

COMPARATIVE ANALYSIS OF BLOOD SUGAR LEVELS IN STUDENTS IN COMPARISON WITH INTERNATIONAL STANDARDS

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Abstract Monitoring blood glucose levels is a key element in the prevention of metabolic and cardiovascular disorders. This study evaluated changes in blood sugar levels among students under different conditions (fasting, after physical activity, and after consuming sugar-containing drinks) and compared the results with international standards established by the World Health Organization (WHO), American Diabetes Association (ADA), and International Diabetes Federation (IDF). The results demonstrated that body weight, physical activity, and dietary habits significantly influence blood glucose levels. Hypoglycemia was observed in underweight students, while excessive consumption of sugary drinks raised glucose levels close to the prediabetic range. Physical activity led to a reduction in glucose due to increased utilization by muscles. These findings emphasize the importance of a healthy lifestyle and regular monitoring of blood glucose among young adults.

Keywords: blood sugar, glucose, glucometer, insulin, diabetes mellitus, hypoglycemia, physical activity.

Introduction

Hyperglycemia and disturbances in carbohydrate metabolism remain a significant medical and social problem worldwide. According to WHO and IDF, more than 537 million adults currently live with diabetes, and this number is projected to rise to 783 million by 2045. Elevated blood glucose levels are strongly associated with cardiovascular complications,

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nephropathy, retinopathy, and other metabolic disorders. Conversely, a decrease in blood sugar below the physiological norm (hypoglycemia) may lead to weakness, cognitive dysfunction, and in severe cases, hypoglycemic coma.

International diagnostic criteria define the following thresholds:

- Fasting glucose: <5.6 mmol/L (normal), $5.6\text{--}6.9$ mmol/L (impaired fasting glucose), ≥ 7.0 mmol/L (diabetes).
- 2 hours after food intake: <7.8 mmol/L (normal), $7.8\text{--}11.0$ mmol/L (prediabetes), ≥ 11.1 mmol/L (diabetes).

Given the increasing prevalence of glucose metabolism disorders, it is crucial to study fluctuations of blood sugar under different physiological conditions such as dietary habits, body mass, and physical activity.

Aim

To analyze changes in blood sugar levels among students under different physiological conditions (fasting, after physical activity, and after consuming sugar-containing drinks) and compare the results with international standards.

Materials and Methods

The study included 32 medical students aged 18–22 years (56.2% females, 43.8% males). Capillary blood glucose was measured using a certified glucometer.

Three conditions were tested:

1. Fasting – after overnight rest.
2. After physical activity – following 5–7 minutes of stair climbing and squatting.
3. After consumption of sugar-containing drinks (cola, sweetened beverages) – measured 20 minutes post intake.

Glucose values were compared with international standards (WHO, ADA, IDF).

Results

1. Fasting glucose

- Students with body weight 60–70 kg had an average glucose level of 4.45 mmol/L – within the normal range (<5.6 mmol/L).
- Students with lower body weight (39–50 kg) demonstrated values of 2.5 mmol/L, indicating hypoglycemia.

2. After physical activity

- Before exercise: 4.5–5.0 mmol/L.
- After exercise: decreased by 0.5–1.0 mmol/L to 3.0–3.5 mmol/L, reflecting increased glucose utilization by muscles. In some cases, values approached hypoglycemic levels.

3. After consuming sugar-containing drinks

- Blood sugar rose by 1.0–1.5 mmol/L, reaching 5.5–6.0 mmol/L.
- These values remain within the normal postprandial range (<7.8 mmol/L), but they are close to the threshold for impaired glucose tolerance.

Discussion

The study demonstrated that blood glucose levels vary significantly depending on body weight, diet, and physical activity:

- Fasting hypoglycemia was observed in underweight students, indicating potential nutritional imbalance. This finding is consistent with WHO reports that insufficient caloric intake can lead to low glucose levels.
- Physical activity effectively reduced glucose levels, highlighting its role in maintaining normal carbohydrate metabolism. However, excessive

lowering in some individuals suggests the need for balanced exercise and nutrition.

- Sugary beverages elevated glucose levels to near-prediabetic ranges. Although within the acceptable postprandial limits, regular consumption of such drinks is linked to insulin resistance and metabolic syndrome, as described in ADA and IDF guidelines.

These results confirm the importance of lifestyle modification in preventing glucose metabolism disorders.

Conclusion

1. Blood glucose levels among students with normal body weight generally remained within international standards, while underweight students showed hypoglycemic tendencies.
2. Physical activity decreased glucose levels by 0.5–1.0 mmol/L, underlining its key role in glucose utilization.
3. Consumption of sugar-containing drinks increased glucose to near the upper normal threshold, suggesting long-term risks for prediabetes and type 2 diabetes.
4. Preventive measures should include:
 - balanced nutrition,
 - reduced intake of sugary beverages,
 - regular physical activity,
 - routine monitoring of blood glucose.

References

1. World Health Organization. Global report on diabetes. Geneva: WHO, 2021.
2. American Diabetes Association. Standards of Medical Care in Diabetes – 2024. Diabetes Care, 2024; 47(Suppl. 1).
3. International Diabetes Federation. IDF Diabetes Atlas, 10th edition.
<https://newconference.ru/index.php/Ireland>

Brussels: IDF, 2021.

4. Witek K, Wydra K, Filip M. A High-Sugar Diet Consumption, Metabolism and Health Impacts with a Focus on the Development of Substance Use Disorder: A Narrative Review. *Nutrients*. 2022;14(14):2940.
5. Sharma K, Akre S, Chakole S, Wanjari MB. Stress-Induced Diabetes: A Review. *Cureus*. 2022;14(9):e29142.