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ORIGINAL RESEARCH

Performance of HbA1c versus the oral glucose tolerance test (OGTT) as a screening tool for diagnosing dysglycemic status in high-risk Thai patients - Evidence review

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1. ABSTRACT

The analyzed study compared glycated hemoglobin (HbA1c, an indicator of average glucose exposure over the previous months) and the oral glucose tolerance test (OGTT, a test that measures the body's response after 75 grams of glucose) in 512 high-metabolic-risk Thai patients. The OGTT classified 19.7% of participants as diabetic, compared to 11.1% using HbA1c. At the 6.5% HbA1c threshold, specificity was high but sensitivity was low: many cases identified by the OGTT were not detected by HbA1c alone.The research contributes to the passage from “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi, which suggests that post-load glycemia can make metabolic alterations visible that are not detected by basal or chronic markers. Independent studies confirm that OGTT and HbA1c often classify different people and that glucose intolerance is a population in which lifestyle interventions can reduce the incidence of diabetes. However, the best screening strategy depends on the population, the clinical purpose, and the feasibility of the test.

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MISSION

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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 HbA1c could identify glucose regulation disorders with results comparable to those of the OGTT in Thai patients already considered at high risk. The practical hypothesis was that a simple test, which can be performed without prolonged fasting and without consuming a glucose drink, could replace or reduce the need for the OGTT.The relevance to the section "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi is precise: the study verifies whether an indicator of average glycemia, HbA1c, identifies the same subjects who show an altered glycemic response two hours after a glucose load. It does not directly evaluate whether the OGTT improves mortality, prevents diabetes, or directly measures pancreatic beta-cell function. Instead, it documents the degree of diagnostic agreement between the two tests and the proportion of dysglycemia that each detects in this specific population.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

A retrospective cross-sectional study was conducted, meaning an analysis of clinical data already collected without following participants over time. Researchers examined tests performed at a hospital in Bangkok between 2007 and 2017. Of the 618 subjects without a prior diabetes diagnosis who underwent an OGTT, 512 met the inclusion criteria.Participants were at least 15 years old, of Thai nationality, and had undergone an OGTT with 75 grams of glucose along with an HbA1c measurement within three months. They were predominantly individuals at increased risk, for example due to excess weight, abdominal obesity, previous impaired fasting glycemia, a high diabetes risk score, or a family history of diabetes. Subjects with known diabetes, pregnancy, hematological or endocrine disorders, and treatments capable of altering glucose metabolism were excluded.After at least 8-12 hours of fasting, fasting glycemia and glycemia two hours after the intake of the glucose solution were measured. The OGTT was used as the reference test. Participants were classified as having normal glucose tolerance, impaired glucose tolerance, or diabetes. The authors calculated sensitivity, i.e., the ability to identify existing cases, and specificity, i.e., the ability to correctly classify non-cases. They also evaluated the agreement between tests using Cohen's kappa coefficient, in which values close to zero indicate poor concordance beyond what would be expected by chance.

4. RESULTS

The average age was 50.3 years, and 60.5% of the 512 participants were female. According to the OGTT, 220 people had normal glucose tolerance, 191 had impaired glucose tolerance, and 101 had diabetes. In other words, the OGTT detected dysglycemia in nearly six out of ten participants: 37.3% with post-load impairment and 19.7% with diabetes.The result most relevant to the book's narrative is that diabetes was nearly twice as frequent with the OGTT compared to the definition based on HbA1c alone: 19.7% versus 11.1%, a statistically significant difference. At an HbA1c threshold of 6.5% or higher, sensitivity was 32% (95% confidence interval: 23-41%): using the OGTT as a reference, HbA1c alone identified about one-third of diabetes cases. Specificity, however, was 94% (95% confidence interval: 92-96%), indicating that a positive value was rarely present in people not classified as diabetic by the OGTT.The HbA1c threshold of 6.2% produced the best statistical compromise between sensitivity and specificity in the study, but this does not prove that it should replace the diagnostic thresholds adopted elsewhere. The agreement between HbA1c and OGTT was only fair for diabetes, with a kappa of 0.306, and very poor for prediabetes, with a kappa of 0.154. For prediabetes, the area under the ROC curve was 0.54: a value close to 0.50 indicates a very limited ability of HbA1c to distinguish between those who did or did not have impaired glucose tolerance according to the OGTT.The groups with impaired glucose tolerance and diabetes were on average older than the group with normal tolerance. The group with diabetes defined by the OGTT also had a higher median Thai cardiovascular risk score, 10 versus 3 in the group with normal tolerance, with a P-value of less than 0.001. Since the study did not include follow-up, this data describes a higher estimated risk, not an observed increase in future cardiovascular events.

5. INTERPRETATION

In simple terms, the two tests do not look at exactly the same aspect of metabolism. HbA1c summarizes average glucose exposure over time; the OGTT, on the other hand, observes how quickly the body can return glycemia to lower values after a glucose challenge. A person can therefore have an average glycemia that is not high enough to exceed an HbA1c threshold and, at the same time, show excessive glycemia two hours after the load.The analyzed study supports the segment of the narrative in the book stating that an impaired post-load glycemic response can remain unidentified by HbA1c when used in isolation. In high-risk Thai patients, the low sensitivity of HbA1c at 6.5% compared to the OGTT documented exactly this trend: the simpler test left a substantial portion of the cases detected by the load test unclassified.However, the result does not prove that the OGTT is universally superior for every person, laboratory, or healthcare system. The OGTT itself presents biological variability, is more demanding, and in the study, it was performed only once. Furthermore, as this was an outpatient population selected for high risk and a cross-sectional analysis, the results are not automatically transferable to the general population, nor do they demonstrate that identifying these subjects earlier reduces the risk of diabetes or cardiovascular disease on its own.

6. INDEPENDENT CONFIRMING EVIDENCE

Confirmation closely aligned with the narrative in this paragraph comes from an independent cross-sectional study conducted in Qatar on 446 people without known diabetes. The agreement between HbA1c and OGTT in identifying prediabetes was poor: only 56% of participants received the same classification using both criteria. Individuals identified as prediabetic by the OGTT showed lower estimated beta-cell function, a higher prevalence of metabolic syndrome, and a higher diabetes predictive score compared to those identified by HbA1c alone. This reinforces the idea that the oral glucose tolerance test may select for a more compromised metabolic profile, though these are indirect indicators rather than new cases of diabetes observed over time [1].The connection to the "time window" described in the paragraph is supported by a large randomized study from the Diabetes Prevention Program. 3,234 people with elevated fasting and post-load glycemia, but without diabetes, were assigned to either a placebo, metformin, or an intensive lifestyle intervention. Compared to the placebo, the lifestyle intervention reduced the incidence of diabetes by 58% and metformin by 31% over approximately 2.8 years of observation. This does not prove that every subject identified by the OGTT will achieve the same benefit, but it demonstrates that in a population with glycemic alterations also documented by the oral glucose load, there was a concrete possibility of delaying or preventing diabetes [2].A systematic review with a network meta-analysis of 73 studies and 139,277 participants evaluated the diagnostic accuracy of HbA1c compared to the OGTT. At the 6.5% threshold, HbA1c had a combined sensitivity of 51% and a specificity of 96%. In practice, a positive result was generally reliable compared to the OGTT, but about half of the cases defined by the reference test were missed. The authors also found that combining HbA1c and fasting glycemia increased sensitivity to 64%, with a specificity of 95%. The summary confirms the trend observed in the Thai study, although it does not directly address prediabetes or the prognostic value of two-hour glycemia [3].

7. CONFLICTING EVIDENCE

Important contextual evidence comes from the DETECT-2 collaboration, which brought together nine studies from five countries with 44,623 participants and assessable retinal photographs. In this analysis, HbA1c and fasting glycemia showed relatively narrow thresholds associated with specific diabetic retinopathy; the authors concluded that an HbA1c of 6.5% represents an appropriate alternative diagnostic criterion. For two-hour glycemia, no similarly clear threshold emerged. This does not refute the lower sensitivity of HbA1c when the OGTT is chosen as the reference, but it indicates that the two tests may have different utilities depending on the outcome considered: identification of post-load hyperglycemia or definition of a threshold associated with a microvascular complication [4].No directly conflicting evidence of sufficient relevance was identified; this does not prove the absence of contrary results. The discrepancy between the tests may depend on ethnicity, distribution of risk factors,

conditions that alter hemoglobin or the lifespan of red blood cells, laboratory methods, and applied thresholds. For this reason, the Thai result should not be interpreted as proof that HbAIc is useless, but rather as evidence of the limitations of its isolated use in that clinical context.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the original study from the independent research used to verify the narrative passage of the book.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Retrospective cross-sectional diagnostic accuracy study	512 high-risk Thai outpatients	OGTT classified diabetes in 19.7% versus 11.1% with HbA1c; HbA1c ≥6.5%: sensitivity 32%, specificity 94%	direct confirmation	moderate
[1]	Cross-sectional observational	446 Qatari adults without known diabetes	OGTT and HbA1c showed poor agreement; the OGTT group had a more compromised metabolic profile	direct confirmation	moderate
[2]	RCT	3,234 high-risk US adults with impaired glycemia	Intensive lifestyle intervention reduced diabetes incidence by 58% compared to placebo	indirect confirmation	high
[3]	Systematic review and network meta-analysis	73 studies, 139,277 adult participants	HbA1c ≥6.5%: sensitivity 51% and specificity 96% compared to OGTT	direct confirmation	high
[4]	Observational pooled analysis	Nine studies, 44,623 adults from five countries	HbA1c 6.5% was an appropriate alternative criterion for a threshold associated with retinopathy	discordant evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The original study clearly shows that, in high-risk Thai patients, an HbA1c of 6.5% was highly specific but identified only a portion of the diabetes cases detected by the OGTT. Its inclusion in the book's section is therefore consistent with the statement that post-load glycemia can highlight abnormalities not detected by an indicator of average glycemia.Independent evidence confirms the discrepancy between HbA1c and OGTT quite well and indicates that individuals identified through post-load glycemic abnormalities may represent a population with a more unfavorable metabolic profile. It is also well-supported that intensive lifestyle interventions can reduce the incidence of diabetes in high-risk individuals with dysglycemia. A contextual clinical assessment remains necessary, as HbA1c retains practical advantages and diagnostic validity for specific purposes.

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.

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