

Cornell Medical Index Health
Questionnaire dealing with
cardiovascular symptoms
7-day dietary survey on adult
volunteers
Daily (calculated) intake
of thiamine
Daily intake of carbohydrate
(total and refined) foodstuffs

Thiamin-Carbohydrate Consumption and Cardiovascular Complaints

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Summary: 1. This is a study of the correlation of cardiovascular complaints (elicited from the Cornell Medical Index Health Questionnaire) and daily processed and nonprocessed carbohydrate consumption and thiamin intake in 74 dental practitioners and their wives.

2. The results suggest that the greatest frequency of cardiovascular responses occurred in subjects consuming smaller quantities of thiamin and generally higher amounts of processed carbohydrate foodstuffs.

Introduction

A recent report [3] indicated a *positive* correlation between carbohydrate consumption and early characteristic, if not pathognomonic, findings suggestive of cardiovascular pathosis in relatively healthy individuals. Specifically, the greater the carbohydrate intake and the older the individual, the greater the frequency of complaints. Another report [4] also indicated a *negative* correlation between thiamin consumption with these very same cardiovascular symptoms and signs. In this latter report, it was noted that the older the individual and the less the thiamin intake, the greater the frequency of cardiovascular symptoms and signs.

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Because of the known significance of thiamin to carbohydrate intermediary metabolism [5], this report is designed to relate both vitamin B₁ and carbohydrate consumption to cardiovascular symptoms and signs.

Method of Investigation

Seventy-four dental practitioners and their wives (members of the Southern Academy of Clinical Nutrition) participated in this experiment. The relative raw data are included (Table 1). It will be noted that the majority of subjects were in the fourth decade (Table 2).

Table 1. Relationship of cardiovascular complaints to daily carbohydrate and thiamin consumption

case number	age	sex	thiamin (mg)	nonrefined carbohydrate (g)	refined carbohydrate (g)	number cardiovascular complaints
13018	33	M	0.88	69	70	1
13019	32	F	0.78	72	110	0
13022	37	M	1.44	156	27	0
13025	37	F	0.72	89	115	0
13026	32	M	0.87	105	105	6
13027	32	F	2.95	90	53	1
13028	40	M	1.69	147	71	0
13029	34	M	0.74	77	62	0
13030	33	F	0.92	63	97	0
13033	36	F	1.05	96	38	0
13034	36	M	1.37	126	57	3
13035	40	M	0.93	88	100	0
13036	38	F	0.48	5	127	1
13039	41	M	1.10	65	27	1
13042	32	F	0.94	128	17	0
13044	30	M	1.59	147	107	0
13047	44	F	0.88	72	38	4
13048	47	M	1.14	92	42	0
13051	41	M	1.27	155	146	2
13052	38	F	0.91	74	63	0
13053	41	M	0.90	81	61	0
13054	47	F	0.69	57	89	7
13055	48	M	1.04	76	103	1
13056	34	M	1.15	52	41	0
13057	23	F	0.73	31	38	1
13059	33	M	1.55	153	66	0
13060	32	F	1.09	129	60	0
13062	46	M	0.88	89	48	0
13063	39	M	0.63	67	50	0
13064	32	F	0.53	53	48	0
13065	39	F	0.55	51	39	1
13066	50	M	0.70	63	47	0
13067	30	F	2.09	105	87	1
13068	37	M	0.84	63	48	1
13071	49	F	0.60	70	79	4
13072	48	M	1.25	132	123	2
13073	35	M	1.27	69	56	2

case number	age	sex	thiamin (mg)	nonrefined carbohydrate (g)	refined carbohydrate (g)	number cardiovascular complaints
13074	25	F	1.14	70	77	1
13075	47	F	0.48	51	46	3
13076	49	M	1.25	127	35	0
13083	41	F	2.54	118	108	1
13084	38	M	0.99	127	88	0
13089	27	F	0.87	42	68	0
13090	35	M	0.82	52	116	0
13097	43	M	1.15	111	45	1
13099	42	F	0.96	83	44	2
13100	41	M	1.17	86	91	0
13105	43	M	1.12	78	6	0
13106	45	F	0.91	89	27	0
13108	33	F	0.13	21	63	0
13109	36	M	1.28	28	195	0
13115	55	F	0.79	63	74	5
13116	56	M	1.09	86	87	0
13121	33	F	0.62	71	45	3
13122	32	M	0.90	151	99	0
13123	32	F	0.63	68	64	0
13124	34	M	0.62	69	46	0
13128	48	F	0.85	105	45	1
13129	48	M	1.10	79	44	1
13132	39	M	0.85	67	30	2
13133	36	F	0.66	81	51	1
13140	37	M	1.26	99	37	0
13144	40	F	0.82	33	20	0
13145	40	M	0.91	52	48	1
13147	41	F	0.63	74	45	0
13148	44	M	0.92	123	33	5
13150	42	M	0.72	64	49	0
13151	34	F	0.71	72	103	2
13152	36	M	1.45	107	143	1
13153	40	M	1.36	97	149	0
13154	40	F	1.03	63	125	2
13158	32	M	1.31	149	88	0
13159	31	F	0.78	93	52	0
13160	34	M	0.98	131	46	0

Table 2. Age and sex distribution

age groups	male	female	total
20—29	0 (0.0 %)	3 (9.1 %)	3 (4.1 %)
30—39	21 (51.2 %)	18 (54.5 %)	39 (52.7 %)
40—49	18 (43.9 %)	11 (33.3 %)	29 (39.2 %)
50—59	2 (4.9 %)	1 (3.0 %)	3 (4.1 %)
total	41 (100.0 %)	33 (100.0 %)*	74 (100.0 %)

* approximate

Each participant completed the Cornell Medical Index Health Questionnaire [2]. Thirteen of the questions (Table 3) deal with cardiovascular symptoms and signs. Shown in Table 4 is the frequency dis-

Table 3. Cardiovascular questions in the Cornell Medical Index Health Questionnaire

1. Has a doctor ever said your blood pressure was too high?
2. Has a doctor ever said your blood pressure was too low?
3. Do you have pains in the heart or chest?
4. Are you often bothered by thumping of the heart?
5. Does your heart often race like mad?
6. Do you often have difficulty in breathing?
7. Do you get out of breath long before anyone else?
8. Do you sometimes get out of breath just sitting still?
9. Are your ankles often badly swollen?
10. Do cold hands or feet trouble you even in hot weather?
11. Do you suffer from frequent cramps in your legs?
12. Has a doctor ever said you had heart trouble?
13. Does heart trouble run in your family?

Table 4. Distribution of cardiovascular complaints

number of cardiovascular complaints	male	female	total
0	26 (63.4 %/o)	15 (45.5 %/o)	41 (55.4 %/o)
1	8 (19.5 %/o)	8 (24.2 %/o)	16 (21.6 %/o)
2	4 (9.8 %/o)	4 (12.1 %/o)	8 (10.8 %/o)
3	1 (2.4 %/o)	2 (6.1 %/o)	3 (4.1 %/o)
4	0 (0.0 %/o)	2 (6.1 %/o)	2 (2.7 %/o)
5	1 (2.4 %/o)	1 (3.0 %/o)	2 (2.7 %/o)
6	1 (2.4 %/o)	0 (0.0 %/o)	1 (1.4 %/o)
7	0 (0.0 %/o)	1 (3.0 %/o)	1 (1.4 %/o)
total	41 (100.0 %/o)*	33 (100.0 %/o)	74 (100.0 %/o)*

* approximate

tribution of affirmative responses. It is clear that the majority (41 out of 74 persons) report no positive findings. Affirmative answers, however, ranged to a high of 7 in one individual. Each participant also submitted a 7-day dietary survey. The daily thiamin intake (expressed in mg) calculated from food tables [6], is summarized (Table 5). The largest group (21.6 per cent) consumed between 0.90 and 0.99 mg per day. Also included is the daily carbohydrate intake (expressed in g) and shown in terms of total and refined (sugars and processed starches) foodstuffs (Table 6). It appears that the greatest percentage of subjects consume between 50 and 99 g of both processed and nonprocessed carbohydrate foodstuffs.

Table 5. Thiamin (vitamin B₁) distribution

thiamin groups	number of subjects	percentage of subjects
0.10—0.19	1	1.4
0.50—0.59	3	4.1
0.60—0.69	7	9.5
0.70—0.79	8	10.8
0.80—0.89	6	8.1
0.90—0.99	16	21.6
1.00—1.09	5	6.8
1.10—1.19	8	10.8
1.20—1.29	3	4.1
1.30—1.39	7	9.5
1.40—1.49	3	4.1
1.50—1.59	1	1.4
1.60—1.69	2	2.7
1.70—1.79	1	1.4
2.10—2.19	1	1.4
2.50—2.59	1	1.4
3.00—3.09	1	1.4
total	74	100.0 % *

* approximate

Table 6. Distribution of daily nonprocessed and processed carbohydrate intake

daily carbohydrate intake (g)	nonprocessed carbohydrate	processed carbohydrate
0—49	6 (8.1 %)	30 (40.5 %)
50—99	47 (63.5 %)	27 (36.5 %)
100—149	17 (22.9 %)	15 (20.3 %)
150—199	4 (5.4 %)	2 (2.7 %)
total	74 (100.0 %)*	74 (100.0 %)

* approximate

Results

In order to compare the cardiovascular complaints to dietary consumption, the subjects have been divided into equal subgroups (Table 7). For example, of the 74 individuals, 37 consumed 0.13 to

Table 7. Carbohydrate and thiamin groups

group	sample size	nutrient	daily intake range
I	37	thiamin	0.13—0.91 mg
II	37	thiamin	0.92—2.95 mg
III	37	nonprocessed carbohydrate	5—78 g
IV	37	nonprocessed carbohydrate	79—156 g
V	37	processed carbohydrate	6—57 g
VI	37	processed carbohydrate	60—195 g

0.91 mg of thiamin daily (Group I); the remaining 37 persons ingested 0.92 to 2.95 mg of vitamin B₁ per day (Group II). Likewise, the entire sample was subdivided into two categories based upon the intake of nonprocessed carbohydrates. Finally, in a similar fashion, two subgroups were developed in terms of processed carbohydrate intake (Table 7). By this technique, it was possible to evaluate the mean cardiovascular scores in terms of the greater or lesser carbohydrate and thiamin intake. Table 8 summarizes the results in terms

Table 8. Relationship of mean cardiovascular score to thiamin and carbohydrate consumption

sample size	carbohydrate intake		thiamin intake	mean cardiovascular score
	processed	nonprocessed		
13	higher	lower	lower	1.5
4	higher	higher	lower	1.5
15	lower	lower	lower	1.1
13	lower	higher	higher	1.0
4	lower	lower	higher	0.8
5	higher	lower	higher	0.8
15	higher	higher	higher	0.5
5	lower	higher	lower	0.4

of decreasing mean cardiovascular scores. It will be noted that the mean cardiovascular score is 1.5 for the 13 subjects consuming the lower amount of thiamin, the lower quantity of nonprocessed carbohydrates, and the higher intake of processed sugar foodstuffs. Conversely, the lowest mean cardiovascular score of 0.4 was found in the 5 subjects ingesting the lower thiamin, higher nonprocessed, and lower processed carbohydrate foods. Hence, there is almost a four-fold difference. It is noteworthy that the two groups with the highest mean cardiovascular scores of 1.5 have in common higher processed carbohydrate consumption and lower thiamin intake. Additionally, it should be underlined that the three groups with the highest mean cardiovascular scores have as a common denominator the smaller thiamin consumption.

It should be underlined that the relationships observed here do not, in themselves, prove cause-and-effect. However, it is noteworthy that these findings are consistent with other reports indicating the relationship of carbohydrate consumption to cardiovascular disease [1, 7, 8]. It is hoped that this report may catalyze interest in this area. The hypothesis set forth here may be tested by observing changes in cardiovascular symptoms and signs with the addition and elimination of the combinations of carbohydrate foodstuffs and vitamin B₁.

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