

# Non-traumatic childhood coma in Ebonyi State University Teaching Hospital, Abakaliki, south eastern Nigeria

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## Abstract

**Background:** Coma is a medical emergency, and optimal management, especially in a resource-poor setting, would depend on the knowledge of its etiology and predictors of outcome. This communication reviews the etiology and outcome of non-traumatic childhood coma in Ebonyi State University Teaching Hospital (EBSUTH), Abakaliki.

**Objective:** To determine the incidence, etiology and outcome of non-traumatic coma in children seen at the EBSUTH, Abakaliki.

**Materials and Methods:** This is a retrospective analysis of records of all children admitted to the children emergency ward of EBSUTH in coma of a non-traumatic origin between 1<sup>st</sup> of January and 31<sup>st</sup> of December, 2007.

**Results:** Forty children presented with coma out of 673 children admitted during the study period, giving an incidence rate of 5.9%. The majority of the children (62.5%) were aged between 1 and 5 years of age, and 79.5% of them were deeply comatose on admission. Most of the cases (85%) of non-traumatic coma were due to infective causes, mainly cerebral malaria (47.5%), pyogenic meningitis (17.5%) and septicemia (10%). Twenty-four (60%) children recovered while 13 (32.5%) died.

**Conclusion :** Infections were the predominant causes of non-traumatic coma in EBSUTH. In view of the high mortality among this group of patients, efforts at the control of malaria and other infections would significantly reduce the incidence of non-traumatic coma in this study site.

**Key words:** non-traumatic coma, children, infections

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## Introduction

Coma is a common childhood neurological emergency that can have a devastating outcome.<sup>[1]</sup> Its etiologies are variable, but are mainly classified into traumatic and non-traumatic because, essentially, traumatic coma is a surgical problem while non-traumatic coma is commonly managed by physicians.<sup>[2]</sup>

Understanding the etiology and predictors of outcome of non-traumatic coma can influence the development of

improved management strategies, especially in resource-poor countries where supportive diagnostic facilities are rarely available.<sup>[3,4]</sup> There is scant information on the etiology and outcome of non-traumatic comatose children in developing countries.<sup>[2-6]</sup> Earlier studies on childhood coma in Nigeria were conducted more than 20 years ago in the South West of the country.<sup>[4-6]</sup>

This study is therefore reviewing the etiology and immediate outcome of non-traumatic coma cases of children that were

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managed at the Children Emergency Ward of The Ebonyi State University Teaching Hospital (EBSUTH), Abakaliki, in the South East of Nigeria. It is hoped that the information derived thereof will help improve the management of children with non-traumatic coma.

### Materials and Methods

This is a retrospective analysis of the medical records of all children admitted into the children emergency ward of the EBSUTH, Abakaliki, over a 1-year period between 1<sup>st</sup> January and 31<sup>st</sup> December, 2007. Children admitted with acute alteration in consciousness were the subjects of the study; however, those alterations of consciousness due to trauma were excluded.

Data collected from the case records include patients' age, sex, date of presentation, duration of illness before presentation, duration of hospitalization, other presenting symptoms, diagnosis (as documented in the case record), consciousness level at admission and outcome classified as discharged, discharged against medical advice (DAMA), referred and death.

Analysis was performed using SPSS version 11.0 and frequencies were compared using the chi square test. All the tests were performed at the 5% significance level ( $P < 0.05$ ).

**Table 1: Age and sex distribution of children presenting with non-traumatic coma at the EBSUTH**

Age (months)	Sex		Total
	Males	Females	
2-12	4	1	5
>13 to 59	8	17	25
>60	6	4	10
Total	18	22	40

EBSUTH: Ebonyi State University Teaching Hospital

### Results

#### Demographic characteristics

During the period under review, 673 children were admitted to the children emergency ward, of which 40 (5.94%) had non-traumatic coma. The average monthly distribution of cases was 3.3 per month, with the modal presentation in June (8; 20%). Table 1 shows that pre-school children (25; 62.5%) constituted 2/3<sup>rd</sup> of the cases and females (22; 55%) presented more frequently than males (18; 45%).

#### Etiology and clinical characteristics

Table 2 highlights the documented causes of coma; the predominant causes were infective in 34 (85%). Cerebral malaria (19; 47.5%) was the most common cause, while other common causes were also infections, pyogenic meningitis (7; 17.5%) and septicemia (4; 10%). Only one case of cerebral malaria presented in infancy; the majority (14/19; 74%) were aged 1-5 years compared with 11/21 (55%) children with other conditions presenting during this age group. The difference in distribution of diseases according to age was however not significant ( $X^2 = 22.7$ ,  $P = 0.42$ ).

Twenty-six (65%) children were ill for 24 h or less before presentation while for 11 (27.5%), their illnesses had lasted for between 2 and 7 days and one (2.5%) child was ill for more than 7 days. The information on the duration of illness was not available for two (5%) children. Eight children (20%) were on admission for less than or equal to 24 h, while 18 children (45%) spent between 2 and 7 days on admission and 12 children (30%) were on admission for more than 7 days. The record of duration of hospital stay of two (5%) children was not available.

Table 3 shows the other presenting symptoms. Most of the children presented with more than one symptom: fever (34; 85%) and convulsion (23; 57.3%) were the most common

**Table 2: Distribution of etiology of non-traumatic comatose children in the EBSUTH according to their age**

Diagnosis	Age group (months)			Total
	2-12	13-59	>60	
Cerebral malaria	1	14	4	19
Meningitis	2	2	3	7
Septicemia	1	2	1	4
Encephalitis	0	2	0	2
Status epilepticus	0	1	1	2
Acute watery diarrhea	1	0	0	1
Hepatic encephalopathy	0	1	0	1
Kerosene poisoning	0	1	0	1
Alcohol poisoning	0	0	1	1
Bronchopneumonia	0	1	0	1
Neurocutaneous syndrome/hydrocephalus	0	1	0	1
Total	5	25	10	40

$X^2 = 22.7$ ,  $df = 22$ ,  $P = 0.42$ , EBSUTH: Ebonyi State University Teaching Hospital

symptoms. The admitting Glasgow coma scale was available for 39 children. Most of them (31/39; 79.5%) were deeply comatose, with a Glasgow coma scale of less than or equal to 8, while the rest had a higher Glasgow coma scale (8/39; 20.5%).

### Outcome

Twenty-four (60%) children recovered and were discharged home, two (5%) were DAMA, one (2.5%) was referred out and 13 (32.5%) died. Table 4 shows that on logistic regression, none of the variables had a predictive effect on the mortality of the non-traumatic comatose children. Children with a Glasgow coma scale of less than or equal to 8 had higher mortalities (11/31; 35.5%) compared with those with a higher Glasgow coma score (2/8; 25%). However, the difference was not significant (Fisher's exact,  $P = 0.69$ ).

### Discussion

In this report, infections were the most common causes of non-traumatic coma. The predominance of infectious causes in non-traumatic childhood coma agrees with reports from other developing countries.<sup>[1-6]</sup> However, reports show that the infective agents differ depending on locality. Cerebral malaria being the predominant one in this study site is

similar to the finding in Ibadan<sup>5,6</sup> and Tanzania,<sup>[4]</sup> while septicemia was prominent in Saudi Arabia,<sup>[3]</sup> and Dengue fever was the major cause in South East Asia.

Pre-school age was the most common age group that presented with non-traumatic coma. This differs from the finding of Ali *et al.*<sup>[1]</sup> in Saudi Arabia that reported that non-traumatic coma was higher among infants while traumatic coma was more common among the pre-school age group. This was thought to be due to the increased risk of trauma in the pre-school age due to poor supervision. This difference could be due to the high contribution of cerebral malaria to the cases of coma in this study. Severe cases of malaria, like cerebral malaria, are uncommon in early infancy probably due to the maternally acquired partial protection in hyperendemic areas like Nigeria.<sup>[7]</sup> Its frequency, however, increases during early childhood and reduces after the age of 5 years, as also observed in this report.

The mortality rate of 32%, although higher than the 26.7% previously reported from Nigeria<sup>[6]</sup> and Canada, is comparable to recent records of between 35% and 47% from Ibadan,<sup>[4,5]</sup> Middle East<sup>[1]</sup> and India.<sup>[8,9]</sup> This high mortality is not likely to be due to late presentation, as a majority of the children (68%) presented early. The increased mortality in this and other recent Nigerian studies<sup>[4,5]</sup> could be a reflection of the declining investment in the health sector with a resultant inadequate manpower and diagnostic and resuscitation facilities.

Age and sex did not have any influence on the outcome in this report. Previous reports on this in the literature reveal conflicting findings; while some report that the mortality was worse among males compared with females, others did not find any difference.<sup>[7]</sup>

The non-relationship between Glasgow coma scale score and mortality had been reported severally.<sup>[1,4,8]</sup> While some had observed that it is the motor component that has a prognostic significance,<sup>[7]</sup> others observed that it is the predictive value that determines the neurological outcome among survivors.<sup>[1]</sup> Both individual components of Glasgow coma scale and neurological outcome were not assessed in

**Table 3: List of symptoms presented by children presenting with non-traumatic coma at the EBSUTH**

Symptoms	Frequency	Percent
Fever	34	38.6
Convulsion	23	26.1
Vomiting	6	6.8
Diarrhea	6	6.8
Headache	6	6.8
Cough	5	5.7
Fast breathing	3	3.4
Abdominal pain	2	2.3
Dizziness	1	1.1
Vomiting of blood	1	1.1
Smelling of alcohol	1	1.1
Smell of kerosene	1	1.1
Total	88	100

**Table 4: Logistic regression of factors predictive of mortality in non-traumatic comatose children in the EBSUTH**

Variables	B	SE	Wald	Sig	R	Exp
Age	-0.01	0.01	0.55	0.46	0.00	0.99
Sex	-2.29	1.72	1.78	0.18	0.00	0.10
Coma scale	0.73	0.46	2.55	0.11	0.11	2.07
Temperature	-0.67	0.52	1.62	0.20	0.00	0.57
Pulse rate group	2.86	1.86	2.36	0.12	0.92	17.52
Respiratory rate group	0.94	1.36	0.48	0.49	0.00	2.55
Duration of illness group	-0.002	0.10	0.56	0.81	0.00	0.998
Duration of admission	0.003	0.002	3.20	0.07	0.17	1.00
Diagnosis	-1.51	0.89	2.90	0.89	0.15	0.22

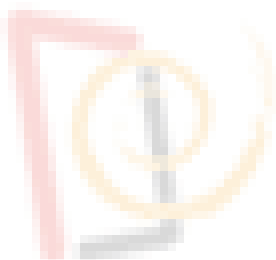
this communication. Nayana *et al.*<sup>[9]</sup> stated that Glasgow coma scale does not have a long-term predictive value in acute non-traumatic coma; rather, it is the etiologic agents that are predictive. In this study, both depth of coma and etiology were not predictive of outcome.<sup>[10]</sup>

In conclusion, non-traumatic coma in children in EBSUTH, Abakaliki, were mainly due to infections, with cerebral malaria being the predominant cause.<sup>[11]</sup> Mortalities among these cases were high, and there should be an increased effort at infection control so as to reduce the incidence of non-traumatic coma in this study site.

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