

ORIGINAL ARTICLE

Non-traumatic coma: causes and outcome in a Nigerian tertiary hospital

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INTRODUCTION

Coma is a state of unawareness of self and environment or a suspension of those mental activities by which people are made aware of

themselves and their environment, coupled always with a diminished responsiveness to environmental stimuli.¹ Patients presenting with non-traumatic coma are frequently seen

ABSTRACT

Background: Non-traumatic coma arising from primary neurological or non-neurological diseases is common, and the outcome is often poor. Data on non-traumatic coma among adults is lacking in South-East Nigeria.

Objective: To determine the causes and outcome of non-traumatic coma among adult medical in-patients who presented with coma.

Methodology: A retrospective study of the medical records of patients admitted in the medical wards of a Nigerian tertiary hospital on account of non-traumatic coma over a twenty-four month period.

Results: Non-traumatic coma accounted for 7.4% of the 1507 medical admissions ($n=111/1507$) during the period under review. There were 71 (64%) females and 40 (36%) males with a mean age of 57.7 ± 23.2 years and age range of 20 to 89 years. Stroke accounted for 52.2% ($n=58$) of non-traumatic coma while metabolic causes and infections accounted for 18.9% ($n=21$) and 18% ($n=20$), respectively. Infectious causes peaked in those below 50 years of age while stroke and metabolic causes peaked in those 50 years and above. Forty-two (37.9%) of the patients that died presented with Glasgow Coma Score (GCS) <6 . The difference in the outcome between those with GCS <6 and those with GCS ≥ 6 was statistically significant ($\chi^2 = 16.799, p=0.0001$).

Conclusion: Acute stroke accounted for most cases of non-traumatic coma followed by metabolic and infective causes. Even in non-traumatic coma the presenting GCS can be a valuable tool for prognostication.

Keywords: Adult in-patients, infections, metabolic, South-East Nigeria, stroke.

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in the medical emergency ward and most are consequently admitted into the medical wards. Non-traumatic coma is a common problem and prognosis is often poor worldwide.²

Earlier studies had reported that most cases of non-traumatic coma in all ages were caused by infections. However, more recent studies, even in developing countries, record higher prevalence of vascular and metabolic causes than infective causes.^{3,4,5} Non-traumatic coma among adults has been reported both in North-West and South-West Nigeria but, not in the South-East before now.^{4,5}

METHODOLOGY

This was a retrospective review of medical records of patients admitted from the medical emergency into the medical wards of a Nigerian tertiary hospital diagnosed with non-traumatic coma, from January 2004 to December 2005. The study was conducted at the medical wards of Nnamdi Azikiwe University Teaching Hospital Nnewi, South-East Nigeria.

Patients from all clinical sub-specialties in internal medicine are usually admitted into the two medical wards of the hospital from the medical emergency department and, also, from the medical outpatient clinics. However, all patients presenting with coma are seen in the medical emergency of the hospital and consequently, admitted into the wards.

The case records of all medical admissions during the period under survey were retrieved from the medical records department of the hospital and reviewed. Those who presented to the medical emergency with non-traumatic coma were selected and analyzed. Data extracted from the medical record files included demographic data (age and sex), relevant history and clinical examination findings,

admitting GCS, available investigation results, diagnosis and the outcome (died or discharged). Diagnosis of non-traumatic coma was based on documentation of coma not due to trauma and a GCS of $3 \leq 8$. With the information obtained the causes of non-traumatic coma were defined.

Stroke was defined as sudden onset focal or global neurological deficit of vascular origin lasting more than 24 hours or resulting in death. The diagnosis of meningitis was based on the presence of fever, headache, alteration in the level of consciousness and documentation of signs of meningism on examination and in addition a positive cerebrospinal fluid result with or without isolation of pathogen. Metabolic cases were diagnosed based on laboratory results during the events and other relevant clinical data (history, past medical history and examination findings). Patients below 18 years of age, classified as paediatrics, were excluded.

Statistical Analysis

Data were analyzed using Statistical Package for the Social Sciences SPSS version 15 (SPSS Chicago Inc., Illinois (IL), USA). Relevant percentages, frequencies, means and standard deviation were calculated. The *chi square* was used to test association between GCS and outcome with the level of significance at $p < 0.05$. Findings were represented with relevant tables and a figure.

RESULTS

Non-traumatic coma accounted for 7.4% ($n=111/1507$) of the 1507 medical admissions during the period under review. There were 71 (64%) females and 40 (36%) males with a mean age of 57.7 ± 23.2 years and age range of 20 to 89 years (Table 1).

Table 1: Age and sex distribution

Age Range	Male (%)	Female (%)	Total (%)
≤29	2 (1.8)	3 (2.7)	5 (4.5)
30-39	6 (5.4)	5 (4.5)	11 (9.9)
40-49	5 (4.5)	15 (13.5)	20 (18.0)
50-59	5 (4.5)	16 (14.4)	21 (18.9)
60-69	9 (8.1)	15 (13.5)	24 (21.6)
70-79	6 (5.4)	15 (13.5)	21 (18.9)
≥80	7 (6.3)	2 (1.8)	9 (8.1)
Total	40 (36.0)	71 (64.0)	111(100.0)

The causes of non-traumatic coma are shown in Table 2. Stroke accounted for 52.2% ($n=58$) of cases while metabolic and infective causes accounted for 18.9% ($n=21$) and 18% ($n=20$) of cases, respectively. The group "Unknown" included cases where no diagnosis was arrived at before the patient died and the information in the medical records were inadequate to make diagnosis. The two cases of poisoning were alcohol intoxication and organophosphate rodenticide (rat poison).

Table 2: Sex distribution of the causes of coma

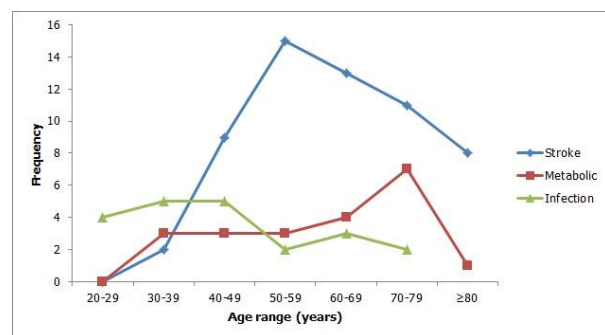
Disease	Male	Percent age (%)	Female	Percentage (%)	Total	Percent age (%)
Stroke	16	14.4	42	37.8	58	52.2
Metabolic encephalopathy*	7	6.3	14	12.6	21	18.9
Hyperglycaemia	1	0.9	8	7.2	9	8.1
Hypoglycaemia	3	2.7	3	2.7	6	5.4
Hepatic encephalopathy	2	1.8	2	1.8	4	3.6
Uraemic encephalopathy	1	0.9	1	0.9	2	1.8
Infection*	14	12.6	7	6.3	21	18.9
Meningitis	6	5.4	3	2.7	9	8.1
HIV related diseases	4	3.6	3	2.7	7	6.3
Sepsis	3	2.7	1	0.9	4	3.6
Cerebral malaria	1	0.9	0	0.0	1	0.9
Poisoning	2	1.8	1	0.9	2	1.8
Others*	1	0.9	8	7.2	9	8.1
Hypertensive encephalopathy	0	0.0	4	3.6	4	3.6
Unknown	1	0.9	4	3.6	5	4.5
Total	39	35.1	72	64.9	111	100.0

HIV – human immunodeficiency virus

* Frequency and percentage represents the sum for all the individual diseases under this group

Figure 1 shows the age distribution of the major causes of coma. Stroke peaked in the 50-59year age group while infection and metabolic causes peaked in the 30-49year age range and 60-69year age range, respectively.

Figure 1: Age distribution of the major causes of coma



A total of 62 patients died, accounting for 55.9% ($n=62/111$) mortality in this study, and

14.6% (62/424) of all medical admission deaths during the period. Forty-two (37.9%) patients that died had admission GCS of 3 to <6 while 20 (18%) had GCS \geq 6 (Table 3). The difference in the outcome between those with GCS 3 to <6 and those with GCS \geq 6 was statistically significant ($\chi^2 = 16.799, p=0.0001$).

Table 3: Outcome in relation to admitting Glasgow coma score (GCS)

GCS on Admission	Died (%)	Discharged (%)	Total (%)
<6	42 (37.9)	14 (12.6)	56 (50.5)
\geq 6	20 (18)	35 (31.5)	55 (49.5)
Total	62 (55.9)	49 (44.1)	111 (100)

DISCUSSION

Non-traumatic coma accounted for 7.4% of medical admissions during the period under review. This is less than 8.1% and 10% reported in North-West and South-West Nigeria.^{4,5} The lower rate in this present study might be accounted for by the methodological difference in these studies. While we studied non-traumatic coma among those admitted into the wards the other two studies were at the medical emergency units. This difference will mean exclusion of those cases of non-traumatic coma that died within the first 24 hours in the medical emergency ward before they could be admitted into the wards in this present study. Nonetheless the rate of 7.4% is still remarkable, indicating that non-traumatic coma is a common medical problem that deserves further evaluation.

There were more females than males admitted with non-traumatic coma in our study. This is at variance with the two previous Nigerian studies on non-traumatic coma that showed a higher male ratio.^{4,5} The male preponderance in the previous Nigerian studies was attributed to several socio-cultural factors that favour a higher male utilization of health facilities in developing countries.⁵ While the cause of the higher

female predominance in this present study is not quite obvious, it may not be unrelated to the higher female prevalence of strokes in this present study, as stroke was the most frequent cause of non-traumatic coma. Gender difference in the prevalence of stroke in the country is varied with a higher female preponderance reported by Ogun, *et al* in South-West Nigeria and a higher male dominance reported in North-West and South-East Nigeria.^{6,7,8}

Stroke was the most frequent cause of non-traumatic coma in this present study. This agrees with recent studies even in developing nations.^{4,5,9} With the increasing westernization of developing countries, chronic diseases like stroke are now emerging, as common causes of morbidity and mortality. Stroke, currently, accounts for 2.9% of medical admissions and 2.4% of emergency room admissions in Nigeria.^{6,10} Majority of stroke cases in this present study were among those \geq 50years, with a peak in the 50 to 59-year age range.

Metabolic conditions, notably diabetes mellitus, were prominent causes of coma in our study. The complications of diabetes accounted for 13.5% ($n=15$) of non-traumatic coma in our study. This is higher than 12.5% and 10.3% ($n=20/194$) reported in Ibadan and Kano, respectively.^{5,4} This is not surprising because diabetes, like stroke, is another disease of urbanization with increasing incidence and prevalence in developing countries, due to the increasing adoption of the western lifestyle in developing countries.¹¹

Hepatic encephalopathy accounted for 3.6% ($n=4$) of coma in our study which is lower than 8.2% ($n=16$) reported in Kano.⁴ The high prevalence of chronic liver disease in sub-Saharan Africa has been linked to the high prevalence of risk factors for the disease like Hepatitis B and C and chronic alcoholism, in

the region.¹² However, the reason for the lower prevalence in our study is not immediately obvious since regional differences in the prevalence and causes of hepatic encephalopathy in Nigeria has not been conclusively documented. Unlike the previous Nigerian studies that recorded high frequency of uraemic encephalopathy as a cause of non-traumatic coma, uraemic encephalopathy accounted for only 1.8% ($n=2$) in our review.^{4,5}

Infections were prominent causes of coma in this present study accounting for 18% of cases of coma. This is at variance with the other Nigerian studies in which infections were higher (28.9%) in Kano and a lower percentage (11%) in Ibadan.^{4,5} The lack of uniformity in grouping the infections in these studies might have contributed to some of these disparities.

It is also worth noting that Kano is situated within the sub-Saharan meningitis belt though the Kano study was conducted outside the period of meningitis epidemic so that the reported cases of meningitis in the study were rather sporadic in nature.

The prominent infective causes of coma in this present study were meningitis and human immunodeficiency virus (HIV) related diseases. Various HIV-related conditions like HIV encephalopathy, opportunistic infections and brain space occupying lesions can all lead to coma in HIV-positive patients.¹³ The lack of adequate investigation and assessment limited the further delineation of the primary causes of coma in the HIV cases in this present study.

Only a single case of cerebral malaria was recorded in our study in contrast to reports from other African countries.¹⁴ However, in Kano no case of cerebral malaria was recorded and in Ibadan cerebral malaria accounted for 1% ($n=1$) of cases of adult non-

traumatic coma. The low frequency of cerebral malaria in adults in the tropics has been attributed to the development of immunity against malaria under the stable endemic conditions prevailing in the region.¹⁵

Mortality rate for non-traumatic coma was 55.9% in our study, and this is lower than 76% reported in Ibadan.⁵ A higher mortality for most causes of non-traumatic coma are expected in emergency wards especially in developing nations where delay at presentation to hospital and the delay in making a diagnosis are common.

A delay at making a diagnosis within the first 24hours of hospital presentation and initiating appropriate management is a poor prognostic factor for non-traumatic coma identified in Ibadan.² Worthy of note is the lower mortality rate of 49% reported from Kano.⁴ Though the Kano study was in the emergency department, the higher prevalence of stroke in our study which has a poorer outcome compared to metabolic causes which was the predominant cause in the Kano study, might have been contributory.

Stroke is a major cause of morbidity and mortality worldwide with poor outcome despite current advances in the management of stroke.¹⁶ It accounts for 4.6%-17% medical admission deaths, whereas, case fatalities from stroke range from 14.9% to as high as 77%.^{17,18,19}

CONCLUSIONS

Acute stroke accounted for most cases of non-traumatic coma followed by metabolic causes and infections. The high prevalence of these diseases of urbanization in causing non-traumatic coma underscores the need to emphasize the primary prevention of these medical conditions. The admission GCS used in patients' management proved a valuable tool for prognostication even in cases of non-traumatic coma.

Study limitations:

This study was limited by unavailability of high yield neurologic investigative modalities (like serological test, electroencephalography, viral studies, neuroimaging and others) that would have enhanced accurate delineation of the differential diagnosis of the causes of non-traumatic coma. Where these investigative modalities are available, high cost limited their use to only a few patients, who could afford them. Lack of adequate diagnosis has been reported as a poor prognostic factor for non-traumatic coma.^{2,20}

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