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ORIGINAL RESEARCH

Risk of progression to diabetes from prediabetes defined by HbAIc or fasting plasma glucose criteria - Evidence review

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1. ABSTRACT

The analyzed study compared, in Korean adults without baseline diabetes, the ability of glycated hemoglobin (HbA1c, an indicator of average glucose exposure over the previous months) and fasting plasma glucose to identify individuals with prediabetes who would develop diabetes over the following five years. In nearly 18,000 participants, the group identified by HbA1c showed a progression reported as higher compared to the group identified by fasting glucose.In the chapter dedicated to HbA1c, "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi uses this result to explain that HbA1c can recognize a population with higher metabolic vulnerability. Independent evidence confirms that higher HbA1c values are associated with a greater future risk of diabetes and that HbA1c also reflects glycemic exposure after meals. However, studies in other populations have found similar predictive capacities between HbA1c and fasting glucose. The most prudent interpretation is therefore that HbA1c adds useful prognostic information, without automatically replacing other tests.

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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.

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2. ANALYZED STUDY

The research question was whether prediabetes identified via HbA1c or fasting plasma glycemia was associated with a different probability of developing diabetes in the medium term. The hypothesis was that these two criteria, while both describing a condition of impaired glycemia, do not necessarily select individuals with the same level of risk.The study is relevant to the passage from "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi, which describes HbA1c as a measure of persistent glycemic exposure and, therefore, potentially capable of identifying subjects more vulnerable to the future onset of diabetes. The publication primarily documents a prognostic association: a prediabetes classification based on HbA1c was followed by a higher frequency of diabetes compared to a classification based on fasting glycemia. However, it cannot prove that HbA1c causes diabetes, nor that it directly measures the deterioration of pancreatic beta cells or insulin resistance.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

A cohort of 17,971 Korean adults, aged between 20 and 79, who underwent periodic health check-ups was analyzed. The average interval between assessments was 5.2 years, with a reported range of 3.1 to 6.7 years.Prediabetes was defined according to two criteria: fasting plasma glycemia between 5.6 and 6.9 mmol/L or HbA1c between 5.7% and 6.4%, equivalent to 39–46 mmol/mol. Incident diabetes, meaning diabetes that developed during the observation period, was defined by fasting glycemia equal to or greater than 7.0 mmol/L, HbA1c equal to or greater than 6.5%, or the initiation of antidiabetic medication.Since the available material consists exclusively of the abstract, the detailed exclusion criteria, initial clinical characteristics of the groups, any overlap between subjects identified by the two tests, statistical adjustments, or separate analyses by age, sex, body weight, or other risk factors are not reported in the available material.

4. RESULTS

At the beginning of the study, 5,495 participants, equal to 30.6% of the cohort, were classified as having prediabetes based on fasting glycemia. Using the HbA1c criterion, 3,664 participants were classified as having prediabetes, equal to 20.4%. HbA1c therefore identified a numerically smaller proportion of people compared to fasting glycemia.Over the following five years, progression to diabetes was reported in 14.7% of subjects with prediabetes identified by HbA1c and in 10.4% of those identified by fasting glycemia. In simple terms, in the Korean cohort, the group selected by HbA1c had a frequency of subsequent diabetes diagnosis that was 4.3 percentage points higher than the group selected by fasting glycemia.The abstract states that the difference was statistically significant, but the full P-value is truncated in the provided material. Hazard ratios (HR)—that is, the ratios between the rates at which diabetes appears in the groups—confidence intervals, or results of analyses adjusted for potential baseline differences between participants are not reported in the available material.

5. INTERPRETATION

The result suggests that a measure capable of summarizing glucose exposure over time can identify, in this specific population, individuals in whom metabolic impairment is more persistent. HbA1c does not just capture a single fasting morning; it depends on the amount of glucose circulating over the previous weeks and therefore also incorporates a portion of the variations that occurred after meals.This is the segment of the book's narrative actually supported by the study: prediabetes defined by HbA1c higher observed frequency of diabetes in the following five years compared to prediabetes defined by fasting glycemia alone. The idea that this difference represents a progressive impairment of pancreatic beta-cell insulin secretion and an increase in insulin resistance is pathophysiologically plausible, but it was not measured directly in the analyzed study.The data does not authorize considering HbA1c as always superior to fasting glycemia. The two tests may identify only partially overlapping groups, and their predictive capacity depends on the population, the thresholds used, conditions that modify HbA1c, and the definition adopted for incident diabetes.

6. INDEPENDENT CONFIRMING EVIDENCE

A systematic review of 16 prospective studies, involving a total of 44,203 adults and a mean follow-up of 5.6 years, found a continuous relationship between HbA1c and the subsequent development of diabetes. In subjects with HbA1c between 5.5% and 6.0%, the five-year incidence ranged from 9% to 25%; with HbA1c equal to or greater than 6.0%, the five-year risk ranged from 25% to 50%. This evidence confirms the prognostic step in the book: a higher HbA1c identifies a greater future probability of diabetes. The review collects observational studies and does not prove that HbA1c is the cause of metabolic evolution; furthermore, some definitions of incident diabetes included glycemic markers linked to HbA1c itself [1].An analysis using continuous glucose monitoring clarified why HbA1c can provide additional information compared to fasting glycemia alone. In 77 participants without diabetes, greater glycemic exposure after meals was associated with higher HbA1c after adjusting for potential confounding factors. The study therefore supports the intermediate step of the narrative: HbA1c also reflects postprandial glycemic components—that is, those occurring after meals—which are not detectable by a single fasting blood draw. The sample was small and the study was observational; it does not allow for directly attributing the risk of diabetes to these glycemic excursions [2].Taken together, these independent studies reinforce the idea that HbA1c is a prognostic biomarker—that is, an indicator associated with the likely future course—and that it synthesizes aspects of daily glycemia different from those captured by fasting measurements alone. Confirmation of the link with beta-cell function and insulin resistance, however, remains predominantly indirect.

7. CONFLICTING EVIDENCE

A large Japanese cohort provided results less favorable to the idea of a clear superiority of HbA1c. In 6,241 adults without diabetes followed for an average of 4.7 years, the progression to diabetes among those who had prediabetes identified only by HbA1c was 7%, compared to 9% among those who had prediabetes identified only by fasting glycemia; the difference was not statistically significant. After adjustment, both criteria were associated with a strong increase in risk compared to normoglycemia: HR 6.00 for isolated HbA1c and HR 6.16 for isolated fasting glycemia [3].This study does not contradict the fact that HbA1c can signal an increased risk. However, it scales back the comparative claim that it always identifies a more vulnerable population than fasting glycemia. The concordance between the two tests was incomplete, and the highest risk was observed when both criteria were present. The differences between the Japanese and Korean cohorts may depend on the population, period, definitions, and baseline metabolic characteristics.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the publication subject to the review from the independent research used to confirm or define the narrative of the book's paragraph.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Prospective cohort	17,971 Korean adults, followed for an average of 5.2 years	Prediabetes defined by HbA1c showed a 14.7% progression to diabetes, compared to 10.4% using the fasting glycemia criterion.	direct confirmation	moderate
[1]	Systematic review of prospective cohorts	44,203 adults across 16 studies	As HbA1c increased, the subsequent risk of diabetes increased; HbA1c ≥6.0% was associated with a 25% to 50% five-year risk.	direct confirmation	moderate
[2]	Observational with continuous glucose monitoring	77 people without diabetes and groups with type 2 diabetes	In people without diabetes, higher postprandial glycemic exposure was associated with higher HbA1c.	biologically consistent evidence	preliminary
[3]	Longitudinal cohort	6,241 Japanese adults without initial diabetes	HbA1c and fasting glycemia in isolation showed similar risk increases; the combination of the two criteria identified the highest risk.	discordant evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed directly supports the finding that, in the Korean cohort examined, prediabetes defined by HbAIc was associated with a higher observed progression to diabetes compared to prediabetes defined by fasting glycemia alone. The prognostic value of HbAIc is confirmed by independent evidence, and its link to postprandial glycemic exposure is biologically plausible. However, it remains necessary to avoid a generalized conclusion of HbAIc superiority: the tests identify different and complementary profiles, and their performance varies across populations and clinical settings.

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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