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## INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/17267

DOI URL: <http://dx.doi.org/10.21474/IJAR01/17267>



### RESEARCH ARTICLE

#### PREVALENCE OF NEUROLOGICAL DISORDERS IN NORTH KASHMIR (ADULTS)

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#### Manuscript Info

##### Manuscript History

Received: 21 September 2015

Final Accepted: 23 October 2015

Published: November 2015

##### Key words:-

Headache, Neurological Disorders,  
Epilepsy, Stroke, Dementia

#### Abstract

**Background:** A population-based study aimed to provide information about the etiological profile, natural history and risk factors of various neurological disorders that will help to identify the effective intervention required to reduce the frequency of neurological disorders in the community.

**Methods:** A sample of population comprised 10,368 individuals out of total population of 67,717 in rural community of Kashmir valley in a two-phase programme. Phase I constituted screening of the population by door-to-door survey. Those screened positive for neurological disorders were examined by neurologist in phase II. The population was surveyed for neurological disorders including epilepsy, stroke, migraine, Parkinson's disease, cerebral palsy syndromes, dementia and peripheral nerve disorders.

**Results:** The crude prevalence rate for all neurological disorders was 8295 per 1,00,000 headache syndrome were the most prevalence disorders with prevalence rate of 5,883. The crude prevalence rate for epilepsy was 366 per 100000 followed by peripheral nerve disease (309 per 100000). The prevalence rates per 100000 for dementia, post-polio-sequelae, mental retardation, spinal cord disease and cerebral palsy were 241, 125, 96, 87 and 38, respectively. Among the stroke 559 per 100000, hemorrhagic strokes were more than ischemic strokes with hypertension as main risk factors.

**Conclusion:** This study proved an eye-opener for exploring the magnitude of various neurological disorders in the community needs large sample studies for further substantiation.

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#### Introduction:-

Neurological disorders are a major cause of morbidity and mortality across the globe and constitute significant part of overall disease burden.<sup>1,2</sup> The specificity of neurology, earlier relegated to the periphery is now gaining importance due to increased awareness and development of newer diagnostic and therapeutic modalities. At this juncture, the time is right enough to rationale expert services and generate manpower-based pragmatic forward planning.

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The special characteristic of chronicity, progression, recurrence and high fatality of certain neurological disorders with consequent physical, mental and cognitive disability with limited therapeutic options, constitute to the heavy burden on the individual, family and society. The stigma attached to a disorder like epilepsy leads to complexities in Identification, management and counselling. Despite its phenomenal burden it is disappointing that neurological disorders till recently did not attract enough attention as a public health problem.<sup>3,4</sup>

Accurate and quantifiable data on the health problems prevalent in any community are required for the formulation of objective and credible health policies. Methods that access medical records and death certificate data to prevalence of neurological disorders have inherent methodological flaws since they tend to be restricted mainly to the person with previous medical evaluation with mortality data based only on the underlying cause of death. Community based survey has provided a better alternative to such approaches.<sup>5,6</sup> Although a large amount of data is available from the developed world, it cannot be extrapolated to the population in developing countries because of difference in socio-cultural ethos, genetic differences and varied ecology, making it crucial to carry out population based neuroepidemiological studies in developing countries.

### **Material And Methods:-**

The prospective study was conducted in Block Ganderbal of Jammu and Kashmir through Sher-i-Kashmir Institute of Medical Sciences. This area has population of 67,717 and constitutes of 95 villages. Total study population was 17280 (28%) of total population. The survey was conducted among adults (>14 years) and the net study population was 10,368 (60%) of the total population. Before starting the study an information campaign was undertaken through television, radio, newspapers, Govt. Officials and local medical staff to make the residents aware of the research project and emphasize its importance.

A training programme was conducted, involving multiple-purpose workers (MPW's), Aganwardi workers, field-staff of Sub-district Hospital Ganderbal and medical students working under the social and preventive medicine, of Govt. Medical College Srinagar. A training manual from the copiah county study was adopted for the study.<sup>7</sup> This community survey was conducted as a two phase programme for a period of 5 months with point prevalence. PHASE-I: This phase constituted screening of the population by door-to-door survey by trained staff and two postgraduates with help of pretested questionnaire according to WHO protocol.<sup>8</sup> The questionnaire was administered in local language to all interviewers subjects. A household was defined as a group of subjects related by blood or marriage living in the same income source and in the same housing unit.<sup>9</sup>

To gain more confidence and more co-operation, Village/Mohalla head (Muqdam) was taken into confidence for motivating people. All screened positive in phase-I were examined by neurologist in phase II. The neurologist used common diagnostic criteria disability was estimated by Barthel Index-10.

The option of being examined at home was especially important for bed-ridden persons and for those who insisted on the doctor coming to them. Those not cooperating for the study were excluded.

The neurological diagnoses were based on the following clinical diagnostic criteria:

1. Epilepsy: Either individual who had two or more afebrile and non-symptomatic seizures at different times (and one during last 5 years) or individuals who were taking anti-epileptic drugs even if they had not had seizures during the last 5 years.<sup>11</sup>
2. Stroke: Sudden or rapid onset of non-convulsive and focal neurologic deficit lasting more than 24 hrs or leading to death, with no apparent cause other than vascular origin.<sup>12</sup>
3. Migraine: History of paroxysmal headache, usually of one side, and associated with visual disturbance autonomic symptoms or focal neurological features lasting more than a day but less than 4 days.<sup>13</sup>
4. Parkinson's Disease: Presence of at least two cardinal features of parkinsonism, including involuntary movements (tremors, rigidity, dyskinesia and bradykinesia).<sup>14</sup>
5. Cerebral palsy syndrome and Mental retardation: Non-progressive disorder of movement and posture, and an end result of insult or injury sustained by the developing brain during the pre, peri- or neonatal periods. Mental retardation diagnosed with global delay in the development of cognitive learning excluding dyslexia and based on clinical grounds without specific psychometric evaluation.<sup>15</sup>
6. Dementia: Progressive deterioration in the mental function of the individual in presence of a state of clear consciousness.<sup>16</sup>

7. Peripheral Nerve Disorders: The diagnosis was made on clinical grounds, in accordance with previous literature.<sup>15</sup>
8. Poliomyelitis: Only identifying lameness of a limb was taken as a sole criterion for diagnosis of paralytic polio.<sup>17</sup>

### Statistical Analysis:

The data including various demographics of patients and profiles of neurological disorders were recorded in master chart studied and analyzed by experienced statistician. Studied 't' test was used and Chi-square test was applied wherever necessary p-value of <0.005 was considered significant.

### Results:-

This prospective study involving survey of area with population of 67,717 out of which 10368. Subject were screened for neurological disorders, after excluding 6,412 individuals (children < 14 years). The study population included 5269 (50.8%) males and then 5099 (49.2%) females in the age group of 15-24 years, 10.76% subject were in the age > 60 years. Females were more illiterate (60.70%) than males ( $p < 0.0001$ ). The overall crude prevalence rates for all neurological disorders was 8295 per 100,000. Out of 860 patients with neurological disorders 403 (46.8%) were males and 457 (53.2%) were females. (Table 1= Table 6 page 31 of thesis.

Headache syndromes were the most common neurological disorder and were common in females (60% approximately) ( $P = < 0.0001$ ). Other principal neurological disorders were cerebrovascular diseases, seizure disorders, Parkinson's diseases, dementias and radiculopathies. (Table 2)

The crude prevalence rate for migraine was 2575 per 10,000 more common in females carrying high statistical significance ( $P = < 0.0001$ ).

The crude prevalence rate for non-migraine headaches was 3308 per 100,000, majority in younger age females (57%  $P = 0.0036$ ).

The crude prevalence rate for stroke was 559 per 100,000. There were more males (64%,  $p = 0.0048$ ) (table 3) 74% patients had hemorrhagic stroke, 60.34% of stroke patients were smokers and 82.8% smoker stroke patients were males ( $P < 0.001$ ). Hypertension was found to be an important risk factor for haemorrhagic stroke than in Ischaemic stroke and overall 81.03% stroke patients were known hypertensive ( $P = < 0.0001$ ).

The crude prevalence rate for epilepsy was 366 per 100,000. 74% patients were in the age group of 15-29 years with decrease of disease with age. Majority (63.15%) patients with epileptics were males, and (47.36%) of epileptic patients had no neurological abnormality. Among the patients with neurological abnormality majority (21.06%) had mental retardation.

The crude prevalence rate for Parkinson's disease was 154 per 100,000. Majority of Parkinson's (56.25%) were males, majority (62.50%) of these patients were belonging to stage 1, and 31.25% were exposed to various agricultural chemicals ( $P = < 0.001$ ). Exposure to these chemicals was during farming, orchard spraying, gardening and cultivation of vegetables. 18.75% of Parkinson patients had Dementia [Table 28]. Regarding exposure to smoking 50% of Parkinson patients were smokers, out of which 75% were males.

The crude prevalence rate for Dementia was 241 per 100,000. It was common in elderly > 65 years (92%) and majority (68%) were males. Regarding peripheral nerve disease, the overall crude prevalence rate was 309 per 100,000; majority (71.9%) of patients had radiculopathy males were dominating with clustering of cases in the age group of 35-54 years.

The overall prevalence rate for neuropathy was 36 per 100,000. Regarding neuropathies 6 out of 9 patients were males with polyneuropathy in 5 patients, mono-neuropathy 2 and cranial neuropathy 2 patients. Among mono-neuropathies, one had ulnar nerve entrapment neuropathy due to Rheumatoid arthritis (documentation from a referral center); Second patient had traumatic radial nerve palsy and 2 patients had Idiopathic Bell's Palsy. The prevalence rate for post-polio sequelae was 125 per 100,000. All 13 patients were in the age group of 15-35 years; 6 males and 7 were females.

Mental retardation had a crude prevalence rate of 96 per 100,000. These were 10 patients, 6 were males and 4 were females and all 10 patients were in the age groups of 15- 19 years. The prevalence rate for spinal cord diseases was 87 per 100,000. Among 9 patients, 5 (4 males and 1 female) were due to trauma (accidents, falls, gunshots). Majority were associated with fracture dislocation of cervical and lumbar spine. One patient aged 35 years had craniovertebral anomaly diagnosed from a referral institute. One patient (35 year old) male patient had documented lumbar canal stenosis from a referral institute, and one young female had spinal epidural abscess (Tubercular) documented from a referral clinic. Two patients with myasthenia both females had multiple sclerosis and motor neuron disease diagnosed referral clinics.

The overall crude prevalence of other movement disorders was 77 per 100,000. These included tremors in 6 patients (one with essential tremor and another with tremor of thyrotoxicosis).

### Discussion:-

The successful completion of both the pilot and the main study in northern Kashmir suggests the feasibility of conducting population based studies by a two stage method involving preliminary screening for neurological diseases and subsequent examination and diagnosis by a neurologist; a strategy recommended for developing countries.<sup>6</sup>

The sensitivity and specificity achieved by the study questionnaire are comparable to those from other studies that have used a similar protocol,; and further confirms the impression from other studies in Thugbah, Nigeria, China, Tunisia and India that the questionnaire is a useful screening instrument for major neurological disorders for which it was designed.<sup>15,19-23</sup>

The good coverage of the community achieved in this study shows that such survey can provide an accurate census of the community and valid information about its basic demographic status. It demonstrated that the strategy of evaluating subjects with abnormal responses initially in their homes improved community compliance and minimized loss to follow up. 6% of our study population were above 65 years of age which is slightly higher compared to that of national figure. 39.24% of the study populations were literate which is much lower than the national adult literacy rate in India.<sup>24</sup>

Overall crude prevalence of various neurological disorders was 8295 per 100,000. This figure is less compared to various studies in Saudi Arabia, Italy, Tunisia, Ethiopia, Gowribidanur (India) and Kuthar valley (India).<sup>15,22,25-28</sup> This may be because of smaller sample size in our study. A study conducted in France had only 295 cases positive for various neurological disorders.<sup>29</sup>

In our study among the positive cases, females outnumbered males which is consistent with the study conducted at Thugbah.<sup>15</sup> Other study conducted at Ethiopia had more males than females positive for various neurological disorders.<sup>27</sup> Headache syndromes constituted a major group of neurological disorders in our study, with overall prevalence rate of 5883 per 100,000 that is higher as compared to other studies published in Tunisia, Hongkong and India.<sup>27,38,30,31</sup> This higher prevalence may be because of tremendous stress in community due to prevailing turmoil in the valley. For migraine the prevalence observed in our study is higher compared to the Hongkong study.<sup>30</sup> Stress could be main contributory factor.

The prevalence rate for stroke in our study is low as compared to various studies in China, Chile and USA.<sup>32-34</sup> This is presumed that better general health and higher life expectancy in Western countries may favour the high occurrence of stroke which is a disease of later age. However the prevalence rate for stroke in our study was high as compared to studies in India and Tunisia.<sup>22,35</sup>

This probably because of high illiteracy rate and less health care awareness reflecting poor adherence to anti-hypertension treatment and, high salt saltish tea (Noonchai) which as a risk factor needs to be elucidated. The prevalence of epilepsy syndromes in our study is similar to the previously published studies from Tunisia and India.<sup>22,23</sup> However the prevalence was low as compared to studies in China<sup>36</sup>, Nigeria<sup>37</sup>, USA.<sup>27</sup> This low figure could be due to non-inclusion of children, failure to identify mild cases or low prevalence per se. Majority of patients had not received any specific treatment because of specialist care. Majority of epileptics were idiopathic which is consistent with other studies.<sup>22</sup>

The prevalence rate for Parkinson's disease in our study was high as compared to studies<sup>22,27</sup> possibly due to a small proportion of population above 65 years. In these and, prevalence was low as compared to one study in France.<sup>27</sup> 31.25% Parkinson patients in our study were exposed to agricultural chemicals, that are risk factor disease.<sup>38</sup> Other movement disorders including tremors and choreoathetosis constituted 77 per 100,000, compared to 115 per 100,000 in Thugbah study<sup>15</sup> and 34 per 100,000 in Gowribidanur study.<sup>28</sup> The prevalence of dementia in our population is lesser compared to that which possibly is explained on the basis of large proportion of geriatric population in West. However the prevalence in our population compared to previous studies.<sup>15,22</sup>

The crude prevalence rate for peripheral nerve disease was more males. The male preponderance can be explained by less number of females exposed to manual work which looks like to be major factor for radiculopathies and in our set up majority of females remain indoors due to religious and cultural background. The prevalence of peripheral nerve disease was high in our study compared to Gowribidanur and Kuthar studies.<sup>28,37</sup>

The prevalence rate for post-polio sequelae (PPS) in our study was found in younger age group similar to figures in other studies.<sup>27,39</sup> Prevalence of mental retardation in our study was low as compared to previously studies in Thugbah, Tunisia, Ethiopia and Kuthar.<sup>15,22,26,27</sup>

The high prevalence of spinal cord diseases in our study was attributed to trauma in majority of cases. The crude prevalence rate for cerebral palsy was less compared to various studies<sup>26,27</sup> possibly because of exclusion of children from our study. The prevalence of primary muscle disease in our study was 29 per 100,000 population similar to a study conducted at Thugbah<sup>15</sup>. All patients were muscular dystrophies with medical documentation from tertiary care centers.

To conclude, we suggest large sample studies in future for further exploration and clarification of prevalence of various neurological disorders.

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