

## Original article

# Demographic pattern and clinical characteristics of optic neuritis in a tertiary eye care centre

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### Abstract

**Purpose:** To study the demographic pattern and clinical characteristics of optic neuritis cases in a tertiary eye care centre in Nepal. **Design:** Descriptive, cross-sectional study. **Methodology:** Complete ocular examination was done in all the newly diagnosed cases of optic neuritis presenting from January 1<sup>st</sup> 2012 to June 30<sup>th</sup> 2013. Demographic pattern, clinical features, visual acuity, colour vision, contrast sensitivity and visual field defects were studied. **Results:** Sixty seven eyes of 50 patients (28 females and 22 males) with optic neuritis were included in the study. The mean age was 34.32 years  $\pm$  13.72 years. The male: female ratio was 1:1.27. All the cases presented with complaint of blurring of vision. Painful ocular movement was noted in 58%. On ophthalmoscopic examination around 2/3<sup>rd</sup> of eyes suffered from papillitis (72%) and 1/3<sup>rd</sup> from retrobulbar optic neuritis (27%). Only one case of neuroretinitis (1%) was seen in the study. The colour vision pattern was variable. Contrast sensitivity was reduced in 94%. Centrocaecal scotoma was seen in 10.5%. **Conclusion:** Females were predominantly affected. Unilateral involvement was the most common presenting as papillitis.

**Keywords:** colour vision, contrast sensitivity, optic neuritis, visual field

### Introduction

Optic neuritis is an acute inflammatory disorder of the optic nerve. The disease is characterized by sudden loss of vision, often accompanied by periocular pain. Majority of cases are idiopathic, however demyelination specifically multiple sclerosis is reported to be the most common association (Saxena et al, 2010).

Various studies reported from Nepal (Das H et al, 2010; Shrestha R et al, 2007) included only adult population.

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This study was done to find out the demographic pattern and clinical characteristics of optic neuritis in both adult and children.

### Materials and Method

This was a descriptive, cross-sectional study done in patients with optic neuritis presenting to the outpatient department and Neuro-ophthalmology clinic of B. P. Koirala Lions Centre for Ophthalmic Studies during the eighteen month period from January 1<sup>st</sup> 2012 to June 30<sup>th</sup> 2013. It included 67 eyes of 50 patients who fulfilled the diagnostic criteria based on clinical findings (diminution of visual acuity, pain on eye movement, relative afferent pupillary defect) and investigation findings

(visual field defect, visual evoked potential changes suggestive of optic neuritis, colour vision defect of recent onset).

Other causes of optic neuropathy like ischemic, traumatic, toxic, compressive and infiltrative were ruled out. Detailed history was taken regarding onset of visual loss, duration, whether associated with pain, history of any previous attack and history of any other systemic or neurological symptoms. Clinical examination included; determination of best corrected visual acuity (BCVA) on Snellen's chart (E chart for illiterates or Catford drum for children), pupillary reaction, slitlamp biomicroscopy and fundus examination under mydriasis. Investigations included contrast sensitivity on Pelli-Robson chart, colour vision with Farnsworth Panel D15 test, Goldman visual field (GVF), visual evoked potential and magnetic resonance imaging whenever practically possible.

### Statistical analysis

Data processing was done with SPSS version 20.

### Results

A total of 67 eyes of 50 patients were enrolled in the study. The mean age was 34.32 years  $\pm$  13.72 years. The maximum number of cases belonged to the age group 21-30 years (24%). Only 6% (3 cases) belonged to the paediatric age group <15 years. More female (56%) cases were seen than the males (44%) with the male:female ratio of 1:1.27.

Unilateral cases (66%) of optic neuritis outnumbered bilateral (34%) cases. Around 2/3<sup>rd</sup> of eyes suffered from papillitis (72%) and 1/3<sup>rd</sup> from retrobulbar optic neuritis (27%). Only 1 case of neuroretinitis (1%) was seen in the study. Frequency of involvement was found to be almost equal in both eyes (right eye 51% and left eye 49%). (Table 1)

Among the children under 15 years, 75% (2 cases) were bilateral and 25% (1 case) was unilateral. All the three paediatric cases had papillitis.

All the cases presented with the complaint of blurring of vision. Extra-ocular complaint of tingling sensation of extremities was seen in 2% cases. (Table 2)

Commonest cause of optic neuritis was found to be idiopathic i.e. 52% in unilateral and 41% bilateral. Sinusitis (12%), viral illness (12%), ischaemic heart disease (6%) and tuberculosis (23%) were more commonly found in bilateral optic neuritis. Diabetes (9%), viral illness (9%), hypertension (12%) and typhoid (6%) were commonly found in unilateral optic neuritis. (Table 2)

Around 46% cases presented with BCVA below 1/60 of which 4.5% had vision of No Light Perception (NPL). BCVA was 6/6 to 6/18 in only 17.9%. (Table 3)

Colour vision could not be assessed in 61% eyes due to poor visual acuity. However in 39% eyes that could be tested, the colour vision defect was found in 77% and normal colour vision was seen in 23%. The pattern of colour vision defect was 50% non-specific defect, 11% red-green, 12% total colour vision defect and 4% had tritan defect. (Table 3)

Contrast sensitivity could not be assessed in 54% due to poor visual acuity. However in cases where contrast sensitivity could be checked, 94% showed reduced contrast sensitivity and 6% had normal contrast sensitivity result. (Table 3)

In 59.7% (40) eyes visual field testing could not be performed due to poor visual acuity. Rest of the eyes i.e 40.3% (27 eyes) in which the visual field testing could be done showed centrocaecal scotoma in 25.9% (7 eyes). (Table 4)

**Table 1: Table showing the characteristics of optic neuritis**

Characteristics (n= 50 cases)	No.	Percentage
<b>Age group (years)</b>		
1-10	1	2%
11-20	9	18%
21-30	12	24%
31-40	10	20%
41-50	11	22%
51-60	6	12%
61-70	1	2%
<b>Gender</b>		
Male	22	44%
Female	28	56%
<b>Laterality</b>		
Unilateral	33	66%
Bilateral	17	34%
<b>Clinical diagnosis (n= 67 eyes)</b>		
Papillitis	48	72%
Retrobulbar Neuritis	18	23%
Neuroretinitis	1	1%

**Table 2: Table showing the clinical characteristics in optic neuritis**

	No.	Percentage
<b>PRESENTING COMPLAINTS</b>		
Blurring Of Vision	50	100%
Painful Eye Movement	29	58%
Ocular Pain	3	6%
Headache	18	36%
Flashes	3	6%
Floater	2	4%
Coloured Halos	1	2%
Curtain Like Effect	1	2%
<b>II. ASSOCIATED SYSTEMIC ILLNESS</b>		
<b>Bilateral Optic Neuritis</b>		
Tuberculosis	4	23%
Diabetes Mellitus	1	6%
Ischaemic Heart Disease	1	6%
Sinusitis	2	12%
Viral Illness	2	12%
Nil	7	41%
<b>Unilateral Optic Neuritis</b>		
Hypertension	4	12%
Diabetes Mellitus	3	9%
Psychiatric Illness	1	3%
Typhoid	2	6%
Viral Illness	3	9%
Nil	17	52%

**Table 3: Table showing presenting BCVA, colour vision defect and contrast sensitivity in optic neuritis**

n = 67 eyes	No.	Percentage
<b>BCVA</b>		
6/6-6/18	12	17.9%
6/24-6/60	13	19.4%
5/60-3/60	6	9%
2/60-1/60	5	7.5%
<1/60-PL	28	41.8%
NPL	3	4.5%
<b>Types of colour vision defect</b>		
a. Could not be assessed	41	61%
b. Assessed	26	39%
Non-Specific	13	50%
Red-Green	3	12%
Total Colour Vision Defect	3	12%
Normal	6	23%
Tritan	1	4%
<b>Types of contrast sensitivity</b>		
a. Could not be assessed	31	54%
b. Assessed	36	46%
Reduced	34	94%
Normal	2	6%

**Table 4: Table showing the pattern of visual field defects in cases of optic neuritis**

Type of visual field defect	No.	Percentage
Centro Caecal Scotoma	7	10.4
Enlarged Blind Spot + Reduced Central Sensitivity	6	9.0
Generalised Constriction+ Enlarged Blind Spot	3	4.5
Central Scotoma	2	3.0
Enlarged Blind Spot	2	3.0
Homonymos Hemianopia	2	3.0
Generalised Constriction of Visual Field	1	1.5
Centro Caecal Scotoma + Enlarged Blind Spot	1	1.5
Reduced Central Sensitivity	1	1.5
Reduced Central Sensitivity + Constricted Inferior Field	1	1.5
Normal	1	1.5
Could not be assessed	40	59.7
Total Eyes	67	100

### Discussion

A total of 67 eyes of 50 patients with optic neuritis meeting all the inclusion criteria of the study protocol were enrolled.



In our study maximum cases belonged to the age group 21-30 years (24%) similar to study in another center in Kathmandu (Shrestha R et al, 2007). The mean age was  $34.32 \pm 13.72$  years similar to the study from Eastern Nepal (Das H et al, 2010) and Iran (Farzad Fatehi et al, 2012). But studies from China (Zhang et al, 2008) and India (Saxena et al, 2010) reported optic neuritis more prevalent in the younger age group.

In our study female predominance was seen similar to the study in Japan (Suehiro et al, 2002) and China (Zhang et al, 2008). However male predominance was seen in previous studies from Nepal (Das H et al, 2010; Shrestha R et al, 2007).

Unilateral optic neuritis was more than bilateral optic neuritis similar to the study in India (Saxena et al, 2010), China (Zhang et al, 2008) and Japan (Suehiro et al, 2002). In contradiction study from Eastern Nepal (Das H et al, 2010) showed more cases of bilateral optic neuritis and another centre in Kathmandu showed equal number of unilateral and bilateral cases (Shrestha R et al, 2007).

All the cases presented with diminution of vision. In our study 58% had painful ocular movement almost similar to Indian study -66% (Saxena et al, 2010), but more than in the studies from China-42.9% (Zhang et al, 2008), Chandigarh-33.4% (Jain et al, 1980), Eastern Nepal-33.33% (Das H et al, 2010) and Japan-17.6% (Suehiro et al, 2002).

In our study papillitis was more common than retrobulbar optic neuritis and neuroretinitis similar to other study from Nepal (Shrestha R et al, 2007) and India (Saxena et al, 2010; Tandan et al, 2006). In contradictory the ONTT (Beck RW et al, 1992) study showed retrobulbar neuritis as the predominant type.

No underlying etiology could be found in maximum cases similar to other study (Shrestha R et al, 2007). None of the study cases were

diagnosed as multiple sclerosis similar to studies from China (Zhang et al, 2008) and India (Jain et al, 1980). In contradictory study from Japan (Suehiro et al, 2002) reported 22.8% cases of optic neuritis associated with multiple sclerosis. Another Indian study (Saxena et al, 2010) reported 2 cases of multiple sclerosis. Since our study was cross-sectional and we had excluded the recurrent cases of optic neuritis, that could be one of the reasons of not diagnosing multiple sclerosis as the etiology of optic neuritis.

In bilateral optic neuritis parainfectious causes (eg. sinusitis and viral illness) and ATT induced optic neuritis were more common. Parainfectious causes were common in unilateral optic neuritis. Idiopathic cases were more common in both unilateral and bilateral optic neuritis.

Visual acuity finding were almost similar to study from China (Zhang et al, 2008) but different than in study from another centre from Kathmandu and Eastern Nepal (Shrestha R et al, 2007; Das H et al, 2010).

In our study non-specific colour vision defect was more common followed by normal colour vision. In contrast to our study, total color blind was common in another study (Shrestha R et al, 2007) and an Indian study reported normal colour vision as predominant type in cases of optic neuritis (Tandan et al, 2006). The ONTT (Beck RW et al, 1992) showed that most cases of optic neuritis show mixed red-green and blue-yellow colour vision defects. Colour vision defect may shift over time. Thus, colour vision defect can not be used for the differential diagnosis of optic neuritis (Beck RW et al, 1992).

Contrast sensitivity was reduced in 94% similar to western study (abnormal contrast sensitivity in 93%) (Beck RW et al, 1984) and Indian study (100% abnormal contrast sensitivity) (Tandan et al, 2006).

In our study visual field could be done in 40.3% (27) cases of which centrocaecal scotoma was the most common field defect. In contrast to our study, Chandigarh study reported concentric contraction (Jain et al, 1980) and Malayasian study reported paracentral scotoma (Ismail et al, 2012) as the most common visual field defect in cases of optic neuritis. Similar to our study, central, centrocaecal and arcuate scotomas were the common field defects in Eastern Nepal study (Das H et al, 2010) and central scotoma (13.8%) was the most common defect in study from valley (Shrestha R et al, 2007).

### Conclusion

Most of the cases of optic neuritis belonged to the age group 21-30 years with 6% cases from the paediatric age group. There was a slight preponderance in females. Unilateral optic neuritis was more common in adult while bilateral was common in children. Papillitis was predominant type in both the adults and children. Parainfectious causes were common followed by ATT induced optic neuritis.

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