

# Diet-Vitamin Program for Jail Inmates

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*Results of an eight-week diet-vitamin program in a county jail included: (7) significant improvement in previously impaired perception as measured on the Experiential World Inventory; (2) reduction of inmates' voluntary sugar intake as measured on self-report questionnaires; (3) improvement in morale, mood, and self-motivated behavior among inmates as measured by self-reports and staff observations.*

*The program included: (7) diet education aimed at balancing blood sugar levels; (2) vitamin supplements; and (3) availability of a high-protein evening snack.*

*Recommendations include: (7) implementation of diet changes and diet education in jails and prisons to treat hypoglycemia; (2) large-scale study of the efficacy of vitamins in normalizing perception and behavior.*

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2 Drug treatment centres have found much hypoglycemia among addicts; dietary treatment improved this condition and improved prognosis signs for rehabilitation, (Pillari and Narus, 1973).

3 About 10 percent of the general population suffers from a

primary functional hypoglycemia (Fredericks and Goodman, 1969).

## Background

A pilot program was planned and carried out in the Morris County Jail to test the hypothesis that vitamin therapy and diet changes can improve certain abnormal behavior found in jail inmates.

The hypothesis that diet and vitamins may serve as rehabilitating agents for a large number of inmates is based on the following conditions usually experienced by jail inmates:

(1) Poor pre-jail diet—Behavior and emotional health are influenced by nutrition. Inmates of jails can be presumed to have followed a less than optimum diet previous to incarceration; many are drug addicts or alcoholics, two groups which are\* notorious for poor eating habits.

(2) Stress raises nutritional requirements—Stress (physical or emotional) raises the need for certain nutrients. Being arrested, standing trial, and going to jail do constitute stresses.

(3) Low Blood Sugar—Drug<sup>2</sup> and alcohol abuse are likely to produce a secondary relative hypoglycemia (low blood sugar).<sup>3</sup> A large proportion of inmates of the Morris County Jail have been arrested on drug- and/or alcohol-related charges. It is, therefore, likely that a large number of inmates suffer from some degree of low blood sugar.

There are other indications of relative hypoglycemia among Morris County Jail inmates (D'Asaro, 1973). This condition can precipitate antisocial and criminal behavior (Salzer, 1966), which can lead to repeated arrests (recidivism).<sup>4</sup>

While little is known as to the cause and prevention of crime and the rehabilitation of criminals, it is known that low blood sugar levels and marginal protein-vitamin-mineral intake can influence general health and behavior in a negative way. The condition of low blood sugar can precipitate antisocial and criminal acts. Optimizing the diet and vitamin-mineral intake of inmates and educating inmates about diet may well influence their general health and behavior in a positive way, and help in leading to the rehabilitation of a certain percentage of inmates.

**Objectives of the Diet-Vitamin Study**

The objective was observing the relationship of optimization of nutritional intake to changes in the direction of rehabilitation. We decided to observe the following:

<sup>4</sup> According to Bolton (1972), mild hypoglycemia is most closely linked to high aggressiveness. Persons with more severe hypoglycemia who come to the attention of physicians cannot function well enough to be very violent. Severe hypoglycemia often results in extreme fatigue, dizziness, and finally unconsciousness. Jail inmates can be presumed more likely to suffer from a milder hypoglycemia, the type which can precipitate criminal activity.

Recently, J. A. Yaryura-Tobias (1973, 1974) described a new syndrome involving violent behavior and hypoglycemia. Dietary treatment of the low blood sugar was found to be the aspect of therapy most closely related to the reduction of aggression.

(1) As a result of the diet changes and/or vitamin supplementation, is there (a) any change in the direction of normality in the scores of inmates on psychological tests? (b) any improvement in subjective feeling as reported by inmates on questionnaires and/or by observations of jail personnel?

(2) Is nutrition education in jail effective, so that dietary habits of inmates are likely to be improved post-release? Do inmates change their dietary habits as reported on self-report inventories?

**Procedure**

**A. Length of Study**

An eight-week study of the effects of diet education, diet change, and vitamin supplementation was planned.

**B. Subjects**

Inmates who were expected to be incarcerated for at least two months and whose participation was approved by the jail physicians and Warden were invited to volunteer. Forty-four inmates started the program, 25 finished.<sup>5</sup>

<sup>5</sup> The reason for the high dropout rate is that a number of inmates were released suddenly and unexpectedly, so that no second questionnaire and/or psychological tests could be administered. Only data from inmates who completed at least two questionnaires are included in this report.

TABLE 1

SUPPLEMENT SCHEDULE

Study Group (N =21)		Control Group (N =7)*
With Lunch		With Lunch
A	B	
1 Vicon-C (less minerals)	1 Vicon-C	Placebo for Vicon-C
3 B-Complex placebos	3 B-Complex	3 placebos for B-Complex
With Evening Meal		With Evening Meal
Vicon-Plus (less minerals)	Vicon-Plus	Placebo for Vicon-Plus

\* 3 inmates received placebos after stopping vitamin supplements.

### C. Design

There were two groups participating in the study: an experimental group (N = 21) who received vitamin supplements and a placebo group (N = 7) (see Table 2). All participants were exposed to nutritional education and diet changes.<sup>6</sup> Psychological test scores of participants were also compared to scores of non-participants.

### D. Vitamin Supplements

A therapeutic potency supplement, to correct any existing deficiencies, was chosen<sup>7</sup>

### E. Diet

This diet program included:

(1) Inmate education as to the nature and dietary treatment of relative hypoglycemia (low blood sugar).

(2) Changes in the actual diet available to participants in the study.

Diet to treat low blood sugar (Abrahamson, 1971; Martin, 1973; Weiler and Boylan, 1970; Hawkins and Pauling, 1973):

This is a relatively high-protein, moderate-fat, moderate- to low-carbohydrate diet which avoids sugar and other concentrated sweets as well as caffeine. The diet avoids long fasts.<sup>8</sup>

#### 1. Education

All participants in the study met in small groups of five to six inmates with the jail nutritionist. She explained the nature of low blood sugar and its treatment and the purpose of the study. She also strongly urged them to cut down their sugar-candy-caffeine intake<sup>9</sup> and to take advantage of the free evening snack. There was opportunity for exchange of questions and answers. Periodically, the nutrition education would be re-enforced by articles in the jail newspaper and announcements on bulletin boards.

<sup>6</sup> Originally there were two vitamin groups, A and B, supplemented at different levels (see Tables 1 and 2). After reviewing the results of inmate questionnaires and psychological tests and finding no significant differences between the two groups, we combined the data of groups A and B.

#### 2. The Jail Diet

The Morris County Jail is fortunate in having a

most capable Cook-Food Supervisor. The meals are excellent and well balanced. The great majority of inmates eat a better diet in jail than outside. Therefore, only relatively minor changes were needed to adapt the diet to treat hypoglycemia.

Changes made in the jail diet were the availability at each meal of decaffeinated coffee, artificial sweetener, and a dietetic Kool Aid-type drink. Also, a snack of peanuts, two ounce bags, was offered to inmates nightly during the study.<sup>10</sup>

<sup>7</sup> After reviewing the formulations of all the therapeutic multivitamins in the market, we decided on Vicon-Plus and Vicon-C (Meyer Laboratories, Inc.) as meeting most of our requirements. These are nonprescription supplements which are available to the public. This company also provided us with placebos. Vicon-Plus and Vicon-C do not contain vitamin B-12 or folic acid and are also low in vitamin B6. Supplementing these vitamins in generous amounts has been found to improve behavior in emotionally disturbed persons. Therefore, therapeutic dosages and placebos of B12, folic acid, and B6 were added. (For composition of supplements, see Table 2.)

A multimineral supplement was not included, since the tissues of persons with some behavior disturbances have been found too high in certain minerals - copper and iron (Pfeiffer, 1973). Zinc and manganese were added as supplements, for two reasons: (a) the American diet is low in these trace minerals, and (b) many persons with behavior disturbances have low tissue levels of zinc and manganese. Also, these two trace minerals in dietary doses increase copper excretion. Zinc has been shown to be an "antianxiety factor" in disturbed persons. These mineral substances can in no way be harmful.

<sup>8</sup> In persons with hypoglycemic tendencies, sugar and caffeine cause a spiking of the blood sugar level followed by a sharp drop below fasting level. Low blood sugar levels can cause criminal behavior. This diet is designed to produce an even level of blood sugar all through the day by preventing sharp variations in blood sugar levels.

<sup>9</sup> Many inmates are sugar addicts (D'Asaro, 1973); they add much sugar to foods and eat a lot of candy. They also drink large volumes of sugar-sweetened coffee and/or Kool Aid (also high in sugar).

<sup>10</sup> Long fasts are contraindicated in the treatment of hypoglycemia. In jails, as in most institutions, there is a long fast between the 5 p.m. dinner and the 7-8 a.m. breakfast. Inmates often buy candy bars to tide them over; sweets of course are banned in the diet to treat hypoglycemia. The only high-protein, no-sugar snack that was acceptable to the jail administration was bagged, salted peanuts. Peanuts are a high-protein, no-sugar food; two ounces of peanuts provide more protein than a two-ounce hamburger.

Because of administrative and psychological reasons, all the jail inmates, participants (vitamin and placebo), and non-participants were offered the peanut snack.

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TABLE 2

## VITAMIN SUPPLEMENTS

### Composition of Vicon-Plus:

Vit. A -	4,000 I.U.
D <sub>2</sub> -	50 I.U.
E -	50 I.U.
Vit C -	150 mg
ZnSO <sub>4</sub> -	80 mg (50 mg dried ZnSO <sub>4</sub> ) omitted in Group A
MgSO <sub>4</sub> -	70 mg (50 mg dried MgSO <sub>4</sub> ) omitted in Group A
Niacinamide -	25 mg
B <sub>1</sub> -	10 mg
B <sub>2</sub> -	10 mg
CaPantothenate -	10 mg
MnCl <sub>2</sub> •	4 mg - omitted in Group A
B <sub>6</sub> -	2 mg

### Composition of Vicon-C:

C -	300 mg
Niacinamide -	100 mg
ZnSO <sub>4</sub> -	80 mg - omitted in Group A
B-1 -	20 mg
B <sub>2</sub> -	10 mg
CaPantothenate -	20 mg
B <sub>5</sub> -	5 mg

### Composition of B-Complex (Group B only):

B-12 -	25 mcg
Folic Acid -	1 mg
B <sub>5</sub> -	50 mg

(Placebos for Vicon-C and Vicon-Plus were donated by Meyer Laboratories, Inc., 1900 W. Commercial Blvd., Fort Lauderdale, Florida 33309. Placebo tablets for the three B-complex vitamins were contributed by Cooper Laboratories, Inc., 110 E. Hanover Avenue, Cedar Knolls, N.J. 07927.)

All inmates were cautioned not to take the vitamins on an empty stomach. (The high potency of Vicon-C could be upsetting.)

### Vitamin Supplementation: Side Effects

**Skin eruptions:** Two inmates (Group B) complained of skin eruptions after a week or more on the vitamins. These eruptions cleared up when vitamins were stopped.

**Constipation:** One inmate (Group B) claimed that the vitamins cleared up his chronic constipation. He later complained of recurrent constipation when he was on placebos.

**Excess hunger:** One participant (Group B) dropped out after 2.5 weeks because he felt the vitamins increased his appetite to such an extent that he was afraid of gaining weight.

**Illness:** Two men (Group A) felt nauseated the second week. One man (Group B) felt listless.

**Changed urine color:** All inmates questioned noted urine change —yellow, more foamy.

**Other:** Several inmates (Group B) reported feeling remarkably better, as did one of the older Sheriff's Officers who was also taking the vitamins. Some inmates requested and received the continuance of vitamin supplementation after completion of the study. They also wanted to know the brand name of the vitamins so they could continue supplementation after release. Two Sheriff's Officers also requested brand names.

**F. Evaluation**

The following criteria were applied to judge the effectiveness of the program: (a) **Psychological tests**

(1) Experiential World Inventory (measures perception; El-Meligi and Osmond, 1970)

(2) Eysenck Personality Inventory (neuroticism dimension, Eysenck and Eysenck, 1963)

(3) Croesbeck Expanded Rotter I.E. (measures locus of control, Groesbeck, 1972)

These tests were given participants before and after vitamin and/or placebo supplementation.

**(b) Questionnaires**

All participants completed a self-questionnaire before the start of the study and again after several weeks. These questionnaires were designed to determine change in sugar, caffeine, candy, and evening snack consumption, as well as how inmates felt, subjectively (Table 3, Questionnaire #2).

**(c) Observations**

Certain jail personnel and inmates were asked to observe and report any behavioral and/or physical changes and complaints among participants.

TABLE 3 INMATE QUESTIONNAIRE#2

1. During the study period, how many cups of real (not decaffeinated) coffee or tea did you have?
  - a. breakfast \_\_\_\_\_ How many teaspoons real (not substitute) sugar \_\_\_\_\_
  - b. mid-morning \_\_\_\_\_ How many teaspoons real sugar \_\_\_\_\_
  - c. lunch \_\_\_\_\_ How many teaspoons real sugar \_\_\_\_\_
  - d. mid-afternoon \_\_\_\_\_ How many teaspoons real sugar \_\_\_\_\_
  - e. supper \_\_\_\_\_ How many teaspoons real sugar \_\_\_\_\_
2. How many cups decaffeinated coffee did you drink per day? \_\_\_\_\_
3. During the study period, how many cups of real (not dietetic) Kool Aid did you drink every day? \_\_\_\_\_
4. How many cups of low-sugar Kool Aid did you drink per day? \_\_\_\_\_
5. During the study, did you add real sugar to anything besides coffee or tea? \_\_\_\_\_ To what? \_\_\_\_\_ how many teaspoons/day \_\_\_\_\_
6. How many bars or packages of candy per day did you eat **before** this study? \_\_\_\_\_ If you didn't eat candy every day, how many packages did you eat per week? \_\_\_\_\_
7. During the study, how much candy did you eat per day? \_\_\_\_\_  
How many per week? \_\_\_\_\_
8. Did you eat the peanut snack?  
Every night \_\_\_\_\_  
Sometimes \_\_\_\_\_ How many nights per week? \_\_\_\_\_  
Never \_\_\_\_\_
9. During the study, I felt most hungry:  
before breakfast \_\_\_\_\_ before lunch \_\_\_\_\_ before dinner \_\_\_\_\_ at night \_\_\_\_\_
10. The kind of food you eat and vitamins can make a difference in how you feel. How did you feel during the study period?  
Felt better \_\_\_\_\_ Felt worse \_\_\_\_\_ Felt the same \_\_\_\_\_
11. Check how you felt specifically during the study period:
  - (a) irritable, angry, tense, nervous: more \_\_\_\_\_ less \_\_\_\_\_ same \_\_\_\_\_
  - (b) a need for sweets, candy, coffee: more \_\_\_\_\_ less \_\_\_\_\_ same \_\_\_\_\_
  - (c) hungry: more \_\_\_\_\_ less \_\_\_\_\_ same \_\_\_\_\_
  - (d) headaches: more \_\_\_\_\_ less \_\_\_\_\_ same \_\_\_\_\_ never had them \_\_\_\_\_
  - (e) depressed: more \_\_\_\_\_ less \_\_\_\_\_ same \_\_\_\_\_
  - (f) got along with other inmates: better \_\_\_\_\_ worse \_\_\_\_\_ same \_\_\_\_\_
12. If it should be really proven that cutting down on sugar and caffeine is helpful to inmates do you think that jails and prisons should:
  - (a) Restrict candy, sugar, and caffeine so that inmates can't eat too much of it?  
OR
  - (b) Just tell inmates how excess sugar and caffeine are harmful, could have played a part in their troubles leading to imprisonment, and rely on the judgement and willpower of inmates to restrict sugar and caffeine for themselves?  
Please explain your reasons:

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**Results of Perception Test Scores (Experiential World Inventory)**

Inmates who received vitamins and diet education significantly lowered (approached toward normal) their perception test scores in four out of eight dimensions: sensory, time, self, and ideation (see Table 4.)

Seven inmates participating in the diet program who received placebos instead of vitamins also improved their test scores in the perception test, although the improvement was slightly less marked. Three of these inmates in the placebo group had previously been given vitamins, were tested, switched to placebos, and retested. Their scores

rose slightly (indicating increased impairment) on the second testing in two dimensions.

Average scores of the Morris County inmate population usually indicate severe impairment on the EWI perception test (see Table 5.) These scores do not appear to improve as a function of time in jail (see Table 6).

**Results of Test Measuring Degree of Neurotic Anxiety (Eysenck Personality Inventory)**

Results of the Eysenck Personality Inventory showed that the level of anxiety decreased among inmates parti-

**TABLE 4**

**PERCEPTION TEST SCORES OF INMATES RECEIVING BOTH DIETPROGRAM AND VITAMINS**

N = 14

Scales	Before Diet-Vitamin		After Diet-Vitamin	
	Mean	S.D.	Mean	S.D.
Sensory	6.67	8.26	2.17	3.25**
Time	15.67	7.20	8.17	4.75*
Self	11.33	9.52	6.00	7.80"
Ideation	10.00	7.16	4.33	3.20"*
	* p < .05			
	**p < .01			
	***p < .001			

**TABLE 5**

**Perception Scores of Inmates\* compared to those of Schizophrenics, Alcoholics, Neurotics, and Normals\***

Means and standard deviations of EWI raw scores for male groups

Scales	Schizop		Morris County Jail Inmates		Alco 'holies		Neurotics		Normals	
	(N =	ihrenics (N = 161)	(N =	= 17)	(N =	= 200)	(N =	= 33)	(N =	= 181)
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D
Sensory	19.18	20.80	12.29	12.09	10.30	11.18	<b>7.12</b>	6.81	4.97	6.25
Time	13.60	7.65	11.18	6.60	10.01	4.48	8.73	4.19	6.49	<b>3.58</b>
Body	10.37	11.78	5.65	6.45	5.16	6.43	4.73	6.20	2.84	<b>3.59</b>
Self	13.71	12.74	10.53	7.21	9.11	7.16	6.88	5.44	3.70	2.92
Others	11.45	8.84	8.65	4.81	6.23	5.31	4.45	3.49	4.55	4.07
Ideation	9.48	7.92	9.18	4.90	5.75	5.12	5.15	4.40	2.76	<b>2.60</b>
Dysphoria	9.47	10.30	7.82	8.10	7.05	7.37	6.76	8.57	1.81	3.08
Impulse	7.92	7.86	6.65	4.14	4.72	3.81	5.12	4.86	3.40	2.54

Scores of jail inmates range between schizophrenics and alcoholics. \*Jail inmates' scores are consistently higher than neurotics and normals, according to results of Morris County Jail testing. The average scores of the 17 inmates above are fairly typical of test scores noted here. \*\*from Manual for Clinical Use, Experiential World Inventory, p.31 (El-Meligi and Osmond, 1970).

TABLE 6

EWI PERCEPTION SCORES-TIME IN JAIL

(Inmates not in Diet-Vitamin Program)

Dimension	2 Weeks & Less (N = 9)	3-7 Weeks (N = 17)	8 Weeks & Over (N = 15)
Sensory	14.89	17.53	15.80
Time	10.44	11.24	12.80
Body	7.11	7.53	6.40
Self	11.33	12.53	12.60
Others	10.00	12.12	11.80
Ideation	9.56	9.65	10.13
Dysphoria	6.89	11.88	9.40
Impulse	7.33	6.47	6.07

TABLE 7

ANXIETY LEVEL AMONG PARTICIPANTS IN THE DIET-VITAMIN PROGRAM

(N = 14)

Before entering Program	After program
Mean = 11.14	Mean = 7.93

TABLE 8

PERCENT OF CHANGE IN ANXIETY LEVELS AMONG INMATES

Diet-Vitamin Program (N = 14):	-29%
Decisional Training (N = 16):	-29.5%
Other or No Programs (N = 24):	+4.56%

icipating in the diet-vitamin program. This decrease was not significant (see Table 7) and was probably partly due to the concurrent participation of many of these inmates in a decisional training program. The decisional training program is known to reduce anxiety.

Among inmates who did not participate in the diet-vitamin program or decisional training program, anxiety levels rose (see Table 8).

Results of Test Measuring Locus of

Control (Grosbeck Expanded Rotter I.E.)

According to the scores on these tests, locus of control did not appear to be affected by the diet-vitamin program.

Results

Effectiveness of Diet Education, as measured on self-report questionnaires

(Both the vitamin-supplemented and the placebo group received equivalent education as to nutrition and treatment of low blood sugar.)

According to responses on the questionnaires, inmate consumption of sugar and caffeine was voluntarily reduced, and craving for sweets was somewhat reduced.

Subjective Changes (as measured on self-report questionnaires and staff observations)

Inmates generally reported improvement as a result of the diet-vitamin program. The vitamin group reported greater improvement than the placebo

TABLE 9

EFFECT OF DIET EDUCATION Summary of Questionnaire

Diet Education Group (N=25)	Decreased	Remained Same	Increased
Candy consumption	48%	48%	4%
Sugar intake	40%	44%	16%
Caffeine intake	40%	60%	0
Feel need for sweets, coffee	32%	60%	8%
Feel hungry	25%	50%	25%

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group in all categories except "How feel in general" (see Table 10. All the respondents received diet education and the evening snack. Responses of the inmates given vitamins and those given placebos are compared.)

Reports of staff observations also indicated improvement. Members of staff reported "better morale" and increased participation of inmates in the diet-vitamin group in other jail activities. Increase in contributions to the jail newspaper was noted and helpfulness in organization of recreational and other activities received remark. A general observation was that these inmates seemed to increase in self-motivated activity and that the activities engaged in were not troublesome and tended to be helpful to others.

### Discussion

The flaws in the design of the study cause fewer problems than would appear at first glance. Flaws include: (1) participants in the study were volunteers, probably well-motivated to begin with, and had atypical average scores for our inmate population on the EWI before the diet-vitamin program began; (2) because of the diet education, participants knew nearly all about what we hoped to find and why, thus inviting "good faking" to "help" the researchers; (3) the placebo control group for vitamins was much too small,<sup>11</sup> having an N of only seven, three of which had previously been included in the vitamin group.

The third problem, the small size of the control group for vitamins, is a real flaw in design. Therefore, the greater

TABLE 10

**SUBJECTIVE CHANGES**  
(Summary of Questionnaires)

**1. How feel in general:**

	<b>Better</b>	<b>Same</b>	<b>Worse</b>
Vitamin (N = 21)	33%	67%	0
Placebo (N = 7)*	57%	29%	14%

**2. Feel irritable, angry, tense, and nervous:**

	<b>Less</b>	<b>Same</b>	<b>More</b>
Vitamin IN = 21)	33%	67%	0
Placebo (N = 7)	29%	57%	14%

**3. Incidence of headaches:**

	<b>Less</b>	<b>Same</b>	<b>More</b>
Vitamin**	14%	71%	10%
Placebo	0	86%	14%

**4. Depression: '**

	<b>Less</b>	<b>Same</b>	<b>More</b>
Vitamins	33%	52%	14%
Placebo**	0	100%	0

**5. Get along with others:**

	<b>Better</b>	<b>Same</b>	<b>Worse</b>
Vitamin	24%	71%	5%
Placebo	0	86%	14%

\* Three of the inmates in the placebo group had previously been given vitamins, were tested, switched to placebos, and retested. \*\* Based on 17 replies \*\*\* Based on 6 replies

improvement reported on questionnaires by the vitamin group over improvement reported by the group having only diet changes and diet education can be viewed as simply suggestive and thus worthy of further investigation. The loss of previous improvement in EWI scores of the three inmates who were switched from vitamins to placebos also can be viewed as a suggestive case history.

Volunteerism and motivation of our atypical participation group and knowledge about the study of participants do not seem to cause many problems to the interpretation of results.

Test scores do not seem to have been influenced by "good-faking"<sup>12</sup> motivations because: (1) The average scores of participants were not improved on all tests: the locus of control test scores showed no change and this test can be presumed to be susceptible to faking good. (Example of a question: "Probably half the people who have good jobs don't deserve them.") (2) The EWI perception test, on which the largest change occurred, may be less susceptible to faking good than other tests used in the study. Some inmates have been invited to fake good responses on this test and have produced very little improvement in score. (In fact, inmates seemed slightly resentful about this assignment, possibly because they felt they already had produced as favorable a picture as they felt they could.)

While the participants were not representative of our total jail population (volunteers with atypical pretest scores on the EWI), their differences from the average inmate seemed to be in the

"help" the researchers prove the efficacy of their program. direction of health (better motivation, less apparent pathology reflected in test scores). Since these apparently "healthier" inmates improved as a result of the diet-vitamin study, it seems likely that less healthy inmates would also show improvement under the same conditions. In any case, the representative quality of the participating group is not an issue. Morris County inmates (a suburban sample) cannot be considered representative of all inmates anyway. The atypical quality of the sample is probably in the direction of a better nutritional background than would be found in a less affluent area. Therefore, a representative sample of inmates would be expected to benefit even more greatly than have our inmates from a diet-vitamin program.

The most marked improvement due to the diet-vitamin program was improvement in EWI perception scores. Inmates' scores on this test generally indicate decided abnormality in experienced perception. In fact, Morris County inmates closely approach schizophrenics in their scores. Furthermore, perception test scores do not appear to improve over time in the absence of a diet-vitamin program. This may indicate that time in jail, removed from drug or alcohol -intake, does not itself serve to normalize perception. The continuance of abnormal scores may even bring into question whether drugs or alcohol were entirely the original causes of the abnormal perception scores. (Nearly 85 percent of Morris County inmates report having some drug- or alcohol-related problem.) In any case, removal from drugs and alcohol does not seem to improve perception scores, at least in a jail setting, over a period of several months. During the diet-vitamin study, perception scores were rapidly normalized within a period of a few weeks!

Judging by the results of the inmate questionnaire, diet education about treatment of low blood sugar was effective. A large number of participants cut down on those substances contraindicated in hypoglycemia: sugar, candy, and caffeine. Sheriff's Officers and

11 Due to problems with jail administration, the population studied and the duration of the study were both smaller than desired. As a warning to other researchers it should be noted that this study evoked some wrath on the part of jail administration, county administration, and the local press. Other studies here, not about nutrition, have caused few problems. It may be that combining public emotionality about food with emotionality about crime can create a public "boiler maker."

12 Producing fewer pathological responses on post-tests to

inmates remarked that many participants had been "hooked" on sugar and had great difficulties cutting down on sugar and coffee intake. The fact that such a large percentage of inmates did manage to cut down speaks well for diet education

Many reports of improved "morale," etc., on inmate self-reports and by staff observations may be due to good wishes for the success of the program. However, some reported improvements were quite marked and seem beyond the range of wishful thinking. Probably the most marked was the increase in self-motivated activity of participating inmates as reported by staff. This observation suggests the possible efficacy of a nutrition program in helping inmates to improve themselves.

### Recommendations

Diet changes to treat existing hypoglycemia and diet education should be implemented immediately in jails and prisons. The necessary diet changes and education are simple, inexpensive, and harmless to those inmates not suffering from hypoglycemia (D'Asaro, 1974). There is a great likelihood that a very large number of inmates do suffer from some degree of hypoglycemia, which aggravates and perpetuates the behavior leading to crime. Since the cure is easy and of negligible cost to the taxpayer, it should be used. This recommendation is indicated by a large body of research<sup>13</sup> additional to the small study reported here.

Implementation of diet changes probably should be accompanied by careful education of jail administration<sup>14</sup> and care in explanation to any public media reporting about penal institutions.<sup>15</sup>

<sup>13</sup> Some of this research is listed in the attached bibliography.

<sup>14</sup> Jail administrators, like everyone else, probably take pride in the food they are serving now. Suggesting change without implying criticism of existing practices may be an important assignment for education efforts.

<sup>15</sup> See footnote #11.

Vitamin supplementation in jails and prisons may also prove of value in normalizing behavior and in creating the "will to get better" among inmates. Larger research efforts to determine the efficacy of vitamins should be undertaken at once. Given the persistence, expense, and tragedy of criminal behavior, a treatment involving minor expense which looks hopeful should be investigated immediately.

Further research should investigate whether inmates have other nutritional needs which differ from the normal population and whether any of these can be viewed as primary influences on their behavior. Hypoglycemia in most cases probably is secondary since it is likely to be caused by drug and alcohol abuse, other poor habits, and stress related to the criminal behavior. As such, it can be seen as caused by crime, and only secondarily perpetuating it. Of great importance is the investigation of the possible primary influences of nutritional needs on criminal behavior.

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