

Abnormal Blood Glucose as a Prognostic Factor for Adverse Clinical Outcome Among Children with Acute Medical Conditions in Ghana.

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Introduction

Abnormal blood glucose (hypoglycemia or hyperglycemia) is associated with increased morbidity and mortality in acutely ill children.

Extent of the problem has not been assessed in Ghana.

Patients and Methods

Definitions:

Hyperglycemia: blood glucose ≥ 8.3 mmol/L (150 mg/dl)^{1,2}

Hypoglycemia: blood glucose level < 2.5 mmol/L (45 mg/dl)³

Severe malaria: malaria with life threatening event

Severe malaria with acute disease: malaria with another acute disease

Assumed malaria: clinically but not biochemically proven malaria

Study design

Prospective cohort study

Exposed: Dysglycemia

Non Exposed: Euglycemia matched to age group and specific diagnosis

Age groups were 3-23.9 months, 24-59.9 months and 60-144 months

Outcome: complication (including death)

Results

To get 430 children with euglycaemia and dysglycaemia in a ratio of 1:1, a total of 800 consecutive patients were enrolled

Age Group Distribution

Age (months)	Exposed (%)	Non Exposed (%)
3.0-23.9	100 (46)	101 (47)
24.0-59.9	58 (27)	58 (27)
60.0-144.0	57 (26)	56 (26)
Total (%)	215 (100)	215 (100)

The commonest acute medical condition among children admitted with abnormal blood glucose was Severe Malaria.

Blood Glucose Distribution Among Participants

Glycaemia	Both (%)	Non exposed(%)	Exposed (%)
Normoglycaemia	215 (50)	215(50)	0 (0)
Hypoglycaemia	28 (7)	0 (0)	28 (7)
Hyperglycaemia	187 (43)	0 (0)	187 (43)
Total (%)	430 (100)	215(50)	215(50)

Complications Among Patients

Complications	Both (%)	Exposed(%)	NonExposed(%)	Total (%)	p-value
No Complication	314 (73)	119 (55)	195 (91)	314 (73)	0.000
Complication	116 (27)	96 (45)	20 (9)	116 (27)	0.000
Total	430 (100)	215 (50)	215 (50)	430(100)	

Both = Exposed and Non Exposed together

The complications among patients with acute medical conditions include Shock, IVH, ARF etc.

Outcome at discharge

Outcome	Both(%)	Exposed(%)	Non Exposed(%)	p-value
Died on Ward	40 (9)	30 (14)	10 (5)	0.001
Discharged well	382 (89)	179(83)	203 (94)	0.001
Discharged with complications	8 (2)	6 (3)	2 (1)	0.001
Total (%)	430 (100)	215 (50)	215 (50)	

Both = Exposed and Exposed together

Outcome Among Glycaemic Groups

Glycaemic group	Survived (%)	Died (%)	Total (%)
Normoglycaemia	205 (95)	10 (5)	215 (100)
Hypoglycemia	18 (64)	10 (36)	28 (100)
Hyperglycaemia	167 (89)	20 (11)	187 (100)

A total of 40 patients died by the end of the study and 30 (75%) of them had abnormal blood sugar ($p = 0.000$). More patients died within the hypoglycaemia group (10/28) compared to those with hyperglycaemia (20/187) $p = 0.000$.

Relative Risk of dying is 3 among patients with dysglycemia compared to a patient with euglycemia (95% CI: 1.5-6.0), $p < 0.001$

Relative Risk of developing complications is 4.8 in patient with dysglycemia (95% CI: 3.1-7.5) ($p = 0.000$)

Discussion

The results of this study show that dysglycemia reflect increased severity of an acute medical condition in children presenting to the emergency room at KATH.

These figures are similar to findings in other studies. Elusiyan et al³ found out that presence of hypoglycaemia at admission was associated with death and dying within 24 hours of admission. Moreover, Osier et al⁴ in Kenya found out that mortality for children with abnormal blood glucose was 34.2% compared to 7.6% in euglycemic children admitted to an emergency ward.

Conclusion

Dysglycemia is associated with increased complications and mortality. Hypoglycemia is a greater predictor.

Recommendations

All hospitals and clinics should do random blood glucose for all children with acute medical illness

Those found to be **hypoglycaemic** should be immediately managed with 10% dextrose and monitored and the primary condition effectively managed

Children with **hyperglycaemia** on admission should be monitored closely till resolution

References

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