Cancer proneness profile: a study in weight and blood glucose

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An earlier report of 262 subjects[1] indicated that, with advancing age, subjects characterized by slightly elevated blood glucose (80 to 95 mg. percent) reported a higher incidence of cancer when compared with a group of subjects showing a blood glucose range of 60 to 75 mg. percent. The present report is designed to serve a twofold purpose. First, the previously reported results[1] will now be reanalyzed in a larger group of 517 individuals. Additionally, the frequency of reported cancer will be studied in terms of blood glucose and weight singly and in combination.

Method of investigation Capillary blood glucose (Dextrostix method) was determined two to four hours following food or drink in 517 persons of the 8,940 participants in the November 1964 Birmingham, Alabama, Diabetes Detection Drive.[2] Each of the subjects completed the Cornell Medical Index Health Questionnaire (CMI).[3] A present or past history of cancer was specifically elicited by the question, "Did a doctor ever treat you for tumor or cancer?" The presence or absence of obesity was determined from the answer to the question, "Are you definitely overweight?" Thus, it was possible to analyze the frequency of reported cancer with weight and blood glucose separately and in combination.

Results Figure 1 pictorially portrays the relationship of blood glucose and reported cancer. Three age groups appear on the abscissa and the numbers in parentheses designate sample size. Described on the ordinate is the frequency of reported cancer. Four items deserve consideration. First, with advancing age, irrespective of blood glucose, the percentage of subjects reporting cancer progressively rises from zero in the youngest group to ap-

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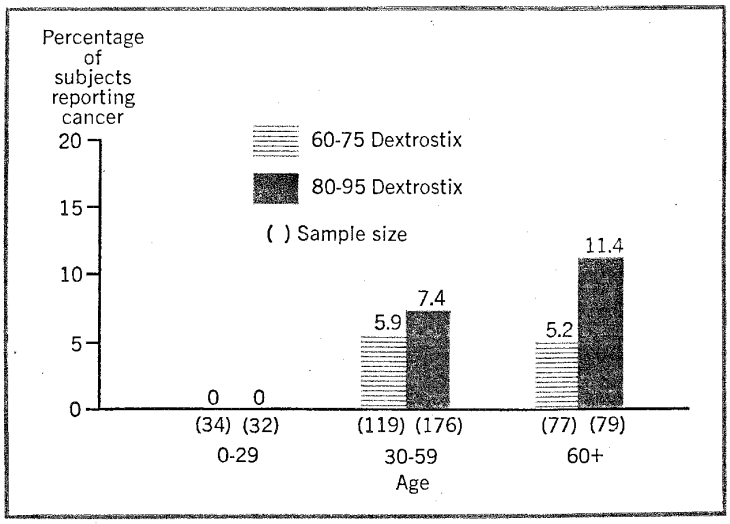

FIG. 1. *The relationship of reported cancer and blood glucose in terms of age*

proximately 8% in the elderly category. Second, in the youngest group, 0 to 29 years, there is no cancer in either of the blood glucose categories. Third, in those classified as middle age, 30 to 59 years, the reported cancer is slightly higher (7.4 vs. 5.9%) in the group characterized by the slightly higher blood glucose (brown columns). Finally, in the oldest group, those with the higher blood glucose (brown bar) reported an incidence of cancer over twofold (11.4 vs. 5.2%) that observed in the subjects with a relatively lower blood glucose.

In Figure 2, an attempt has been made to compare the frequency of reported cancer to weight, irrespective of blood glucose. Three items should be underlined. First, irrespective of weight, there is no cancer in the youngest age group. Second, in the middle age bracket, cancer was reported more frequently (8.9 vs. 5.5%) in the subjects admitting overweight. Parenthetic mention should be made that the delineation with weight (8.9 vs. 5.5%) is greater than with blood glucose (7.4 vs. 5.9%) as shown in Figure 1. Third, in the oldest subjects, the difference between the overweight and nonoverweight is greatest (13.4 vs. 5.8%). The demarcation in this age group with weight is greater than the difference for the same group with blood glucose.

Finally, Figure 3 relates the frequency of reported cancer to both blood glucose and weight. The nonoverweight with the lower blood glucose is shown by the solid gray columns. There is no reported cancer in the 25 subjects in the youngest age group of this category; but 6.8 and 5.3% in the middle and oldest age brackets, respectively. The frequency of cancer in the nonoverweight with the slightly higher blood glucose (black columns) is 0, 4.6, and 6.5%, respectively, for the three age cate-

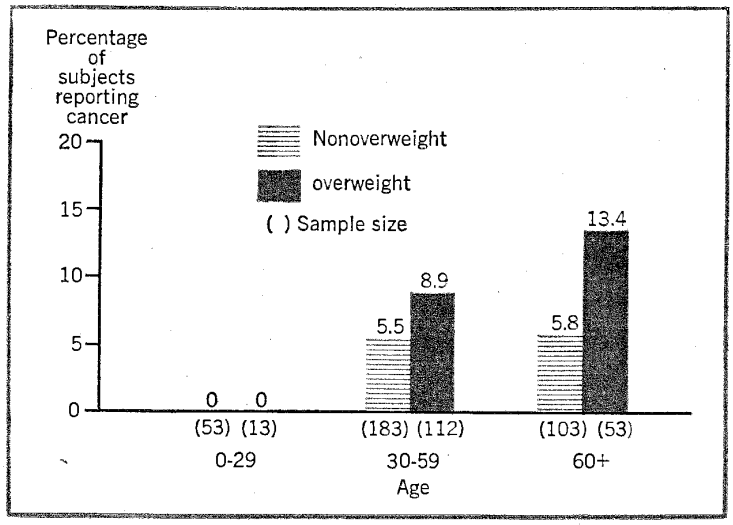

FIG. 2. *The relationship of reported cancer and weight in terms of age*

gories. For the groups having as a common denominator overweight and lower blood glucose, the values are 0, 4.4, and 5% (lined columns). Finally, the scores for those with overweight and slightly higher blood glucose rise from 0 to 11.9 to 18.2% with advancing age (brown columns).

Discussion The literature is replete with evidence showing a relationship between diabetes mellitus and carcinomatosis.[4-8] Only a paucity of published reports suggests a correlation of marginal disturbances in carbohydrate metabolism and cancer.[1,9,10] The findings in this study emphasize the possible relationship of cancer to small variations in blood glucose which have existed for varying periods of time.

Much has been written about obesity as a general mortality risk factor and in specific disorders such as coronary heart disease and diabetes mellitus.[11] Only limited observations have been made with regard to obesity and malignant disease. For example, there is suggestive evidence of a positive relationship between cancer and weight in female subjects.[12] The limited data available in this study support the thesis that increasing weight and reported cancer may indeed be related.

When cancer is viewed in the light of both weight and blood glucose, the patterns are more sharply defined than when cancer is related to either of these variables independently. This, as far as can be determined, has not been previously reported.

Summary Capillary blood glucose (Dextrostix method) two to four hours after food or drink or both were consumed was determined in 517 participants of the Birmingham, Alabama, Diabetes Detection Drive. The blood glucose scores were compared

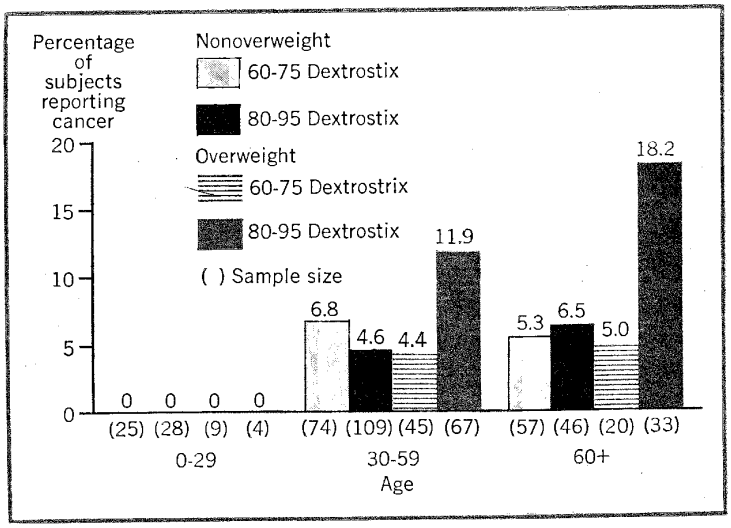

FIG. 3. *The relationship of reported cancer to weight and blood glucose in terms of age*

with the reported incidence of overweight and cancer by means of a self-administered questionnaire. The data suggest that, with advancing age, subjects with blood glucose scores of 80 to 95 mg. percent report more cancer than individuals with blood glucose values in the 60 to 75 mg. percent range. The results suggest that, with advancing age, subjects who indicate overweight report more cancer than those who deny obesity. Within the limits of these observations, individuals with slightly higher blood glucose levels and overweight report more cancer than when these two variables are considered separately.

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