



Blood Sugar and Health

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A LifeLong Health Presentation

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High fasting blood sugar levels increase risk for heart disease, stroke, and overall mortality even at levels below diagnosed diabetes. The following study shows the need for maintaining healthy blood sugar levels, even below levels indicating diabetes.



Glycated Hemoglobin (HbA_{1c})

- This test indicates the average blood glucose concentration over the past three months
 - It is being suggested as a screening tool for diabetes (a HbA_{1c} of 7.0 or higher indicates diabetes)
 - It also predicts increased risk of heart disease and overall mortality even for people without diabetes

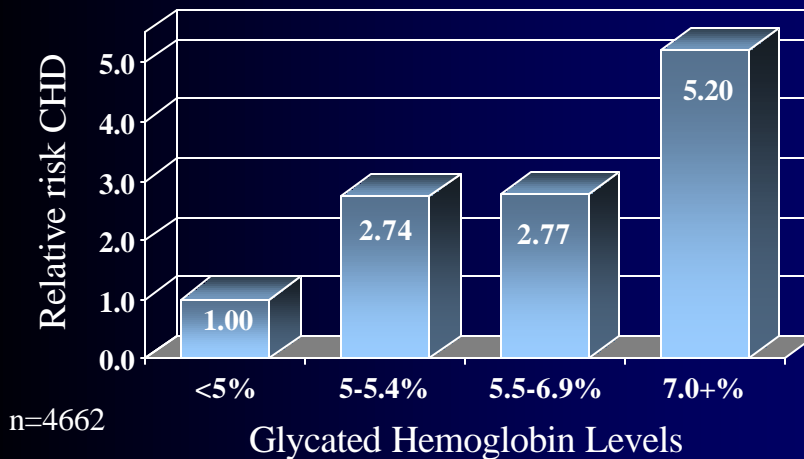
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A glycated hemoglobin (HbA_{1c}) test indicates the average blood glucose concentration over the past three months and is being suggested as a screening tool for diabetes and increased risk of heart disease and overall mortality.

Kay-Tee Khaw et al, Glycated haemoglobin, diabetes, and mortality in men in Norfolk cohort of European Prospective Investigation of Cancer and Nutrition, *British Medical Journal* Vol. 322:1-6, Jan. 6, 2001



Glycated Hemoglobin and Coronary Heart Disease



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In a prospective study of 4,662 men in Norfolk (United Kingdom) followed for 4 years, blood sugar levels, measured using glycated hemoglobin, were a strong predictor of coronary heart disease.

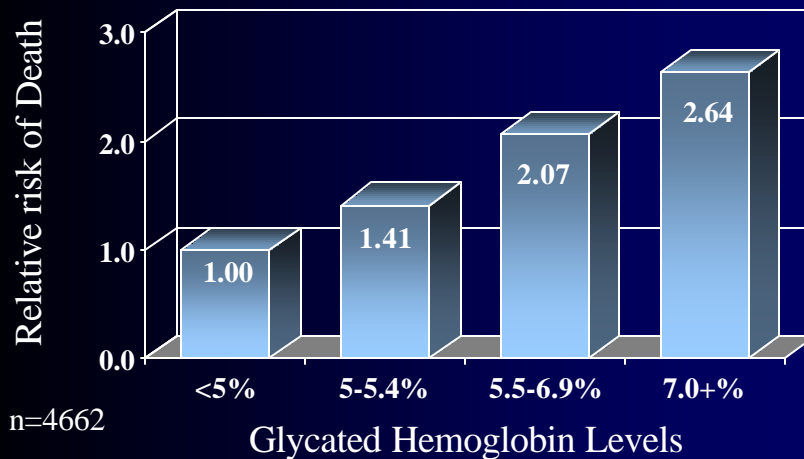
Men with glycated hemoglobin levels of 5% or greater were at increased risk of ischemic heart disease. Their relative risk was about 2.8 times higher, even if they didn't have diabetes. In persons with diabetes, a high glycated hemoglobin (7.0 or higher) increased the risk of developing coronary heart disease by 5.2 times.

This increased risk is after adjusting for age, blood pressure, cholesterol, BMI, smoking, and history of cardiovascular disease.

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Glycated Hemoglobin and Mortality from All Causes



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This graph shows the increased risk of mortality from any cause in relationship to glycated hemoglobin levels.

The predictive value of glycated hemoglobin for total mortality was stronger than that for cholesterol, blood pressure, and body mass index.

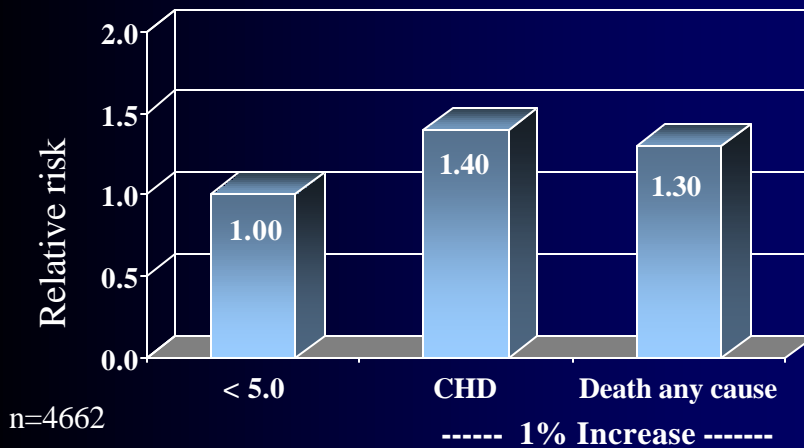
This increased risk is after adjusting for age, blood pressure, cholesterol, BMI, smoking, and history of cardiovascular disease.

People with glycated hemoglobin levels less than 5.0% had the lowest mortality level.

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Relative Risk of a 1% Increase in Glycated Hemoglobin



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An increase of 1% in glycated hemoglobin was associated with roughly a 30% increase in mortality from all causes, and a 40% increase in mortality from coronary heart disease.

Kay-Tee Khaw et al, Glycated haemoglobin, diabetes, and mortality in men in Norfolk cohort of European Prospective Investigation of Cancer and Nutrition, *British Medical Journal* Vol. 322:1-6, Jan. 6, 2001



Affect of a 1% Increase in Glycated Hemoglobin

- An increase of 1% in glycated hemoglobin is associated with roughly a ...
 - 30% increase in mortality from all causes
 - 40% increase in mortality from coronary heart disease

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Conclusion from authors of study.

82% of the excess mortality due to elevated glycated hemoglobin levels (5.0 or greater) was among those people without diabetes. Thus, the authors conclude that more lives could be saved by lowering the glycated hemoglobin levels of the entire population than by just focusing on diabetics. This is because only about 5% of the population (aged 45+) have diabetes.

Kay-Tee Khaw et al, Glycated haemoglobin, diabetes, and mortality in men in Norfolk cohort of European Prospective Investigation of Cancer and Nutrition, *British Medical Journal* Vol. 322:1-6, Jan. 6, 2001



Conclusions

Only about 3-5% of the population over age 45 has diabetes

- But, about 70% of the non-diabetic population over 45 have high glycated hemoglobin levels (HbA_{1c} of 5% or higher)
- Thus 80% of excess mortality due to high glycated hemoglobin (high blood sugar) is in those persons without diabetes

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Prevention Strategy

Reduce the average blood sugar level of the general population to achieve a glycated hemoglobin level less than 5.0% by:

1. Decrease excess body fat
2. Increase the level of physical activity
3. Improve eating habits
 - Decrease the glycemic load in the diet
 - Eat less refined carbohydrates and eat more foods high in dietary fiber

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The focus on heart disease prevention has centered primarily around fats and cholesterol in the diet in past years. This study points out the need to also look at those behaviors linked to high blood sugar levels, primarily:

1. Excess body fat
2. Inactivity
3. Nutritional habits, primarily glycemic load, and dietary fiber intake.

All of these lifestyle changes can help improve glucose tolerance (help prevent insulin resistance which causes an increase in blood sugar levels).



Foods that Affect Glycemic Load

High Glycemic Load Foods

- Snack foods
- Fast foods
- Pastry, cookies
- Sweets
- Soda pop
- White bread/rice
- Refined carbohydrates
- Potatoes

Low Glycemic Load Foods

- Fresh fruits
- Vegetables
- Legumes, peas, beans, garbanzos, soy, tofu
- Nuts
- Whole-grain breads and cereals including oatmeal and brown rice
- Protein rich foods
- Healthy fats

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For a healthy heart and overall good health, keep physically active, maintain a healthy weight and eat healthfully by choosing foods low in saturated and animal fats and with a low glycemic load.

Note: Potatoes have a high glycemic index but are OK to use moderately, especially if you are not overweight and are physically active.



END

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