	41.52	
LSD	14.39		

Table 5b. Statistical analyses of the effect of modified diet on serum triglyceride levels of patients

Time	Mean	S. Deviation	F. test
Before starting	220.40	46.14	
After 2 months	216.60 a	47.06	7.703
After 4 months	188.80 b	47.14	
After 6 months	158.90 c	45.27	
LSD	23.15		

months following the experimental diet, LDL and HDL values were lowered to 86.40 and 112.80 mg/dl, respectively. The obtained results are similar to that reported by Kumar (2014).

The significant differences between the percentages of LDL and HDL with advancing time showed clearly that there are statistically differences at the 0.05 level (Table 6a and 6b). These may be due to reducing of animal fat, calories and triglycerides in controlled diet study. The obtained results are similar to that reported by Kumar (2014). When he studied the correlation between anthropometric measurement, lipid profile, dietary vitamins, serum antioxidants, lipoprotein and lipid peroxides in known cases of 345 elderly hypertensive in South Asian aged 56-64 years.

Table 7 shows the serum glucose levels pattern before and after the modified diet in patients with ischemic heart disease. It can be seen that the mean values of serum glucose before starting the modified diet was 180.20 mg/dl. After 2 months following the experimental diet, serum glucose values were lowered and the mean valued to 174.05 mg/dl. After 4 months following the experimental diet serum glucose mean value was lowered to 150.75 mg/dl, after 6 months following the

experimental diet, serum glucose mean value was lowered to145.2 mg/dl. The obtained results are similar to that reported by Mann *et al.* (2007) when they studied the long-term outcomes of calorie-restricting diets to assess whether dieting is an effective treatment for obesity.

The significant differences between the percentages of serum glucose levels with the advancing time it became clear that there no statistically differences (Table 8). These may be due to reducing of carbohydrates and calories in controlled diet study. The obtained results are similar to that reported by Mann *et al.* (2007). When they studied the long-term outcomes of calorie-restricting diets to assess whether dieting is an effective treatment for obesity.

Conclusion

Cardiovascular disease is linked with nutrition. Where food that containing a large amount of calories, unsaturated animal fat and carbohydrates lead to increase triglyceride and cholesterol contents in the blood. While food contents moderate amounts of calories and low in unsaturated animal fat contributes significantly to lower triglyceride and cholesterol contents in the blood and thereby reduce the risk of heart disease.

Table 6. Effect of modified diet on serum LDL and HDL levels of patients (mg/dl)

No.	LDL (mg/dl)				HDL (mg/dl)			
	Before	After 2 months	After 4 months	After 6 months	Before	After 2 months	After 4 months	After 6 months
1	74	105	83	116	120	90	67	60
2	187	143	108	81	187	165	150	144
2	195	140	74	76	75	100	65	93
4	123	118	70	82	123	92	118	119
5	117	82	78	85	117	97	135	144
6	174	89	78	100	174	115	115	88
7	95	102	108	30	95	118	83	124
8	75	47	62	187	75	90	107	96
9	120	80	92	50	120	110	107	93
10	144	54	40	67	144	100	80	130
11	107	100	134	82	107	143	104	174
12	104	107	127	114	104	172	180	127
13	167	160	70	82	74	94	90	77
14	194	165	105	74	32	60	96	90
15	220	44	67	30	220	120	124	140
16	150	160	82	66	130	120	110	93
17	104	94	100	84	104	164	143	151
18	74	113	74	78	74	106	124	147
19	92	80	74	78	92	113	142	150
20	78	114	102	92	78	89	116	150
Mean	128.30	117.00	104.85	86.40	114.20	112.25	112.90	112.80

Table 6a. Statistical analyses of the effect of modified diet on serum LDL levels of patients

Time	Mean	S. Deviation	F. test
Before starting	128.30 a	28.16	
After 2 months	117.00 b	47.14	3.529
After 4 months	104.85 c	35.92	
After 6 months	86.40 d	22.88	
LSD	11.03		

Table 6b. Statistical analyses of the effect of modified diet on serum HDL levels of patients

Time	Mean	S. Deviation	F. test
Before starting	114.20 a	26.22	
After 2 months	112.25 b	44.00	0.002
After 4 months	112.90 b	28.75	
After 6 months	112.80 b	28.79	
LSD	1. 35		

Table 7. Effect of modified diet on serum glucose levels of patients (mg/dl)

No.	Serum glucose (mg/dl)			
	Before	**After 2 months**	**After 4 months**	**After 6 months**
1	107	102	94	87
2	317	270	252	265
2	84	80	89	102
4	94	101	85	86
5	194	176	171	162
6	270	310	184	112
7	97	84	79	92
8	108	95	91	84
9	98	86	76	78
10	74	82	68	92
11	362	354	264	288
12	295	316	282	205
13	193	164	161	172
14	218	197	176	107
15	175	162	174	162
16	123	194	197	184
17	374	312	297	264
18	107	96	92	84
19	105	94	87	84
20	210	206	196	194
Mean	180.20	174.05	150.75	145.20

Table 8. Statistical analyses of the effect of modified diet on serum glucose levels of patients

Time	Mean	S. Deviation	F. test
0 Time	180.20 a	28.16	
After 2 months	174.05 b	36.00	3 .112
After 4 months	150.75 c	22.65	
After 6 months	145.20 d	24.72	
LSD	11. 44		

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العلاقة بين الغذاء المتناول وأمراض القلب والأوعية الدموية لبعض المرضى في مدينة الزقازيق، محافظة الشرقية

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أجريت هذه الدراسة خلال الفترة مابين ٢٠١٠ ـ٢٠١٤ على ٢٠ مريضًا من مرضى القلب والذي تم اختيارهم من مستشفيات جامعة الزقازيق بمحافظة الشرقية، حيث تم تغذيتهم على نظام غذائي مقترح وتحت سيطرة ورقابة المستشفى ومتابعتهم خلال فترة الدراسة، وتم خفض محتوى الغذاء المقدم لهم من كمية السعرات الحرارية والدهون الحيوانية المشبعة ومحتوى الكوليسترول واستمرت الدراسة ٦ أشهر دون انقطاع مع عدم السماح للمرضى بتناول وجبات إضافية، مع حساب المتناول يوميا من الغذاء لكل المرضى لملاحظة الاختلاف بين المرضى قبل وبعد فترة الدراسة، ولقد أظهرت النتائج أن خفض كمية السعرات الحرارية من ٢٦٢,٨ كالورى قبل البدء في التغذية إلى ٢٢٥,٤ كالورى بعد ٦ أشهر من التغذية وخفض كمية المتناول من الدهون الحيوانية والكربوهيدرات من ٥٢,٢ جرام/يوم إلى ٣٨,٦ جرام/يوم و٤٢٢,٦ إلى ٣٥٤,٨ جرام/يوم على التوالى إلى خفض محتوى الدم من الدهون الثلاثية والكوليستيرول و LDL و HDL من ٢٤٠,٢٠، ٢٩٦,٤٠، ١٢٨,٣٠ و ١١٤,٢٠ ملليجرام/١٠٠ جرام على التوالي قبل البدء في التغذية إلى ١٥٨,٩٠، ٢٣٩,٢٥، ٨٦,٤٠ و ١١٢,٨٠ ملليجرام /١٠٠جرام على التوالي، نستنتج من ذلك أن أمراض القلب مرتبطة بالتغذية حيث أن الزيادة فى كمية السعرات الحرارية والدهون الحيوانية المشبعة والسكر له تأثير كبير على زيادة تركيز نسبة الدهون في الدم، لذا يوصى بتناول الغذاء المعتدل في كمية السعرات الحرارية والمنخفض في محتوى الدهون الحيوانية والمحتوى على كمية مناسبة من الزيوت غير المشبعة لما له من تأثير مفيد في تقليل نسبة الدهون في الدم، وأن الدهون والزيوت المشبعة تعتبر عاملا مساهما خطيرا لأمراض القلب.