

## **Importance of Mortality Statistics in Epidemiology of Neurological Disorders**

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### ***Abstract***

Mortality records of one year was analysed to study the pattern of deaths among neurological disorders in a tertiary referral institution. Deaths among children (< 15 yrs) accounted for 21.7% of cases, predominantly contributed by infections of nervous system. The proportional mortality rates of head injuries and stroke was 37.6% and 17.2% respectively. Epilepsy being the commonness neurological condition accounted for 2.2% of total deaths. The study discusses the various aspects of mortality information along with its importance, highlighting existing lacunae in this area. The need for developing reliable mortality statistics for initiating early intervention towards decreasing mortality is emphasized.

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Key words -

**Mortality statistics,  
Neuroepidemiology,  
Head injuries,  
Stroke,  
Infections of nervous system,  
Proportional mortality rates,  
Health information**

Mortality statistics forms an essential component of Health Information system at national and international levels. These figures reflect the changing disease pattern of a country thus helping in better utilisation of available resources. It is widely acknowledged that mortality statistics has very clear advantages [1], [2], [3]. Analysis of mortality information from neurological disorders in the west has revealed that malignant neoplasms, cerebrovascular diseases and accidents rank second, third and fourth among all conditions contributing to death [4]. The changing disease pattern in developing countries like India has witnessed the emergence of accidents and cerebrovasuclar diseases as major public health problems during the last decade. However, information on mortality from neurological disorders in our country is often accorded low priority because of the non availability of such information due to various reasons. Information of these disorders has been very limited in India. In an attempt to plan for a major study, the present preliminary study was undertaken to delineate the mortality pattern of neurological disorders at National Institute of Mental Health & Neuro Sciences, Bangalore .

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## Methodology

National Institute of Mental Health & Neuro Sciences (NIMHANS) is a tertiary referral Institution in the field of mental health and neurosciences in India. All deaths occurring in one year i.e. 1987 formed the study material. A joint team of an Epidemiologist, Neurologist and a Neurosurgeon analysed these records.

Initially, with the help of a computer, all deaths which occurred in 1987 was obtained along with then registration number and their respective date of death. All these records were classified separately in a serial manner as per their register number for the purpose of analysis. The essential information from death records was transferred to a pretested coded proforma which was designed specially for the purpose of this study. The body of knowledge thus reviewed in records focussed on socio demographic characteristics, referral pattern, duration of illness along with hospital stay, clinical diagnosis, probable cause of death, associated condition at the time of death, etc.

The hospital based proportional mortality rates (number of deaths from the condition under examination/total number of deaths from all causes  $\times 100$ ) was established for each group of neurological condition to assess and develop mortality information. The data thus obtained were analysed to delineate the role and importance of mortality statistics.

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## Results

During the year 1987 a total of 708 deaths occurred at Neurology, Neurosurgery and Psychiatric services of NIMHANS. Eleven deaths related to mental disorders were deleted, as the purpose of the study was to understand the mortality pattern among the neurological disorders. From the remaining 697 records, 605 deaths could be analysed thus accounting for 87.0% deaths.

Table I depicts the age-sex distribution of mortality cases. The male to female ratio was 1:0.36. Deaths in the childhood period (< 15 years) constituted 21.60% of cases. Mortality in 15-24 years amounted to 12.1%. Among other age groups mortality in 45-54 years was highest in the order of 16.8%.

*Table I - Age-sex distribution: Mortality cases*

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Further analysis of the data about the priority conditions in the three age groups revealed that infections of nervous system contributed for 48% of deaths among children. Head injuries constituted the major condition among adolescents to the extent of 51% deaths. The age group of 45-54 years was predominantly represented by head injuries and cerebrovascular diseases to the orders of 39.2% and 32.3% respectively.

Based on clinical diagnosis, 9 groups were evolved in an arbitrary manner to focus on primary neurological conditions resulting in death as shown in Table II. Head injuries constituted the priority condition with hospital based PMR to the extent of 37.6%. Cerebrovascular disorders ranked second with a PMR of 17.2% from total deaths. The rates for epilepsy was low in the order of 2.2%.

*Table II - Distribution of death as per major diagnostic categories for the year 1987*

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Information on certain socio-demographic variables revealed that

- (i) majority of deaths were from urban areas (58.02%),
- (ii) Hindus were in majority (87.7%) and
- (iii) no significant association between occupation and different mortality groups.

Peripheral hospitals like district hospitals (and primary health centres) and medical college hospitals had referred 45.3% and 20.5% of cases respectively. It would be important to analyse this data further to examine the association of different socio-demographic variables across various conditions before drawing any valid conclusions.

The duration of illness before reaching the hospital varied widely from 5 minutes to 10 years across different diagnostic categories. Since the criteria for admission is varied based on

- (i) the extent of severity of illness as perceived by the individual and family members,
- (ii) referral practices of hospitals to NIMHANS,
- (iii) observed severity as assessed by the attending consultant and
- (iv) availability of facilities,

a common pattern regarding duration of illness could not be evolved.

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## **Discussion**

Precise and valid information on mortality from neurological disorders is lacking in India. The decline in mortality from communicable diseases has generated considerable interest and has shifted the focus from communicable to non-communicable diseases [5]. It is appropriate at this juncture to stress the need for developing mortality statistics in newer emerging health problems in developing countries.

As early as 1978, WHO strongly recommended that mortality information in neurological sciences needs strengthening and recommended suitable classification procedures [6]. Many of the newer classification and reporting procedures has already been implemented in developed countries [4], [7]. The present study is a preliminary attempt at studying the pattern of deaths in a territory care speciality institution for neurological disorders.

This study reveals that head injuries, due to road traffic accidents is fast emerging as a major public

health problem in our country. The proportional mortality rate in the present study from head injuries was of the order of 37.6%. this was the major cause of death among adolescents (51%). Information available from India has revealed that deaths due to accidents and injuries has registered an increase from 5.9% in 1982 to 7.0% in 1986. Also at the national level deaths due to the same cause has been highest in 15-24 years age group accounting for 22.7% [8]. In the world, accidents and injuries rank fifth among the leading causes of death resulting in a loss of more 6,65,000 potential life years for children and adolescents [9]. Mortality and morbidity from head injuries as related to road traffic accidents and associated causes being an enormous loss to the individual, family and community by shortening the productive years in the life of the individual subjects. This knowledge from mortality data reveal that suitable measures need to be evolved in preventing this problem through a multi-disciplinary and concentrated approach.

Cerebrovascular disorders ranked second in our series with a PMR of 17.2%. Highest number of stroke deaths occurred in 45-54 years and 55-64 years (27.5% and 20.2%) respectively. The changing pattern in mortality from stroke has been highlighted by Padmavathi et al [10]. Even though, authors report that stroke in India is a lesser problem difference could be more apparent than real due to non-availability of reliable population based epidemiological data. However, the mortality from stroke in recent years has been found to be on the decline specially in developed countries and so also in India [11], [12].

Infections from nervous system contribute for a significant number of deaths in India. Meningitis and encephalitis contributed 9.5% and 2.9% of total deaths in our study. National level data specifically for these problems are not available as per our knowledge in this area. However, with advances in medical care and better availability of facilities, it is hoped that mortality due to this cause would decline in future. Similarly, information on mortality from brain tumour is also lacking. Brain tumour was responsible for 9.5% of total deaths. this could be attributed to late reporting and delayed referral of such cases to tertiary hospitals.

Epilepsy is the commonness neurological condition with a prevalence of 4.6/1,000 population [13]. The mortality rate from epilepsy is very low in the west [14]. In our present study we observe that mortality rates of epilepsy is very low in the order of 2.2%.

Mortality from any given cause is influenced by several factors like age at death, age at illness, interval between onset of illness and reaching health care institution, referral pattern, availability of first aid services, clinical diagnosis, comorbidity at the time of death and several others. Caution has to be exercised while interpreting hospital based mortality data [14], [15]. Since mortality picture changes over a period of time, long term trends would be a better reflection rather than cross-sectional data for making final conclusions. Mortality data coupled with several other indicators often reflect the existing health situation in a given place and enables in drawing the attention of planners and administrators.

While information on mortality is extremely useful, almost needed and has advantages, considerable difficulties are experienced in developing mortality data at different levels. The present pattern of reporting needs to be strengthened at all levels. Inadequate reporting, lack of uniformity, clear definition, lack of accuracy, incompleteness, and lack of resources along with a host of other problems add to the complexities involved in developing mortality information system.

To conclude, the present study has made a preliminary attempt at studying mortality information of major neurological disorders and emphasises the scope and need for developing reliable knowledge in this area. Strengthening the existing methods and evolving suitable measures need to be undertaken for developing mortality information system. This is more important in the area of emerging neurological

disorders for initiating early intervention and reductions of risk factors for decreasing mortality.

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