

# WHAT IS HAPPENING TO MOTOR NEURON DISEASE IN NIGERIA?

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## Abstract

**Background:** Systematic studies of motor neuron disease were last reported from Ibadan, Nigeria, more than two decades ago. Since then, information about motor neuron disease has become limited making it necessary to review the current status of the disease.

**Methods:** The clinical records of all cases of motor neuron disease seen at the University College Hospital, Ibadan, over a twenty-year period were studied. Sex, age, age at onset of illness, type of motor neuron disease and risk factors were documented and compared with findings of two previous reports from Ibadan.

**Results:** Sixteen cases met the inclusion criteria. The mean age of onset of disease was 38.6 years (range 16 to 60 years). Fifteen of the subjects were male and one was female. All subjects had amyotrophic lateral sclerosis. Trauma was the most frequent risk factor identified, documented in six (37.5%) subjects.

**Conclusions:** The frequency of motor neuron disease appears to have declined considerably. While the onset remains in the younger age group, the male predominance has remarkably increased. The proportion of amyotrophic lateral sclerosis has increased from 80 to 100% of cases. Trauma, previously reported to be an uncommon risk factor, is now the most frequent.

**Key Words:** Motor neuron disease, amyotrophic lateral sclerosis, Nigeria

## Introduction

Motor neuron disease (MND) is a neuronal system degeneration that is confined to the motor neurons of the central nervous system.<sup>1</sup> It is characterised by progressive loss of motor neurons in the cerebral cortex, anterior horn cells of the spinal cord and motor nuclei of the brain stem. The main types are progressive bulbar palsy (PBP), amyotrophic lateral sclerosis (ALS), spinal muscular atrophy (SMA), and primary lateral sclerosis (PLS). The presentation may be sporadic, familial or regional, the first being the commonest.<sup>2</sup>

The worldwide incidence of MND is between 0.4 to 1.8 per 100,000.<sup>2,3</sup> The prevalence increases with age, the highest being in the 65-74 year age group.<sup>2</sup> MND is commoner in males, with a male to female ratio of about 2:1 in the developed world where the mean age of onset is 56 years.<sup>4</sup> In the developing world generally, MND is rare, and a younger age of onset has been widely reported.<sup>5</sup> In Ibadan, the hospital frequency was 3.5%. ALS accounted for 60 to 80% of cases, and at least one case was familial.<sup>6,7</sup>

## Materials and Methods

The medical records of 16 patients seen at the University College Hospital, Ibadan, over the period 1980 to 1999 with a clinical diagnosis of motor

neuron disease were reviewed. Five case records were missing and hence were excluded from the study. The diagnosis of MND was made clinically in accordance with The World Federation of Neurology El Escorial diagnostic criteria for ALS.<sup>8</sup> Facilities for electromyography were not available at UCH over the period of review, but we included only cases assessed by a neurologist. In cases where the presentation was not classical, investigations like spinal X-rays, myelography and CSF analysis done excluded close differentials. Statistical analysis was done by Epi Info 6.2 computer package; the mean and mode were used as summarising indices, and the range as index of variability.

## Results

Sixteen case records were reviewed. Fifteen of the patients were male, and 1 female. The mean age at presentation was 38.6 years, the youngest subject being 16, and the oldest 60 years. The mean duration of illness before presentation was 11.5 months, with a range of 1 to 36 months. Ten (62.5%) of the 16 cases presented within one year of onset of symptoms. Patients seen came from different parts of Nigeria with the highest number of three coming from Warri while Sokoto, Lagos and Ibadan had two subjects each. Occupation was also varied, with electrical related occupations accounting for three cases,

and one each of cattle trader, accountant, banker, student, soldier, farmer, civil servant, driver and lecturer (Table 1).

All cases reviewed had amyotrophic lateral sclerosis (Table 1) and the commonest form was limb-onset weakness (in 13 subjects); bulbar-onset disease was seen in three subjects. At presentation however, all but three subjects had bulbar features. In those with limb onset, the lower limbs were involved first in seven patients, the upper limbs first in three, and both upper and lower limbs in one. Speech difficulty was the presenting feature in three subjects, and fasciculations in two. Associated conditions at presentation were impotence without diabetes in two subjects, azospermia in one and tetanus following scarification marks in another.

A history of preceding trauma was recorded in six (37.5%) of the patients but only one of them had associated fracture. The mean interval between injury and onset of illness was 5.8 years, and the modal age was three years (in three subjects); the other three subjects presented after four, seven and 15 years. Alcohol ingestion was documented in seven subjects, smoking in three, hypertension in three, febrile illness in two and extreme physical exertion in one.

Table 2: Putative risk factors in the subjects

Risk factors	No.(n=16)	%
Alcohol	7	43.7
Trauma	6	37.5
Smoking	3	18.7
Hypertensions	3	18.7
Electrical occupation	3	18.7
Domicile in Niger Delta	3	18.7
Fever	2	12.5
Physical exertion	1	6.25

## Discussion

Previous studies of MND in Ibadan had studied 79 and 92 cases over two and 14-year periods respectively.<sup>6,7</sup> This study has however shown only 20 cases over two decades. This may reflect a change in the pattern of hospital attendance. The increase in the number of teaching and tertiary hospitals in Nigeria over the last three decades together with the financial down-turn in Nigeria's economy (making orthodox health care relatively expensive) may act in concert to reduce the hospital prevalence of MND. It is however also likely that the epidemiology of MND has changed over the last three decades as has been seen with diseases like tropical ataxic neuropathy which was reported to be the second commonest cause of spinal pathology next to Pott's disease; it is however rarely seen in Ibadan today.

This study however confirms previous reports in Ibadan and other parts of the developing world that the age of onset is earlier than in the West where age is considered a definite risk factor.<sup>5-9</sup> The mean onset

age in this study of 38.6 years approximates earlier report from Ibadan of 39 years.<sup>7</sup>

The striking finding in this study however is that all the cases seen had ALS as compared to 80% in previous reports from Ibadan; the reason for this is also not clear as is the reason for the sex ratio of 15:1 in favour of males, much wider than previous reports from Ibadan of 3:1 or 2:1 in the developed world.<sup>4,6,7</sup>

Trauma preceded onset of disease in 6 subjects and agrees with reports that trauma is 2-3 times commoner in patients with MND.<sup>10,11</sup> This finding however contrasts with previous reports from Ibadan where the history of trauma was reported to be uncommon.<sup>7</sup> Reports that only severe trauma is associated with MND are not supported by this study as fractures were reported in only one subject.<sup>12</sup>

The over-representation of Warri as place of domicile may suggest the possibility of an environmental factor as being etiologically relevant. Warri is located in Nigeria's Niger Delta, an area associated with the petroleum industry, and one of the subjects in this study works at the National Petroleum Corporation. Abnormal soil chemical constituents have been cited as risk factors for MND and these include selenium, calcium, silicon and aluminium.<sup>12-15</sup> Petroleum products have not been previously reported as risk factors for the development of MND but have been related to other neurodegenerative diseases like Parkinson disease.<sup>16</sup>

With regard to occupation, the over-representation of electrical technicians could imply a possible association with electric shocks as some studies have suggested.<sup>15</sup> The frequency and severity of electric shocks received was however not quantified in this study. The association of MND with animals, carcasses and leather products is controversial. An association with pet exposure has also been reported, although this has been disputed.<sup>17,18</sup> There was no over-representation of exposure to cattle or leather products, but that is not a profession common in the catchment area of the hospital. It is noteworthy that one of the subjects referred from the northern parts of the country where cattle rearing is common, was a cattle trader. Another subject excluded from this review on account of incomplete documentation was also a cattle trader. The significance of alcohol ingestion reported in seven subjects is difficult to comment on in a study of this nature; alcohol ingestion has not been previously cited as a significant risk factor.

There was poor follow up of patients seen with MND during the period of study, and no conclusions can be made with regard to mortality. The outlook for motor neurone disease has however improved in recent years with the demonstration of the benefit of drug therapy. The glutamate antagonist, riluzole (2-amino-6-trifluoromethoxy-benzothiazole) has been reported in case control studies to improve survival especially with bulbar-onset MND and to reduce risk of respiratory events.<sup>19,20</sup> Gabapentin, another glutamate antagonist, has shown equivocal results, but promising trials are going on with antioxidants, insulin-like growth factor-I, brain-derived

neurotrophic factor and protease inhibitors.<sup>21</sup> Reversible improvement has been reported with intravenous interferon while high dose intravenous immunoglobulins were shown to be better than placebo.<sup>22-24</sup>

The retrospective nature of the study limited the historical details that could be assessed. The absence of electromyography facilities at the University College Hospital, Ibadan, during the period of study limited confirmation of the clinical diagnosis, but the classical presentation of the disease, consultant neurological review in all cases and myelography in doubtful cases helped to establish an accurate diagnosis. There is however a need to carry out a prospective multi-centre case-control study in view of the changes in the pattern of MND in Ibadan over time, to establish the role of putative risk factors in its pathogenesis, and to attempt to explain the different epidemiological pattern in the developing world.

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