

## Original Research Article

# Prescribing pattern in outpatient department of neurosurgery in a tertiary care hospital of North India

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## ABSTRACT

**Background:** The neurosurgical disorders are amongst the leading cause of global mortality and morbidity. Though surgical intervention is thought to be the main management protocol in the neurosurgical setup but drugs are being equally used especially in the outpatient setting. The present study was carried out in view of the sparse data available on prescribing pattern in neurosurgery.

**Methods:** The present study was conducted by the department of pharmacology in outpatient department of neurosurgery in a tertiary care centre to look into the prescription pattern among these patients.

**Results:** In 268 patients analyzed, mean age was 43.02±15.93 years and 52.23% were females. Majority of our participants (44%) were found to be of young to middle age group (21-40 years). The diagnosis among the study population was spread over large number of diseases. Lumbar Disc Prolapse (LDP) was found to be the leading cause of neurosurgical morbidity, amounting to 32%. As far as the prescription of various drugs in the outpatient of neurosurgery is concerned, Analgesics were the most common drugs prescribed constituting about 48% of the total drugs prescribed followed by GABA analogues and multivitamins which equally formed 41% of the total prescribed drugs.

**Conclusions:** Although the prescription pattern studies among the outpatient neurosurgery patients are very scant, the analysis of prescription studies will be helpful to encourage the rational drug prescribing pattern.

**Keywords:** Lumbar disc prolapse, Neurological disorders, Prescription pattern

## INTRODUCTION

Non communicable diseases (NCD) including neurosurgical diseases are the leading cause of death and disability globally and are on the rise as a result of demographic and epidemiologic changes occurring in both developed and developing countries.<sup>1,2</sup> When measured in disability-adjusted life years (DALY), NCD accounted for 54% of the global burden of disease in 2010, compared to 43% in 1990.<sup>1</sup>

According to the recently published Global Burden of Disease 2010 Study (GBD 2010), stroke is the second leading cause of death globally and the third leading cause of premature death and disability as measured in DALY.<sup>1</sup> All over the world about 100 million of people are affected by neurological or neurosurgical disorders, which make up to 20% of the global burden of these diseases.<sup>3</sup>

Drug utilization studies are carried out to assess appropriateness of pharmacotherapy which has important

implications for clinical practice as they provide a clear picture of real world utilization pattern of drugs and help us to identify the areas that need change and improvement.<sup>4</sup> To our knowledge no study has been carried out to see the utilization pattern of drugs prescribed to neurosurgery outpatients in this part of the world. Therefore the present study was carried out with the objective to study and evaluate the prescribing pattern among these patients.

**METHODS**

This is a prescription-based, cross-sectional study that was conducted among outpatients with neurosurgical disorders. The study was conducted in the outpatient department of neurosurgery at Sher-i-Kashmir Institute of Medical Sciences (SKIMS) for a period of six months, from September 2018 to February 2019. During this period, a total of 275 patients with neurosurgical disorders were identified, out of which 268 were considered for final results. Each interested patient shared his or her disease history and prescriptions. Information about the demographic profile of patient, diseases which they were suffering from, and medicines prescribed to them was collected in a predesigned questionnaire. Prior to the study, written informed consent was obtained from each patient. The study protocol was approved by the Ethics Committee of the institute. Results were collected and finally compiled and presented by using the latest version of Microsoft Excel 2010 (Roselle, IL, USA) and SPSS version 20.

**RESULTS**

Out of the total 268 patients who were analyzed, majority of them (44%) were found to be of young to middle age group (21-40 years), followed by age group of 41-60 years, which comprised 38% of the total participants. The average age of the patients was found to be 43±15.93 years. When the subjects were evaluated in terms of their sex distribution, there was slight difference between the two and the female percentage was found to be 52% of the total subjects, which is marginally higher than male counterparts (Table 1).

**Table 1: Demographic characteristics.**

Parameter	Observations	(%) (n=268)
<b>Age (years)</b>	Mean±SD	
	43.02±15.93	
0-20	18	(6.7)
21-40	118	(44.02)
41-60	102	(38.05)
61-80	30	(11.19)
<b>Sex</b>	Male	128 (47.76)
	Female	140 (52.24)
<b>Location</b>		
Rural	192	(71.64)
Urban	76	(28.36)

**Table 2: Diagnosis of different diseases.**

Parameter	Observations (n=268)	(%)
<b>Lumbar disc prolapses</b>	86	(32) n=268
Operated	33/86	(38)
Non-operated	53/86	(62)
<b>Haematoma</b>	40	(15) n=268
Subdural	28/40	(70)
Acute subdural	10/28	(36)
Operated	7/10	(70)
Non-operated	3/10	(30)
Chronic subdural	18/28	(64)
Operated	16/18	(89)
Non-operated	2/18	(11)
Epidural	12/40	(30)
Operated	9/12	(75)
Non-operated	3/12	(25)
<b>Cervical disc prolapse</b>	24	(9) n=268
Operated	9/24	(37.5)
Non-operated	15/24	(62.5)
<b>Contusions</b>	15	(6) n=268
Operated	6/15	(40)
Non-operated	9/15	(60)
<b>Depressed/linear fracture skull</b>	15	(6) n=268
Operated	5/15	(33.3)
Non-operated	10/15	(66.6)
<b>Spinal trauma</b>	15	(6) n=268
Operated	11/15	(73)
Non-operated	4/15	(27)
<b>Glioma</b>	14	(5)n=268
Operated	12/14	(86)
Non-operated	2/14	(14)
<b>Meningioma</b>	12	(4.5) n=268
Operated	10/12	(83)
Non-operated	2/12	(17)
<b>Aneurysmal sub arachnoid haemorrhage</b>	10	(4) n=268
Operated	8/10	(80)
Non-operated	2/10	(20)
<b>Cauda equina</b>	9	(3.4) n=268
Operated	9/9	(100)
Non-operated	0/9	(0)
<b>Others</b>	28	(10) n=268

According to the result of the study, the diagnosis was spread over large number of diseases. Lumbar Disc Prolapse (LDP) was found to be the leading cause of neurosurgical morbidity, accounting for 32% of the total patients evaluated. This was followed by various types of hematomas and Cervical Disc Prolapse (CDP), comprising 15%, and 9% of the total study population respectively. The Brain contusions secondary to trauma was seen in 6% of our patients. Brain tumours including meningioma (4.5%) and gliomas (5%) also formed a

good percentage of patients enrolled in our study. The surgical intervention was carried out in 33/86 (38%) patients with LDP and in 9/24 (37.5%) patients with CDP. Majority of the hematoma patients (70%) comprised of Subdural Hematoma (SDH) and Epidural Hematoma (EDH) formed a small percentage (30%) of these patients. When the hematoma patients were analyzed for their management purposes, 75% of the patients with EDH were operated whereas in case of SDH patient's majority (89%) of those with chronic SDH were operated and in those with acute SDH, surgery was carried out in 70% of patients. Surgical intervention was carried out in 6/15(40%) of patients with brain contusions (Table 2).

**Table 3: Details of drugs prescribed.**

Parameter	Observations	(%)
GABA-analogue	110	(41.04) n=268
Pregabalin	70/110	(63.64)
Gabapentin	40/110	(36.36)
Calcium	80	(29.85) n=268
Antiepileptics	82	(30.60) n=268
Levetiracetam	49/82	(60)
Phenytoin	25/82	(30)
Sodium valproate	8/82	(10)
Analgesics	130	(48.51) n=268
COX-inhibitors	79/130	(60.77)
Centrally acting	51/130	(39.23)
Multivitamin	110	(41.04) n=268
Muscle relaxants	76	(28.35) n=268
Tolperisone	24/76	(31.56)
Thiocolchicoside	18/76	(23.68)
Baclofen	8/76	(10.52)
Tizanidine	11/76	(14.47)
Cyclobenzpyrine	15/76	(19.73)
Vitamin D3	65	(24.25) n=268
Injectable methyl cobalamin	15	(5.60) n=268

As far as the prescription of various drugs in the outpatient department of neurosurgery is concerned, analgesics were the most common drugs prescribed, constituting 48% of the total drugs prescribed, followed by GABA analogues and multivitamins both of which equally formed 41% of the total prescribed drugs. COX inhibitors and centrally acting analgesics were the two classes of drugs prescribed for management of pain in our study population. Among the GABA analogues pregabalin was prescribed more commonly than gabapentin, constituting 64% and 36% of total prescribed drugs in this category. Antiepileptics, calcium and muscle relaxants also constituted a good percentage of drugs prescribed by the treating doctors and these classes of drugs were prescribed in 30%, 29% and 28% cases respectively. Patients with brain contusions, acute subdural hematomas, brain tumours and epileptics were put on various anti-epileptic drugs in view of the

occurrence of convulsions which is common in these conditions. Levetiracetam was the most common antiepileptic which was prescribed to 60% of the total patients who were put on anti-epileptic drugs. Vitamin D3 was also prescribed in almost 24% of patients. In the present study, Injectable drug formulations were least prescribed. Methyl cobalamin was the only injectable drug which was prescribed to the participants and was given in only 5.6% cases (Table 3).

**DISCUSSION**

The principle target of the drug utilization studies/research is to promote the rational prescribing of the drugs. Without proper knowledge of drug prescribing pattern, it is impossible to suggest measures to improve the prescribing attitude among prescribers.<sup>5</sup>

The drug prescription pattern studies among the outpatient neurosurgery patients are very scant, and to our knowledge no such study has been carried out in this part of the world. When the sex distribution among the participants was considered, it was found to be equal among the two sexes. Most of the patients in the present study were of rural background. This predominance of rural population among the study population may be justified by the fact that SKIMS is the main super specialty centre which caters to the neurosurgery patients from the whole Kashmir valley. The fact that in India most of the population lives in the rural areas is true in this part of the country too. According to the study of Gourie Devi et al, the prevalence rate of neurological disorders in urban and rural populations was 2,190 and 4,070/100,000, respectively, in India which is comparable to our results.<sup>6</sup> When the age wise distribution of the neurosurgical morbidity was concerned, it was found that the persons in the age group of 21-40 years formed the major portion (44%) of the studied population followed by age group of 41-60 years (38%). In our opinion, this may be justified by the fact that 21-40 years age group is the most active years of the life and people are more vulnerable to different natural calamities including trauma during this period of their life. Different neurological ailments are also more common amongst middle aged and old aged groups. In accordance with WHO, more than 20% of adults aged 60 and above 60 are found to be suffering with neurological disorders.<sup>7</sup> A study conducted by Gajurel et al in India showed similar findings in terms of age and gender.<sup>8</sup>

In the present study lumbar disc prolapse (LDP) was the leading cause of morbidity followed by hematomas and cervical disc Prolapse. According to literature nearly 80% of the population sustains an episode of low back pain (LBP) once during their lifetime.<sup>9</sup> Within the vast differential of LBP, the most common source is intervertebral degeneration leading to degenerative disc disease and lumbar disc herniation (LDH).<sup>10</sup> Majority of our patients with LDH were managed conservatively and surgery was performed in 38% of the cases.

When we look into the management of LDH, the literature supports both conservative management and surgical intervention as viable options for the treatment of radiculopathy caused by lumbar disc herniation. Surgical intervention may result in faster relief of symptoms and earlier return to function, although long-term results appear to be similar regardless of type of management. But the final decision regarding the management of LDH depends on the clinical presentation, severity and course of the disease. Patients with symptoms present for greater than six months should be referred to a spinal surgeon because non-operative management may not be indicated in these individuals.<sup>11,12</sup>

Cranial hematoma was the second most common diagnosis in the present study, and majority of these cases were subdural hematoma (SDH) 70%. Chronic subdural hematoma (CSDH), being the commonest type of SDH and majority of them were operated (89%), and a small percentage (11%) of these patients were put on conservative management. But in case of patients with acute subdural hematoma (ASDH), 70% were operated and a good percentage (30%), of them who had thin rim hematomas without any mass effect or who were neurologically intact were managed conservatively. Treatment of CSDH is primarily surgical evacuation of the hematoma, although small hematomas may resolve spontaneously.<sup>13</sup> A recent study has shown that 23% of the patients with CSDH did not warrant surgery because the haematoma was small.<sup>14</sup> Acute subdural hematoma (ASDH) causing significant mass effect, which may be effectively reduced by surgery, is supposed to be an indication for surgery. Servadei et al developed a protocol to select comatose patients for nonoperative management in ASDH. Since this protocol worked successfully, the authors concluded that nonoperative treatment can be safely used for a defined group of comatose patients with ASDH.<sup>15</sup> Epidural hematoma was diagnosed in only 30% of the studied population and 75% of these patients were managed by surgical intervention.

Cervical disc herniation was managed conservatively in majority (62.5%) of the cases during the present study. There is no clearly established consensus regarding indications for surgery in patients with cervical radiculopathy.<sup>16-18</sup> Given that most patients with cervical radiculopathy improve with conservative management, a trial of observation is warranted in patients without any concerning signs or symptoms. Concerning signs or symptoms that might merit early surgical intervention include progressive neurologic deficits, signs of myelopathy, fractures or other signs of cervical instability.<sup>19</sup>

A small population of our patients were diagnosed to be suffering from brain tumors and glioma and meningioma were the two most common tumor types found. Malignant tumours of the brain are a rare occurrence accounting for approximately 2% of all cancers in adults. The greatest proportions of adult brain tumours are

supratentorial, arising in the frontal, temporal and parietal lobes, and the majority (86%) are gliomas which include astrocytomas, glioblastomas, oligodendroblastomas, and unspecified gliomas.<sup>20</sup>

The prescription of drugs in neurosurgical outpatient has been reported rarely and to our knowledge no such data has been published. Analgesics were the most common drugs prescribed during the current study, as most of our patients were complaining of pain or swelling. This was followed by GABA analogues and multivitamins. GABA analogues are presently considered the drugs of choice prescribed to take care of the neurological symptoms. Antiepileptic drugs and muscle relaxants were also prescribed in many patients. Proton pump inhibitors were also prescribed in a good number of patients which can be justified by the fact that most of our patients received combination of drugs especially analgesics. Calcium along with vitamin D3 were given as nutritional supplements especially in old age group and female patients.

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