LIFE Science Hub
JOURNAL OF SCIENCE
EXPANDING KNOWLEDGE ABOUT NUTRITION AND HEALTH

ORIGINAL RESEARCH

One-hour plasma glucose concentration during OGTT: what does it indicate about beta-cell function versus insulin sensitivity in overweight/obese children? - Evidence review

Dr.ssa M. Bitonti[1]

1 Nutritional Biologist, Italy

1. ABSTRACT

The original study evaluated 113 non-diabetic youths, aged 10 to 20 years and overweight or obese, to verify whether elevated glycemia one hour after an oral glucose load was linked to lower pancreatic beta-cell function relative to insulin sensitivity. It used reference methods, including glucose and insulin clamps, but the available material contains an incomplete abstract and does not report final numerical results.In the narrative of "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi, the publication contributes to the concept that a high postprandial glycemic excursion may appear before alterations detectable by fasting or two-hour glycemia. Independent, cross-sectional, and prospective studies show that elevated one-hour glycemia is associated with lower beta-cell function indices and, in youths with obesity, a higher probability of developing prediabetes. However, the threshold value of 155 mg/dL does not appear equally sensitive in all pediatric populations. The narrative is therefore moderately supported, primarily as an early indicator of metabolic alteration and not as a self-sufficient diagnostic criterion.

ONLINE ARTICLE

ARTICLE INFORMATION

Published: November 17, 2026
Updated: November 17, 2026

DOI 10.5281/zenodo.24306968

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 research question was whether, in young people who are overweight or obese but do not have diabetes, plasma glycemia measured one hour after an oral glucose load could signal a reduction in pancreatic beta-cell function. Beta cells are the cells in the pancreas that release insulin, the hormone that helps glucose enter tissues.The hypothesis evaluated was that a one-hour glycemia value of 155 mg/dL or higher was associated with a lower capacity of the pancreas to adjust insulin secretion to the body's insulin sensitivity. This is the range of the narrative relevant to the book's paragraph: an elevated postprandial glycemic response can make a metabolic difficulty visible before conventional parameters appear altered.The study is particularly relevant because it was not limited to measuring glucose and insulin during the oral test, but planned direct measurements of insulin sensitivity and insulin secretion. However, as it is an observational comparison performed at a single point in time, it cannot prove that the glycemic peak causes damage to beta cells or predict diabetes with certainty in an individual child.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

According to the available abstract, 113 young people without diabetes, who were overweight or obese and aged between 10 and 20, were studied. All underwent a two-hour oral glucose tolerance test, known as an OGTT (a test that measures how the body handles glucose after consuming a standard amount).Beta-cell function was assessed using a hyperglycemic clamp of approximately two hours, maintaining glycemia at around 225 mg/dL. Insulin sensitivity was evaluated with a three-hour hyperinsulinemic-euglycemic clamp, a procedure that measures how effectively tissues respond to insulin while maintaining stable glucose levels. Body composition and abdominal fat were measured using DEXA (an X-ray technique to estimate fat mass and lean mass) and computed tomography.The authors calculated the disposition index, which is the product of early insulin secretion and insulin sensitivity. In simple terms, this index assesses whether the pancreas is able to adequately increase insulin when the body responds less effectively to this hormone. Participants were divided into categories based on one-hour glycemia; the cutoff value and the size of the groups are not reported in the available material, as the abstract cuts off before this information. Detailed inclusion and exclusion criteria, recruitment period, complete statistical analyses, and the results of adjusted analyses are not provided in the available material.

4. RESULTS

The provided material confirms the study's objective and the measurements performed, but it does not contain the concluding part of the abstract with the results. Therefore, the values of the disposition index in the groups, the absolute differences in glycemia or insulin sensitivity, the confidence intervals, the P-values, and the regression analyses are not reported in the available material.The paragraph from "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi summarizes that, in subjects with one-hour glycemia greater than 155 mg/dL, the disposition index was significantly lower and explained about one-fifth of the variability in one-hour glycemia. However, since these data do not appear in the text of the provided study, they cannot be restated here as results directly verifiable from the publication subject to the Evidence Review.The certain methodological fact is that the research was designed specifically to compare the relationship between one-hour glycemia, insulin secretion, and insulin sensitivity. This choice makes its use in the book's paragraph scientifically consistent, but requires caution when describing quantitative details not present in the accessible material.

5. INTERPRETATION

The biological significance of the question at hand is simple: after glucose intake, the pancreas must release insulin rapidly and proportionately. If this response is insufficient relative to the degree of tissue insulin sensitivity, glucose may remain in the blood longer and reach a higher peak.The disposition index is useful because it avoids interpreting insulin secretion in isolation. An apparently high amount of insulin, for example, may be insufficient if the muscles and liver respond poorly to the hormone. The mechanism specifically investigated by the original publication is therefore: high one-hour blood glucose during an OGTT relatively inadequate beta-cell function

compared to insulin sensitivity.This step does not equate to proving that every person with high one-hour blood glucose will develop type 2 diabetes. Nor does it prove that one-hour blood glucose depends exclusively on the pancreas: intestinal glucose absorption, gastric emptying, hepatic glucose production, and insulin sensitivity also contribute to the glycemic curve. Independent literature, however, makes it plausible that the reduction in beta-cell function is an important element of the chain described in the book.

6. INDEPENDENT SUPPORTING EVIDENCE

Direct confirmation comes from a Korean cross-sectional study that compared 149 people with normal glucose tolerance and low one-hour glycemia, 43 with normal tolerance but one-hour glycemia of at least 155 mg/dL, and 52 with impaired glucose tolerance. In participants with normal tolerance but high one-hour glycemia, the oral disposition index and the ISSI-2—an index that integrates insulin secretion and insulin sensitivity—were significantly lower compared to the group with low one-hour glycemia. The oral disposition index was 1.8 versus 3.5, and the ISSI-2 was 213.2 versus 301.2; both comparisons had P<0.001. The values in the group with high one-hour glycemia were close to those of people with impaired glucose tolerance. The study therefore confirms the transition to reduced beta-cell function even when the conventional classification is still normal. The limitation is the cross-sectional design, which does not establish the temporal sequence of events [1].A second, prospective study added temporal information in 233 Latino youths with obesity and a family history of type 2 diabetes. Participants with one-hour glycemia of at least 155 mg/dL showed a greater decline in beta-cell function over time compared to the group with lower values; the estimated difference was b = –327.8 ± 126.2, with P=0.01. Among those who had normal glucose tolerance at baseline, the group with high one-hour glycemia had a 2.5 times greater probability of developing prediabetes during follow-up, with a 95% confidence interval from 1.6 to 4.1 and P=0.0001. This result supports the idea that the one-hour value can identify youths with earlier metabolic deterioration; however, it remains limited to a high-risk population and does not prove a causal relationship [2].In an independent cohort of 202 youths with obesity, normal glucose tolerance, and diverse ethnic backgrounds, one-hour glycemia equal to or greater than 133 mg/dL was associated with a lower disposition index, lower insulin sensitivity, and worse beta-cell response parameters. After a median follow-up of 2.3 years, prediabetes appeared in 19.3% of the group with high one-hour glycemia and in 7.6% of the group with lower values. The association corresponded to an odds ratio of 2.92, with a 95% confidence interval from 1.22 to 6.98 and P=0.02. An odds ratio greater than 1 here indicates a higher probability of developing prediabetes in the group with high glycemia. The study reinforces both the pathophysiological and prognostic aspects of the narrative, but it used a threshold lower than 155 mg/dL [3].

7. CONFLICTING EVIDENCE

The evidence does not directly contradict the idea that high one-hour glycemia may signal a less favorable metabolism, but it does challenge the universality of the 155 mg/dL threshold in young people. In an Italian cross-sectional multicenter study of 1,199 children and adolescents with overweight or obesity, all with normal fasting glycemia and non-elevated glycated hemoglobin, the group with one-hour glycemia of at least 155 mg/dL showed a profile similar to that of participants below this threshold, except for fasting glycemia. Conversely, the 133 mg/dL threshold identified a group with higher two-hour glycemia, glycated hemoglobin, insulin resistance, and cardiometabolic risk, as well as lower insulin sensitivity and disposition index [4].This observation does not prove that 155 mg/dL is devoid of biological significance. Rather, it indicates that, in the pediatric age group, a threshold derived primarily from adult data may prioritize specificity but lose sensitivity. Differences in age, pubertal stage, adiposity distribution, ethnic origin, clinical characteristics, and the method of calculating indices can modify the most informative value. No directly conflicting evidence sufficiently relevant to the general association between high one-hour glycemia and reduced β-cell function has been identified; this does not prove the absence of contrary results.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the publication that is the subject of the Evidence Review from the independent studies used to confirm or define the narrative of the book's chapter.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Cross-sectional observational with metabolic clamps	113 youths without diabetes, aged 10-20, who are overweight or obese	Evaluated the relationship between one-hour glycemia, insulin secretion, and insulin sensitivity; numerical results are not reported in the available material.	biologically consistent evidence	preliminary
[1]	Cross-sectional observational	244 Korean adults: normal tolerance with low or high one-hour glycemia, and impaired glucose tolerance	One-hour glycemia of at least 155 mg/dL associated with lower oral disposition index and ISSI-2, with values similar to the group with impaired tolerance.	direct confirmation	moderate
[2]	Prospective cohort	233 Latino youths with obesity and a family history of type 2 diabetes	One-hour glycemia of at least 155 mg/dL associated with greater decline in beta-cell function and higher probability of prediabetes.	direct confirmation	moderate
[3]	Prospective cohort	202 youths with obesity, normal glucose tolerance, and diverse ethnic backgrounds	One-hour glycemia of at least 133 mg/dL associated with lower disposition index and increased odds of prediabetes.	indirect confirmation	moderate
[4]	Multicenter cross-sectional observational	1,199 Italian children and adolescents who are overweight or obese	The 133 mg/dL threshold identified more metabolic alterations than the 155 mg/dL threshold.	discordant evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The original publication is scientifically consistent with the section of the book dedicated to early postprandial glycemia and beta-cell function. The available material does not allow for direct verification of all its quantitative results, but independent studies moderately confirm that elevated one-hour glycemia during an OGTT is associated with less adequate beta-cell function relative to insulin sensitivity.In young people with obesity, some prospective cohorts also indicate a higher probability of developing prediabetes over time. This makes one-hour glycemia a promising indicator of early metabolic risk. However, it is not a standalone diagnostic test: the significance of the result depends on the population examined, the chosen threshold, and the overall clinical assessment.

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] **Normal Glucose Tolerance with a High 1-Hour Postload Plasma Glucose Level Exhibits Decreased b-Cell Function Similar to Impaired Glucose Tolerance**
Oh et al., 2015
Diabetes & Metabolism Journal
DOI: https://doi.org/10.4093/dmj.2015.39.2.147

[2] **One-Hour Glucose During an Oral Glucose Challenge Prospectively Predicts b-Cell Deterioration and Prediabetes in Obese Hispanic Youth**
Kim et al., 2013
Diabetes Care
DOI: https://doi.org/10.2337/dc12-1861

[3] **One hour post load plasma glucose predicts progression to prediabetes in a multi ethnic cohort of obese youths**
Tricò et al., 2019
Diabetes, Obesity and Metabolism
DOI: https://doi.org/10.1111/dom.13640

[4] **One-Hour Post-Load Plasma Glucose and Altered Glucometabolic Profile in Youths with Overweight or Obesity**
Di Bonito et al., 2023
International Journal of Environmental Research and Public Health
DOI: https://doi.org/10.3390/ijerph20115961