

# Etiology and Outcome of Non-traumatic Coma

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## ABSTRACT

**Abstract:** Non-traumatic coma is a result of heterogeneous group of diseases and is an important cause of morbidity and mortality in children. Local data is scarce on epidemiology. Literature on pediatric non-traumatic coma is rather inconclusive, as there are a few systematic studies, and most of them are retrospective.

**Objectives:** The Purpose of this study was to determine the specific age group, etiology and outcome of non-traumatic coma in children.

**Materials and Methods:** In an observational study over a period of 6 months from 1<sup>st</sup> July 2010 to 31 December 2010, files of 111 children aged between 1 month – 16 years admitted with non-traumatic coma GCS (Glasgow Coma Scale of < 12/15 with at least 6 hrs. duration) to the emergency section of Pediatrics Department of Jinnah Hospital Lahore were reviewed. Data was collected from the files and entered using SPSS version 16. Chi-square and P value were calculated. Etiology was determined from history, physical examination and relevant investigation. Outcome was grouped as died or discharged (with normal neurological examination with mild to moderate disability or vegetative state / severe neurological disability), left against medical advice or referred.

**Results:** Etiology was infectious in 66 (60%) patients, accidents / intoxication in 13 (11.4%) patients, epilepsy (status epileptics) in 12 (10.8%) patients, encephalopathy in 8 (7%) cases, metabolic (diabetic ketoacidosis, inborn error of metabolism) in 5 (4.50%) patients. Overall mortality was in 29 (26.12%). Mortality was high in infants 53.12% as compared to other age groups.

**Conclusion:** The most common cause of non-traumatic coma in children was Central Nervous System infections. Mortality was high in infants.

**Keywords:** Non-traumatic coma, Glasgow coma scale, mortality.

## INTRODUCTION

Coma is a frequent cause of admission in emergency ward of pediatric ICU. It is estimated that 10 – 15% of admission in emergency ward are because of coma (India).<sup>1</sup> Local data is scarce on epidemiology of non-traumatic coma.

Coma is not a disease but a symptom of many treatable and untreatable causes. If timely diagnosed, results are favorable. However, a delay in diagnosis may cause death.

The main purpose of this study was to find out etiology, outcome and factors affecting outcome.

Literature on pediatric non-traumatic coma is rather inconclusive, as there are a few systematic stu-

dies, and most of these are retrospective. Very little information is available, particularly so from developing countries including India.<sup>2-4</sup>

## MATERIALS AND METHODS

This is a retrospective study conducted in Department of Pediatrics Jinnah Hospital Lahore (JHL). The study was conducted over a period of 6 months. All patients coming to the emergency ward with GCS ≤ 12 / 15 between age of 1 month and 16 years were included in the study.

Data was collected on pre-designated proforma which included history, GCS, Neurological findings

etc. Relevant investigation as dictated by history and examination e.g CSF, Blood C/S, brain imaging, metabolic work up was done.

Etiology was grouped under the heading of infections, status epilepticus, accidental / intoxications, congenital, encephalopathy, metabolic and miscellaneous / undiagnosed cases.

**Infections** included:

Pyomeningitis, encephalitis, tuberculous meningi-

**Table 1:** Age wise distribution.

Age	Number = 111	Percentage
1 month – 1 year	32	28.9
> 1 year – 5 year	39	35.1
> 5 year – 15 year	40	36

**Table 2:** Cause specific outcome.

Etiology	Number	Percentage	Discharged with Normal CNS	Discharged with Impaired CNS	Died	LAMA
Infections	66	60%	34 (51.5%)	14 (22.2%)	18 (27.5%)	
Status epilepticus	12	10.8%	8 (66.7%)	2 (16.7%)		
Accidental / Intoxication	13	11.4%	11 (84.6%)			2 (15.4%)
Encephalopathy	8	7.20%	3 (37.5%)		4 (50%)	1 (12.5%)
Congenital	4	3.60%			4 (100%)	
Metabolic	5	4.50%	3 (60%)		1 (20%)	1 (20%)
Miscellaneous	3	2.70%	1 (33.3%)			2 (66.7%)
Total	111		60 (54%)	16 (14.4%)	29 (26.12%)	6 (5.40%)

P = 0.000

tis, brain abscess, cerebral malaria.

**Accidental / intoxication** included:

Near Drowning, electric shock, suffocation, poisoning, drug intake.

Congenital included brain malformations and congenital hydrocephalus etc.

**Encephalopathy** included hypertensive, disseminated encephalomyelitis, hepatic and intracranial bleeding.

**Metabolic** included diabetic ketoacidosis and inborn errors of metabolism.

**Miscellaneous** included undiagnosed cases.

**Table 3:** Age specific outcome.

Age	Number	Discharged	Died
1month – 1 year	32	15 (46.87%)	17 (53.12%)
> 1 year – 5 year	39	27 (69.23%)	7 (17.94%)
> 5 year – 16 year	40	33 (82.5%)	5 (12.5%)

P = 0.000

**Table 4:** GCS specific outcome.

GCS	Discharged	Died	LAMA	Referred	Total
3 – 8	19 (46.34%)	21 (51.21%)		1 (2.4%)	41 (37%)
9 – 15	56 (80%)	8 (11.4%)	6 (8.5%)		70 (63%)

P = 0.000

## RESULTS

During a study period of 6 months 111 children out of 2600 admissions (4.25%) were admitted with diagnosis of non-traumatic coma as per

criteria.

**Table 1:** Children < 5 years of age constituted

**Table 5:** Age specific etiology.

Age	Accidental / Intoxication	Congenital	Encephalopathy	Infections	Metabolic	Status	Misc.
1month – 1 yr.	5 (15.6%)	1 (3.1%)	1 (3.1%)	18 (56.3%)	4 (12.5%)	3 (9.4%)	
> 1 yr – 5yr.	5 (12.8%)	1 (2.4%)	2 (4.9%)	23 (56.1%)		8 (19.5%)	
> 5 yr – 15 yr.	3 (7.3%)	2 (4.9%)	5 (12.2%)	25 (61%)	1 (2.4%)	1 (2.4%)	3 (7.6%)

about two third (64%) of the study group.

**Table 2:** The most common cause of coma was infections 66 (60%) followed byaccidental / intoxication 13 (11.4%) and status epilepticus etc.

The most common cause of infection was acute bacterial meningitis (30.3%), encephalitis (18.18%) and TBM (10.60%)

Out of 111 case 29 (26.12%) died, 75 (67.56%) were discharged, 6 left against medical advice and 1 case was referred for VP shunt.

Mortality varied according to causes as it was 100% in congenital cases, 50% in cases with encephalopathies and 40% in metabolic cases.

Survival was better in cases with status epilepticus.

**Table 3:** Age also had an association with mortality. Among infants mortality was 17 (53.12%) as compared to 1 – 5 years and > 5 years to 16 years where it was 7 (17.94%) and 5 (12.5%) respectively.

**Table 4:** Out of 111 cases, 40 (37%) had GCS ≤ 8/15 and mortality was 21 (51.21%) in this group.

**Table 5:** Metabolic causes were more common in infants, status epileptics in 1 – 5 years old and encephalopathies in 6 – 15 years old children.

**DISCUSSION**

Most studies on childhood coma have been done in developed countries and there is few comprehensive data from developing countries, where 80% of the world’s children live.<sup>2</sup> To assess the severity of coma and predict its outcome, various scores have been used in the past including modified Glasgow coma scale.<sup>5</sup> In spite of its various drawbacks, it has been widely used for assessing pediatric coma, though only a few studies are available to support its use in pediatric coma as a whole.<sup>6,7</sup>

In our study frequency of different age groups admitted with non-traumatic coma showed that 64% of the children were < 5 years old. This is supported by A. M. Ali et al from King Fahad Hospital of Saudi

Arabia<sup>8</sup> who says that preschool age children constituted the greatest proportion of cases, 43.9%.

CNS infections were the most common cause of non-traumatic coma in our study. It is supported by many other studies such as those from India<sup>9-11</sup> and England.<sup>14</sup>

However, types of infections seem to vary in different studies, for example an Indian study<sup>9</sup> showed Dengue encephalitis was 28%, viral encephalitis 12%, T.B Meningitis 8%, shigella encephalopathy 3% and Cerebral Malaria 1%. Cerebral Malaria was the most common cause of infection in Africa,<sup>13</sup> where as Dengue hemorrhagic fever was an important cause of infection in South East Asia.<sup>2</sup>

A study from India<sup>10</sup> showed T.B Meningitis 19%, encephalitis 18%, Pyogenicmeningitis in 16% of the cases. When compared to our study, the results are a little bit different for, instance pyogenic meningitis was 21 (18%), viral encephalitis 18 (16%), T. B Meningitis 16 (14%) and Cerebral Malaria 3(2.7%).

The next common causes of non-traumatic coma were Accidental / intoxication 12% followed by epilepsy (causing prolonged seizure activity leading to status epilepticus) 10%. This contrasts with a study from Iran<sup>15</sup> which showed epilepsy (status epilepticus) in 29.4% cases as the second common cause of non-traumatic coma followed by Accidental / intoxication in 6 – 7% of cases. But our results are compatible with studies from India<sup>2,10</sup> which described epilepsy (status epilepticus) in 5 – 10% of cases.

The overall mortality of 26.12% in our study is high if compared to a study from Iran<sup>15</sup> which showed mortality of 16.6%. But when compared to a study from Nigeria<sup>1</sup> results were same, that is 26%. On the other hand mortality figures were higher than ours. i.e 36%, 45.6%, 47.3% from (Bansal’s) India,<sup>10</sup> Malaysia<sup>2</sup> and Saudi Arabia.<sup>8</sup>

The present study showed that outcome is dependent (associated) on the cause as P = 0.000 which is supported by a study from England<sup>16</sup> and from Saudi Arabia.<sup>8</sup> Our study described that mortality was 100%

in congenital cases, 50% in encephalopathies and 40% in metabolic causes. Survival was comparatively better in our status epilepticus, accidental / intoxication and CNS Infections.

The present study also emphasized that GCS at the time of admission also affected the outcome.  $P = 0.000$ . This is further supported by studies from Iran and Saudi Arabia.<sup>15,8</sup> In present study age was strongly associated with outcome  $P = 0.000$ , and also had some association with etiology  $P = 0.049$  as status epilepticus was common in 1 – 5 years old and encephalopathies in > 5 yr old children.

## CONCLUSION

- The most common cause of non-traumatic coma in children was infections.
- Mortality was high in infants
- Etiology of non-traumatic coma and level of GCS have association with outcome.

## SUGGESTIONS

- Vaccination to cover against Strept.pneumoni H. influenza should be improved.
- Identification and treatment of case of tuberculosis and screening of family should be done.
- Early diagnosis and meticulous care of children with non-traumatic coma to prevent progression of cerebral edema and raised intracranial pressure, is mandatory.

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