

Protein-nicotinic acid consumption and early psychologic change

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It is rare to find a "typical pellagrin" who exhibits all the manifestations of the disease. However, the pellagrin usually experiences for some weeks lassitude, anorexia, rather vague digestive symptoms, and emotional instability described by the patient as "nervousness." . . . The initial relatively mild nervous manifestations of headache, irritability, insomnia . . . give way in the acute pellagrin to definite personality changes. . . . The mental symptoms at times so dominate the picture that pellagrins have been referred to mental institutions before the correct diagnosis became apparent . . .¹

This is the classic description of the clinical picture of pellagra. It serves here as a prelude to, and justification for, a study of the possible quantitative relationship of nicotinic acid and protein consumption (the nutrients found to be deficient in classic pellagra) to early psychologic change as measured by a relatively simply derived emotional disturbance score.

Method of Investigation

Seventy-four subjects, dental practitioners and

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their wives (members of the Southern Academy of Clinical Nutrition), participated in the experiment here reported. The majority of the subjects were in their forties.

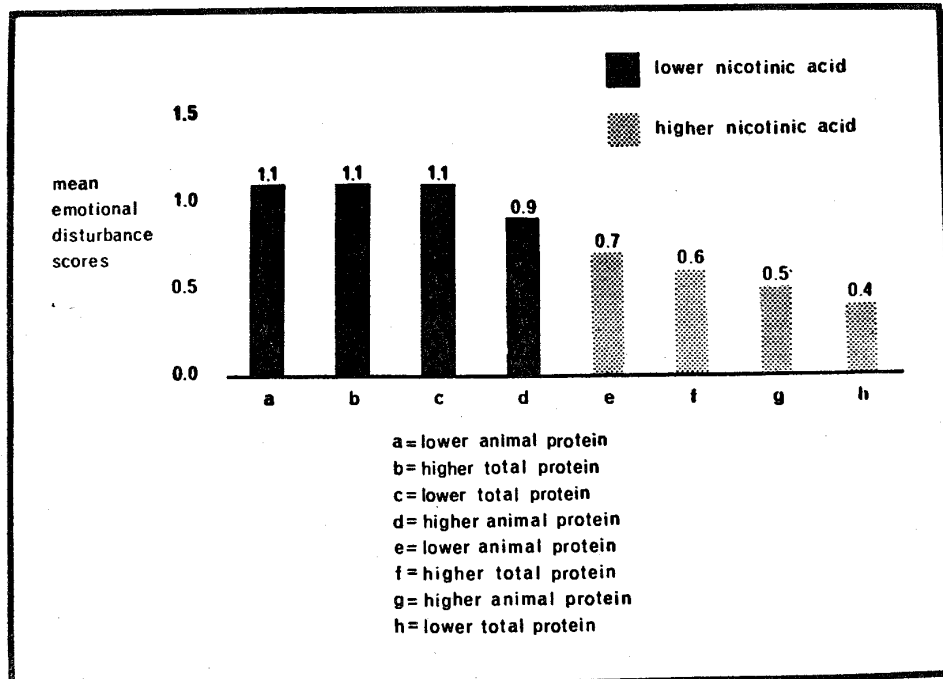
Each participant completed the Cornell Medical Index (CMI) Health Questionnaire.² In this the subject is presented with a list of 195 questions, each followed by two possible responses (yes or no), and is asked to choose the response he or she thinks is appropriate. If in doubt, the subject is asked to guess.

The Cornell Medical Index Health Questionnaire has been devised as an instrument for quickly obtaining a descriptive sketch, for clinical interpretation, of a person's attitudes, feeling states and emotions, or bodily reactions. It does so in a manner not readily discernible to the subject, in order to increase objectivity. Below is a proposed system for calculating an emotional disturbance score based on the CMI:

Emotional Disturbance Score

- 0—fewer than 30 "yes" responses on the entire CMI;
fewer than 3 "yes" responses in Sections I and J;
fewer than 3 "yes" responses on the last page (M-R); and
fewer than 4 questions unanswered or answered both "yes" and "no" or with remarks written in or changed.
- 1—not meeting any one of the above four requirements.
- 2—not meeting any two of them.
- 3—not meeting any three of them.
- 4—not meeting all four of them.

*The relationship of protein and nicotinic acid consumption
to emotional disturbance score*



Each participant in the experiment also submitted a seven-day record of his diet. By means of food tables,³ the daily protein intake in grams (total and animal) was calculated. The daily total protein consumption ranged from a low of 22 g. to a high of 190 g. The per day animal protein intake was found to vary from 9 g. to 160 g. Nicotinic acid consumption ranged from 2.6 mg. to 36.5 mg. per day.

Results

The 74 subjects were divided equally in terms of protein and nicotinic acid consumption, hence there were 37 subjects consuming 22–95 g. of total protein daily and 37 consuming 96–190 g. Thirty-eight subjects ate 9–75 g. of animal protein daily; 36 subjects, 76–160 g. Also, 37 subjects consumed 2.6–16.3 mg. of nicotinic acid per day, and another 37 subjects, 17.0–36.5 mg.

The figure graphically portrays the re-

sults. The black columns represent the groups consuming the lesser amounts of nicotinic acid; the stippled bars, the greater quantity. It is clear that, irrespective of protein consumption, those ingesting the smaller quantities of nicotinic acid displayed the highest emotional disturbance scores.

Discussion

The long and exciting history of pellagra attests to a cause-and-effect relationship of a vitamin and its precursor to psychologic state.⁴⁻⁷ Two areas have received no attention. First, a literature search reveals no evidence that any attempt has been made to quantitate the psychologic findings in classic pellagra. Second, there is no published report regarding measurement of the correlation of nicotinic acid and its pro-

tein precursor to the early and more subtle functional symptoms and signs. This has been attempted, in a small way, in this study of 74 dental practitioners and their wives.

The limited observations described in this report suggest that a relatively small intake of nicotinic acid parallels the greatest positive response (1.1), as judged by the emotional disturbance score. A relatively high intake of nicotinic acid correlates with the lowest response (0.4).

This report is a companion to an earlier analysis⁸ of the relationship of protein-nicotinic acid consumption and a different psychologic test procedure (Cornell Word Form-2). Generally speaking, the patterns are similar. In other words, with both psychologic measures, the subjects consuming the relatively greater amounts of nicotinic acid demonstrated the most physiologic expressions of psychologic state (lowest scores); those ingesting the lesser amounts of nicotinic acid, the poorest (highest) psychologic scores. The one notable difference is that protein appeared to be the dominant variable when the Cornell Word Form-2 was utilized to grade psychologic state; nicotinic acid seems to be the more sharply defined single variable when the mean emotional disturbance score is used as a barometer of psychic state.

It should be underscored that, although the relationships cited here are exciting, they do not prove cause and effect. The possible etiologic role of protein and/or nicotinic acid in psychologic state would require testing before and after double-blind supplementation. If the hypothesis put forth here is valid, significant improvement in psychologic state should follow nutritional supplementation.

Summary

1. The diarrhea, dermatitis, and dementia of pellagra have been well identified with a nicotinic acid-tryptophan deficiency.

2. No published reports attempt to quantitate the possible relationships of this same deficiency to prodromal, non-specific, psychologic findings.

3. Within the limits of the observations here presented, there does appear to be a correlation between nicotinic acid consumption and this emotional disturbance score.

4. The findings reported here parallel those previously reported⁸ with regard to protein-nicotinic acid consumption and a different psychologic barometer (Cornell Word Form-2).

5. Because of this exciting relationship, an attempt will be made in a subsequent investigation to study the relationship of nicotinic acid-protein consumption and another and different semi-quantitative measure of psychologic state (functional complaints).⁹

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