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Dietary Glycemic Index, Glycemic Load, Fiber, Simple Sugars, and Insulin Resistance: The Inter99 Study

Response to Lau et al.

In their important analysis of data from the Inter99 Study on the relationship among glycemic index, glycemic load, and insulin resistance as estimated by the homeostasis model, Lau et al. (1) unfortunately do not provide adequate descriptive information on the distribution and variation in levels of glycemic index and glycemic load in their population. Additionally, the reader is left wondering about the associations of glycemic index and glycemic load with other (dietary) variables.

These types of information are critical for comparison and interpretation of the Inter99 Study to other studies. To date, the strongest association between dietary glycemic index and risk of type 2 diabetes was reported from the study with the largest variation in dietary glycemic index (2). In the absence of the respective data for the Inter99 Study, it is difficult to evaluate whether small variations in the levels of glycemic index and glycemic load could be responsible for the lack of an association with insulin resistance. A small variability can in turn be either inherent to the population or result from the dietary assessment method.

First, some indirect evidence for the latter comes from the fact that the authors used a total of only 57 glycemic index values to estimate the dietary glycemic index of all participants. Second, intakes of soft drinks and selected sweet products were not assessed; however, most of these foods have a high glycemic index and are

highly predictive of the overall dietary glycemic index and glycemic load (3,4). In addition, the consumption of socially undesirable sucrose-containing foods may have been selectively underreported by the Inter99 participants, who were invited to partake in a health survey. Although most sucrose-containing foods have only intermediate glycemic index levels, they are often consumed in large amounts. A selective underassessment may thus affect the estimates of glycemic index, glycemic load, and sucrose without affecting estimates of dietary fiber intake. In this context, the discussion of reasons for the lack of an association between sucrose and the homeostasis model may need reconsideration given that sucrose has a glycemic index of 97 (white bread standard), which is very similar to the glycemic index of white bread, which is 100. Finally, alcohol intake was not considered in glycemic index and glycemic load estimation but has been shown to be highly predictive of glycemic index (3).

Thus, in conclusion, this discussion of the article by Lau et al. points out some of the challenges and complexities faced by applying the concept of glycemic index estimation to dietary data collected with a food frequency questionnaire.

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Dietary Glycemic Index, Glycemic Load, Fiber, Simple Sugars, and Insulin Resistance: The Inter99 Study

Response to Buyken and Liese

Buyken and Liese (1) raised the relevant question of whether low variability in glycemic index and glycemic load could explain the lack of association with insulin resistance (2). The complete ranges (medians) of glycemic index and glycemic load in our study are 16–105 (79) and 0–1,208 (197), respectively. This is in accordance with previous studies (3), and thus, it is unlikely that this explains the lack of association.

We disagree that our article should have provided data on associations of glycemic index and glycemic load with other (dietary) variables because this would have expanded the extent of the article considerably and furthermore blurred the focus of the article.

We are aware of the methodological problems related to dietary assessment methods including estimation of glycemic index (2). Unfortunately, we cannot change the fact that information on intake of soft drinks and selected sweet products were not available in our study. Soft drinks may not, however, contribute substantially to the daily intake of glycemic index-inducing carbohydrates (4), despite the high-glycemic index value of sucrose. Additionally, the intake of sucrose from sucrose-containing foods and soft drinks is not consumed in large amounts in the general Danish population (25–65 years) (5). Thus, the lack of data on soft drinks and selected sweet products may not be a major concern.

Bias introduced in all dietary studies with underreporting cannot be excluded (2). It is, however, impossible to estimate the exact degree of underreporting. Therefore, we do not have a rational basis for a sensitivity analysis. Hence, we would have to make up a set of assumptions re-

garding the magnitude of underreporting intake of socially undesirable sucrose-containing foods. These assumptions would never be reliable. Thus, we recommended caution when interpretation of results from this part of our study.

The last point raised by Buyken and Liese was that alcohol intake may predict glycemic index of the diet and hence affect the estimates of glycemic index and glycemic load. The reported associations are relative changes in the continuous variable homeostasis model assessment of insulin resistance (HOMA-IR) expressed as HOMA ratios with corresponding 95% CIs. After adjustment for alcohol in the multiple analyses, glycemic index demonstrated an insignificant association with HOMA-IR (HOMA ratio 0.99 [95% CI 0.97–1.02]; $P = 0.60$) and glycemic load demonstrated a significant inverse association with HOMA-IR (HOMA ratio 0.99 [0.98–1.00]; $P < 0.01$).

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Eliminating Inpatient Sliding-Scale Insulin: A Reeducation Project With Medical House Staff

Response to Baldwin et al.

We applaud Baldwin et al.’s (1) efforts to improve the management of inpatient hyperglycemia and to advance resident knowledge about best care practices. However, we would welcome additional data to support the authors’ assertion that the effect on medical house staff education was sustained. The data reported were only from the 8-week study period, when an attending endocrinologist rounded with residents twice each day on all study patients. There are no data from a subsequent time period for comparison. In addition, the authors suggest that their inpatient intervention was associated with a sustained improvement in diabetes care. Are follow-up data available regarding the quality of glycemic management since July 2003 when sliding-scale insulin (SSI) use was discontinued? Outpatient HbA_{1c} values in a subset of the study group were noted to improve 12 months after discharge; however, there are no control group data presented. It is therefore difficult to know if the HbA_{1c} improvements were independently associated with the intervention or with other factors related to subsequent patient care.

One of the stated goals of the study was for medical residents to “feel comfortable managing blood glucose without the use of SSI” (1). How was this measured? As part of a larger study in our community teaching hospital, we asked internal medicine resident physicians ($n = 37$) to rate their knowledge, perceived competence, and formal education concerning management of hyperglycemia in the hospital. The responses were taken on a five-point Likert scale, ranging from “strongly disagree” to “strongly agree.” Most (31 of 37, 84%) felt knowledgeable about managing

glucose control in diabetic subjects admitted to the hospital with acute medical conditions other than diabetic ketoacidosis. Similarly, the majority (28 of 37, 76%) agreed or strongly agreed that they understood the routes of insulin administration and how insulin works. However, fewer than half (15 of 37, 41%) indicated that inpatient management of diabetes was explicitly taught during residency training. Nearly all (36 of 37, 97%) wanted additional training in hospital diabetes management. With these baseline data, we will be able to assess the effects of our inpatient diabetes management program on resident physicians’ education, knowledge, and perceptions. Clearly, education and training of resident physicians is a key to success in caring for diabetic patients in teaching hospitals. We concur with Baldwin et al. that teaching medical residents to improve hospital diabetes care is essential.

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Eliminating Inpatient Sliding-Scale Insulin: A Reeducation Project With Medical House Staff

Response to Peterson et al.

We thank Peterson, Charney, and Rennert (1) for their interest in our study (2). We share and applaud their interest in improving the level