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ORIGINAL RESEARCH

Glycemic impact, glucose glycemic equivalents, glycemic index, and glycemic load: definitions, distinctions, and implications - Evidence review

D.ssa M. Mondini[1]

1 Biologist, Italy

1. ABSTRACT

The analyzed study proposes a conceptual distinction between glycemic index, glycemic load, and glycemic impact. The glycemic index describes the relative carbohydrate response of a food; the glycemic load integrates the index and the amount of carbohydrates in a serving; glycemic impact, expressed as glucose glycemic equivalents, aims to translate the predicted response to a serving into the amount of pure glucose that would produce a comparable effect.In section 2.1, “Diet and post-prandial glycemia”, “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi uses this publication to argue that glycemic impact can describe the glycemic potential of a portion actually consumed, going beyond the glycemic index alone. Since only the abstract is available, the original study should be interpreted as a definitional and methodological contribution, not as a clinical trial on personalized nutritional planning. Independent human studies confirm that the quality and quantity of carbohydrates contribute to determining blood glucose and insulin levels after a meal. However, direct validation of glucose glycemic equivalents for mixed meals, daily dietary habits, and individual personalization remains incomplete. The book's narrative is therefore consistent with the evidence, but requires a cautious reading.

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MISSION

LIFE Science Hub – Journal of Science was founded with the aim of making scientific knowledge accessible without giving up methodological rigour, quality of sources and authoritativeness of content. The journal promotes the dissemination of knowledge in the health, nutrition, medical and longevity sciences, building a bridge between the world of research and society.

Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.

2. ANALYZED STUDY

The central question of the publication is to clarify what three often-confused indicators measure—and what they do not: glycemic index, glycemic load, and glycemic impact. In simple terms, the glycemic index compares the speed and magnitude of the glycemia response to carbohydrates in a food relative to glucose. The glycemic load combines this characteristic with the amount of carbohydrates in a serving. Glycemic impact, on the other hand, aims to directly express the potential effect of a specific quantity of food.The publication is relevant to the book's section because it formalizes glucose glycemic equivalents or GGE (grams of pure glucose that would produce a glycemic response equivalent to that attributed to a serving of food). The point being made is not that this tool is already validated for personalized nutritional prescriptions, but that it offers a conceptually different way to represent the glycemic effect of the consumed portion. The analyzed study can therefore explain the distinction between indicators; it cannot demonstrate, based on the available abstract, clinical benefits, disease prevention, or superiority in daily clinical practice.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

Only the abstract is available. The publication appears to be a methodological and conceptual work: it defines the relative glycemic impact as the amount of glucose that would induce a glycemic response equivalent to that produced by a specific amount of food. It then describes glucose glycemic equivalents as a potential virtual component of food, which could be used alongside nutritional data in food databases.Sample size, participant characteristics, inclusion and exclusion criteria, data collection period, foods tested, blood glucose measurement protocol, statistical analyses, significance values, and follow-up are not reported in the available material. Therefore, it is not possible to reconstruct a detailed experimental design or verify the primary quantitative results of the original publication.

4. RESULTS

The main result reported in the abstract is a defining distinction. The glycemic index is a relative value referring to carbohydrates and does not change based on the amount of food consumed. The glycemic load is derived from the product of the glycemic index and the amount of carbohydrates ingested, representing an estimate of overall glycemic exposure. Relative glycemic impact, on the other hand, refers to a specific portion of food and is expressed in grams of glucose glycemic equivalents.In practice, two foods with different glycemic indices can have a comparable impact if consumed in different quantities; conversely, a larger portion can increase the glycemic impact even when the food has an intermediate glycemic index. The authors argue that glucose glycemic equivalents can be treated as a value associated with the portion and potentially included on labels or in nutritional information systems.The abstract does not report absolute experimental data, percentages, P-values, confidence intervals, or measures of predictive precision. Therefore, it does not allow for quantifying how accurately GGEs predict the glycemic response in individuals, nor does it establish whether they are more useful than glycemic load in mixed meals or clinical settings.

5. INTERPRETATION

The biological significance is intuitive: post-meal glycemia depends both on the quality of the carbohydrates—that is, their tendency to raise blood glucose levels more or less rapidly—and on the quantity actually ingested. The glycemic index primarily describes the first element; the glycemic load and glycemic impact attempt to include the second as well.The segment documented by the publication subject to the Evidence Review is therefore: portion of carbohydrate-containing food relative glycemic response expression of the effect as glucose equivalent grams. This is the scientific foundation of the book's statement regarding the “actual glycemic potential” of the consumed portion.However, the interpretation must remain limited. Translating a response into glucose equivalent grams does not eliminate individual differences due to, for example, insulin sensitivity, meal composition, timing, digestion, and physical activity. Furthermore,

the proposal to use GGE in personalized nutritional planning is a potential application, not a clinical efficacy demonstrated by the available material.

6. INDEPENDENT SUPPORTING EVIDENCE

Initial confirmation of the general narrative comes from a crossover study conducted on twelve women with obesity. Participants received four mixed meals in random order, differing in glycemic index and portion size. With equal portion sizes, high-glycemic index meals produced an incremental area under the curve for glycemia and insulin that was nearly double that of low-glycemic index meals; however, for small meals, the difference in glycemia was not statistically significant. The glycemic load of the meal was positively associated with glycemia and insulin responses over the following five hours. Meals with a similar glycemic load produced very similar responses, even if they differed in the quantity and type of carbohydrates [1]. This directly confirms that portion size and carbohydrate quality act together, although the sample was small and consisted only of women with obesity.A second randomized study examined isoenergetic portions of 121 individual foods and thirteen mixed meals in healthy young adults. For individual foods, the glycemic load explained 85% of the variability in the glycemic response and 59% of the insulin response; for mixed meals, it explained 58% and 46% of the variability, respectively. Carbohydrate content alone predicted responses to individual foods, but not to mixed meals [2]. While not directly measuring GGEs, this evidence supports the principle underlying glycemic impact: the quantity of carbohydrates must be interpreted in conjunction with their metabolic quality.A meta-analysis of eleven randomized studies on breakfast meals provided broader findings. Breakfasts with a lower glycemic index or glycemic load reduced postprandial glycemia compared to breakfasts with higher values: the mean difference was –1.32 mmol/L at 60 minutes, –0.74 mmol/L at 90 minutes, and –0.44 mmol/L at 120 minutes [3]. The meta-analysis does not verify glucose glycemic equivalents, but it confirms the biologically consistent direction of the narrative: reducing the glycemic index and/or glycemic load reduces the rise in glycemia after a meal.

7. CONFLICTING EVIDENCE

No directly conflicting evidence has been identified that is sufficiently relevant to the definition of glycemic impact as an effect related to a specific portion. However, there is a significant limitation to the simplification that a single indicator can fully describe a meal.In a crossover study involving ten healthy young adults, high glycemic load meals increased the incremental area under the curve for glycemia and insulin compared to low glycemic load meals. The glycemic index, when considered alone, was not associated with the glycemic response in the first two hours or the subsequent three hours; however, it did increase the insulin response between two and three hours after the meal [4]. The authors therefore proposed considering both the glycemic index and glycemic load together. This does not contradict the book's passage, but it shows that meals with the same glycemic load can maintain metabolic differences linked to the quality of carbohydrates and the composition of the preparation. The small sample size limits the generalizability of the results.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the conceptual publication that is the subject of the Evidence Review from independent research that confirms or defines the scope of its narrative.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Methodological and definitional analysis	No sample reported in the available abstract	Distinguishes between glycemic index, glycemic load, and glycemic impact expressed in GGE per serving	biologically consistent evidence	preliminary
[1]	Randomized crossover study	12 women with obesity	Glycemic load was associated with higher glycemic and insulin responses; meals with similar load produced similar responses	direct confirmation	moderate
[2]	Randomized physiological study	Healthy young adults; 121 single foods and 13 mixed meals	Glycemic load predicted postprandial glycemia and insulin better than carbohydrates alone, especially in mixed meals	direct confirmation	moderate
[3]	Meta-analysis of RCTs	Adults included in 11 randomized breakfast studies	Breakfasts with lower glycemic index or load reduced glycemia at 60, 90, and 120 minutes	indirect confirmation	moderate
[4]	Randomized crossover study	10 healthy young adults	High glycemic load increased glycemia and insulin; isolated glycemic index did not explain glycemia	discordant evidence	low

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed clearly supports a useful distinction: the glycemic index describes a relative property of carbohydrates, while the glycemic impact aims to represent the effect of an actual portion using glucose glycemic equivalents. Independent literature quite well confirms the physiological principle that both the quality and quantity of carbohydrates influence post-meal glycemia and insulin.However, the application of GGE as an autonomous tool for personalized nutritional planning remains preliminary. Glycemic responses, in fact, also depend on meal composition, portion size, individual characteristics, and metabolic context. The book's narrative is therefore supported indirectly and requires further validation in mixed meals and daily life.

Aggiornato al 17/11/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

11. RIFERIMENTI BIBLIOGRAFICI

[1] **Acute effect of meal glycemic index and glycemic load on blood glucose and insulin responses in humans**
Galgani et al., 2006
Nutrition Journal
DOI: https://doi.org/10.1186/1475-2891-5-22

[2] **Prediction of postprandial glycemia and insulinemia in lean, young, healthy adults: glycemic load compared with carbohydrate content alone**
Bao et al., 2011
The American Journal of Clinical Nutrition
DOI: https://doi.org/10.3945/ajcn.110.005033

[3] **Lowering breakfast glycemic index and glycemic load attenuates postprandial glycemic response: A systematically searched meta-analysis of randomized controlled trials**
Toh et al., 2020
Nutrition
DOI: https://doi.org/10.1016/j.nut.2019.110634

[4] **Glycemic Index and Glycemic Load Used in Combination to Characterize Metabolic Responses of Mixed Meals in Healthy Lean Young Adults**
Micha et al., 2011
Journal of the American College of Nutrition
DOI: https://doi.org/10.1080/07315724.2011.10719950