

Determine the Prevalence and Outcomes of Hypoglycemia in Children with Severe Acute Malnutrition

Hypoglycemia in Children with Acute Malnutrition

Rukhsana Habib, Attaullah Bizenjo, Saima Rayaz and Mohammad Hanif

ABSTRACT

Objective: To examine the incidence rate and outcomes of hypoglycemia in children presented with severe acute malnutrition.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Paediatric Medicine Unit 4, Bolan Medical Complex Hospital Quetta from June 2019 to November 2019.

Materials and Methods: Two hundred and five patients of both genders presented with severe acute malnutrition were included. Patients detailed demographic including age, sex and socio-economic status were recorded. Serum glucose level was examined in all the patients. Prevalence of hypoglycemia was recorded. Outcome in term of mortality was examined.

Results: One hundred and twenty (58.64%) patients were males and 85 (41.36%) patients were females. Majority of patients 132 (64.39%) were ages <1 years. Hypoglycemia was found in 40 (19.51%) patients. 32 (15.61%) patients were died among all the patients. Out of 40 hypoglycemic patients 24 (60%) were died and in normoglycemic 8/165 (4.85%) patients were died.

Conclusion: The frequency of hypoglycemia was high in children with severe acute malnutrition. Mortality rate was high in hypoglycemic patients as compared to normoglycemic children.

Key Words: Severe Acute Malnutrition, Hypoglycemia, Mortality

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INTRODUCTION

Malnutrition includes both under nutrition and over nutrition.¹ Under-nutrition is preventable cause of morbidity and mortality among children aged below five years.² Moreover severe malnutrition is one of the reasons of hospital admissions in economically poor.^{3,4} Diarrhea is the second most common life threatening condition worldwide among all infectious diseases in children younger than 5 years.⁵ Diarrhea and malnutrition are inter-related. Hypoglycemia is usually associated with severe malnutrition and persistent diarrhea.^{6,7} Decreased stores of glycogen, increased peripheral utilization of glucose, and intestinal malabsorption have all been associated with hypoglycemia.⁸

In children, hypoglycemia resulting from impaired glucogenesis is associated with mortality from infectious diarrhoea regardless of their nutritional status. The major long term sequelae of severe prolonged hypoglycemia are neurological damage resulting in mental retardation, cognitive impairment, neurological deficit and recurrent seizure activity.^{9,10} Incidence of hypoglycemia varies with the definition, population, method and timing of feeding, and the type of glucose assay.¹¹ The age is also helpful in assessing the probable diagnosis of hypoglycemia. The incidence is highest in the immediate post neonatal period.¹²

MATERIALS AND METHODS

This observational study was conducted at Department of Paediatric Medicine Unit 4 Bolan Medical Complex Hospital Quetta from 1st June 2019 to 30th November 2019. A total of 205 patients of both genders presented with severe acute malnutrition according to the WHO criteria of severe acute malnutrition. Patients detailed demographic including age, sex and socio-economic status were recorded. Patients with congenital heart disease, renal failure patients, cerebral palsy patients and patients with ages above 2 years were excluded. Blood sample was obtained from all the patients to examine the serum glucose level. Hypoglycemia was defined as serum glucose level <54mg/dl. Complete examination was done. Frequency of hypoglycemia was

Department of Paediatric Medicine, Bolan Medical Complex Hospital Quetta.

Correspondence: Dr. Rukhsana Habib, Chief Lady Medical Officer, Paediatric Medicine Unit 4, Bolan Medical Complex Hospital Quetta.

Contact No: 0343-8259814

Email: drrukhjamail.com

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recorded. Outcomes in term of mortality associated to hypoglycemia were examined. Data was analyzed by SPSS 24. Chi-square and student t' test was applied to compare the mortality between hypoglycemic and normoglycemic patients. P-value <0.05 was considered as significant.

RESULTS

One hundred and twenty (58.64%) patients were males and 85 (41.36%) patients were females. Majority of patients 132 (64.39%) were ages <1 year while 73 (35.61%) patients had ages above 1 year. 128 (62.44%) patients had low-socioeconomic status while remaining 77 (37.56%) patients had middle socio-economic status. 175 (85.37%) patients were marasmic while 30 (14.63%) patients were khwashikor (Table 1). From all the patients 40 (19.51%) patients were hypoglycemic while 165 (80.49%) patients were normoglycemic (Fig. 1).

Table No.1: Baseline characteristics of all the patients

Variable	No.	%
Gender		
Male	120	58.64
Female	85	41.36
Age (years)		
<1r	132	64.39
>1	73	35.61
Socioeconomic status		
Low	128	62.44
Middle	77	37.56
Type of SAM		
Marasmus	175	85.37
Khwashikor	30	14.63

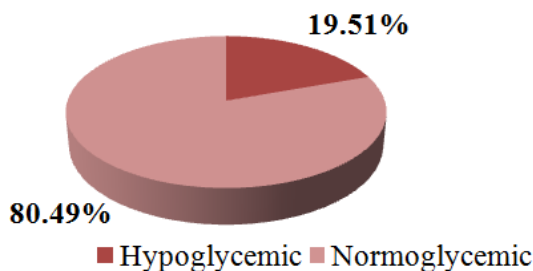


Figure No. 1: Frequency of hypoglycemia

Among 175 marasmic patients 33 (18.86%) patients had hypoglycemia and among 30 khwashikor patients 7 (23.33%) patients had hypoglycemia (Table 2). The overall mortality observed in 32 (15.61%) patients. Out of 40 hypoglycemic patients 24 (60%) were died and in normoglycemic 8/165 (4.85%) patients were died. We found a significant difference in term of mortality between hypoglycemic and normoglycemic patients p-value <0.001 (Table 3).

Table No. 2: Frequency of hypoglycemia according to the bilateral pedal edema

Hypoglycemia	With edema (n=30)	Without edema (n=175)	P-value
Yes	7 (23.33%)	33 (18.86%)	0.046
No	23 (76.67%)	142 (81.14%)	

Table No.3: Mortality between hypoglycemic and normoglycemic patients

Mortality	With edema (n=30)	Without edema (n=175)	P-value
Yes	24 (60%)	8 (4.85%)	<0.0001
No	16 (40%)	157 (95.15%)	

DISCUSSION

Severe acute malnutrition is one of the most common pediatric disorders in developing countries and it accounted 5 to 50% of mortality among children with ages less than 5 years.^{13,14} Worldwide children with severe acute malnutrition had high rate of morbidity and mortality. Hypoglycemia is one of the common complications in severe acute malnutrition patients and directly associated with high rate of morbidity and mortality.^{15,16} The present study was conducted to examine the prevalence of hypoglycemia and mortality associated to hypoglycemia in children with severe acute malnutrition. In present study 120 (58.64%) patients were males and 85 (41.36%) patients were females. Majority of patients 132 (64.39%) were ages <1 year while 73 (35.61%) patients had ages above 1 year. These results were similar to many of previous studies in which male patients were high in numbers 55 to 70% as compared to females and mostly patients with severe acute malnutrition were ages less than 12 months.^{17,18}

In the present study 175 (85.37%) patients were marasmic while 30 (14.63%) patients were khwashikor. These results were similar to the study conducted by Khan et al¹⁹ regarding frequency of hypoglycemia in severe acute malnutrition children and they reported 83.67% patients were without edema and 16.33% patients were with bilateral pedal edema.

We found that 40 (19.51%) patients were hypoglycemic while 165 (80.49%) patients were normoglycemic. Khan et al¹⁹ reported frequency of hypoglycemia in severe acute malnutrition patients was 8.2%. Another study conducted by Tahseen et al²⁰ reported that 30.4% patients were hypoglycemic among 184 severe acute malnutrition patients. A study conducted by Meena et al²¹ reported the prevalence of hypoglycemia was 11.11%.

This study showed that overall mortality observed in 32 (15.61%) patients. Out of 40 hypoglycemic patients 24 (60%) were died and in normoglycemic 8/165 (4.85%) patients were died. We found a significant difference in term of mortality between hypoglycemic and normoglycemic patients. These results were similar to the study by Tahseen et al²⁰ reported that 41 (67.21%) out of 56 children from hypoglycemic group while 20 (15.6%) out 128 children from normoglycemic group expired. The mortality was significantly more in hypoglycemic children. (P=0.000). Our study results regarding outcomes of hypoglycemia were similar to some other previous studies in which mortality rate in hypoglycemic patients was high 40-70% as compared to normoglycemic patients.²²⁻²⁴

CONCLUSION

Severe acute malnutrition is one of the commonest disorders in infants and children less than 24 months with high morbidity and mortality rate. We concluded that the frequency of hypoglycemia was high in children with severe acute malnutrition. Mortality rate was high in hypoglycemic patients as compared to normoglycemic children.

Author's Contribution:

Concept & Design of Study: Rukhsana Habib
 Drafting: Attaullah Bizenjo
 Data Analysis: Saima Rayaz,
 Mohammad Hanif
 Revisiting Critically: Rukhsana Habib,
 Attaullah Bizenjo
 Final Approval of version: Rukhsana Habib

Conflict of Interest: The study has no conflict of interest to declare by any author.

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