Ocular Emergency Study (OES): True Ocular Emergency and Non-urgent Cases at Emergency Department at Hetauda Community Eye Hospital

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Abstract: Purpose: To assess the load of non-urgent and true emergency cases presenting in Emergency department of tertiary eye center in Nepal. Methods: retrospective, descriptive study was done for all emergency visits at Hetauda community eye hospital in 2020. Data on age, gender, address, diagnosis were collected. Diagnosis was classified according to urgency. Results: We had 6526 cases with an average of 18 cases per day. The male to female ratio was 1.47:1. Non-urgent cases comprised of 48% of ED visits. The mean age of patients visiting in ED was 34.18±19.27 years. Foreign body in cornea was the most common diagnosis while mild conjunctivitis was the commonest cause of non-urgent ED visit. The most common age group to visit as true ocular emergency was 21-30 years with 23.20 %. Males were more likely to visit as true ocular emergency than females. Conclusion: younger males are more likely to use Emergency services. More focus should be done in triaging, Public education and awareness to reduce non-urgent cases in emergency department.

Keywords: Ocular Emergency study, True Emergency, Non-Urgent, corneal foreign body, Trauma.

INTRODUCTION

True Ocular emergency requires immediate attention and management to avoid functional damage to eye and periocular structures. Non-urgent Emergency Department (ED) visits are typically defined as visits for conditions for which a delay of several hours would not increase the likelihood of an adverse outcome. (Uscher-Pines et al., 2013) Triaging ocular emergencies are needed to provide optimum care with limited resources. The use of ED by non-urgent patients has become an important public health problem. (Channa et al., 2016; Uscher-Pines et al., 2013) A systematic review suggested that at least 40% of all ED visits in the US are non-urgent. (Uscher-Pines et al., 2013) Non urgent cases crowd the system and delays treatment to true emergencies hampering their visual and functional potential.

Ocular Emergency study (OES) was done to assess the load of true versus non-urgent emergency cases at Hetauda Community Eye Hospital (HCEH) in 2020. Such study has not been done in Nepal. The findings will allow health care providers to coordinate with health care policy makers and researchers for developing effective options for managing these conditions. HCEH is the only tertiary level eye care hospital in Makwanpur District and provides eye care services to the district and its surrounding areas. The 24 hours emergency system is frequented by true emergency and non-urgent cases alike. This negatively impacts the quality of patient care and patients-service provider relationship. Quick review, early disposal and convenience of time makes ED services favorite over routine OPD clinics.

SUBJECTS AND METHODS

This is a retrospective descriptive study done at a tertiary level community eye hospital in Nepal. Institutional review Board (IRB) clearance was taken from Tilganga Institution of Ophthalmology (TIO- IRB) and the study was carried out in line with the ethical standards of the Helsinki Declaration. All cases visiting ED of HCEH in 2020 from 1st January to 31st December were retrieved via electronic medical record system (EMR). Every case was classified as true ocular emergency and non-urgent cases based on diagnosis at presentation. Similar diagnosis was grouped into one for analysis purpose. Age, gender, caste, address, month

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of presentation and history of trauma were taken into account.

A common definition of level of urgency was used and documented as true emergency: immediate (within one to two hours); urgent (within 24 hours); and semi-urgent- (within a week) and not urgent cases. (Graves, 2010–2012; Stagg et al., 2017) Successful patient outcomes in emergencies depends on prompt recognition as well as appropriate initial management and/or referral. (Hodge & Lawless, 2008) Categorizing patients into level of urgency help to initiate appropriate care, counselling and timely referral. Careful examination and appropriate treatment are important to minimize the occurrence of poor visual prognosis and vision loss or blindness. (Heng & Hamilton, 2018)

The data was cleaned with MS office Excel 2019 and statistical analysis was done with IBM SPSS Statistics for Windows, version 26 (IBM Corp., Armonk, N.Y., USA). Means with Standard deviations were used to describe the distributions of continuous variables. Categorical variables were described in Percentages. Comparisons of categorical data were performed with the use of Pearson's chi-square test. P < 0.05 was considered statistically significant.

RESULTS

HCEH ED saw 6526 patients in 2020 with an average of 17.88 cases per day. The maximum case was 763 in November. The male to female ratio was 1.47:1. Younger active male patients were more in both true emergency cases and non-urgent cases. The mean age of patients in ED was 34.18±19.27 years. Table 1 presents the demographic characters of patients visiting ED.

Table 1: Demographic Characteristics

|                      | True emergency | Non-urgent | Total       |
|----------------------|----------------|------------|-------------|
| Number (%)           | 3349(51.32%)   | 3177(48.68%)| 6526(100%)  |
| Mean age (std deviation) | 34.58(16.95) years | 33.77(21.44) years | 34.18(19.27) years |
| Median (Range)       | 31 years (1-89) | 33 years (1-99) | 33 years (1-99) |
| Average case per day | 9.16            | 8.70       | 17.88       |
| Male: female         | 2.1:1           | 1.04:1     | 1.47:1      |
| Common in month      | October (6.47%) | June (6.45%) | November (11.69%) |
| Common diagnosis     | Foreign body cornea (24.10%) | Conjunctivitis (23.76%) | Foreign body cornea (12.37%) |

Non-urgent cases consisted of nearly half (48.68%) the case load. Young adults and male population were high in true emergency case group. A chi-square test of independence performed to examine the relation between gender and emergency status showed positive correlation between male gender and true emergency, X² (1, N = 6526) = 190.178, p <.001. The number of cases visiting ED was highest in November while there was sharp drop in all cases in August. The line chart figure 1 shows the pattern of number of cases in different month.

Figure 1: line chart showing month wise cases in ED

Ethnic variation showed consistency with the composition of the population in the area as shown in Table 2 (Sharma et al., 2014).
Table 2: Ethnic distribution of patients visiting ED

| Ethnic Group            | Percentage | Number |
|-------------------------|------------|--------|
| HILL BRAHMAN            | 24.96%     | 1629   |
| HILL CHHETRI            | 16.47%     | 1075   |
| HILL DALIT              | 5.52%      | 360    |
| HILL JANAJATI           | 45.92%     | 2997   |
| MADHESHI BRAHMAN        | 0.55%      | 36     |
| MADHESHI CHHETRI        | 0.34%      | 22     |
| MADHESHI DALIT          | 0.21%      | 14     |
| MADHESHI JANAJATI       | 1.36%      | 89     |
| MADHESHI OTHER CASTES   | 3.31%      | 216    |
| MUSLIM                  | 1.32%      | 86     |
| OTHERS                  | 0.03%      | 2      |

Hill Janajatis were the most common ethnic group to visit ED in the study period. (Ethnic classification is based on annex 3 Caste and ethnicity classification). Among the true ocular emergency cases, corneal foreign body was the most common (Figure 2) followed by corneal epithelial defect.

**Figure 2: Corneal foreign body**

Ocular trauma consisted a significant population of True ocular emergencies. Conjunctivitis and dry eyes were the top two common non-urgent cases. Ocular infections were a common presentation in true emergency group (Figure 3).

**Figure 3: Herpes Zoster Ophthalmicus**
Table 3 and table 4 shows top 20 true ocular emergency and non-urgent cases.

**Table 3: Twenty most common true ocular emergency cases**

| Diagnosis                        | Number (% ) |
|----------------------------------|-------------|
| FOREIGN BODY CORNEA              | 807(24.10)  |
| DEFECT EPITHELIAL CORNEA         | 426(12.72)  |
| SUBCONJUNCTIVAL HEMORRHAGE       | 312(9.32)   |
| FOREIGN BODY CONJUNCTIVA         | 245(7.32)   |
| KERATOCONJUNCTIVITIS             | 206(6.15)   |
| CGI ZONE I                       | 198(5.91)   |
| CHEMICAL INJURY                  | 146(4.36)   |
| STYE EYE                         | 131(3.91)   |
| KERATITIS                        | 108(3.22)   |
| UVEITIS                          | 98(2.93)    |
| CORNEAL ULCER                    | 88(2.63)    |
| CORNEAL ABRASION                 | 76(2.27)    |
| THERMAL INJURY                   | 72(2.15)    |
| HSV KERATITIS                    | 64(1.91)    |
| CGI ZONE II                      | 45(1.34)    |
| CONJUNCTIVAL LACERATION          | 39(1.16)    |
| NEONATORUM OPHTHALMIA            | 35(1.05)    |
| LID LACERATION                   | 25(0.75)    |
| CP HAIR                          | 18(0.54)    |

**Table 4: Twenty most common non-urgent cases**

| Diagnosis                        | Number (%) |
|----------------------------------|------------|
| CONJUNCTIVITIS                   | 755(23.76) |
| DRY EYES                         | 480(15.11) |
| ALLERGIC CONJUNCTIVITIS          | 411(12.94) |
| REFRACTIVE ERROR                 | 200(6.30)  |
| CATARACT                         | 174(5.48)  |
| PINGUECULITIS                    | 168(5.29)  |
| SPKS                             | 125(3.93)  |
| PSEUDOPHAKIA                     | 107(3.37)  |
| PTERYGIUM                        | 97(3.05)   |
| PRESBYOPIA                       | 90(2.83)   |
| EPISKLERITIS                     | 86(2.71)   |
| CHALAZION                        | 72(2.27)   |
| NLDO                             | 47(1.48)   |
| BLEPHARITIS                      | 42(1.32)   |
| GLAUCOMA                         | 42(1.32)   |
| CONJUNCTIVAL MASS                | 32(1.01)   |
| KERATOCONJUNCTIVITIS PHLYCTENULAR| 31(0.98)   |
| MEIBOMITIS                       | 22(0.69)   |
| OCULAR NAD                       | 22(0.69)   |

In the age wise analysis, 21-30 years was the most common age for True emergency group while 1-10 years was the most common age in the non-Urgent group as shown in table 5.

**Table 5: Age wise distribution of cases visiting ED**

| Age group | Non-urgent (%) | True emergency (%) | Total (%) |
|-----------|----------------|--------------------|-----------|
| 1-10      | 607(19.11)     | 295(8.81)          | 902(13.82)|
| 11-20     | 273(8.59)      | 343(10.24)         | 616(9.44)|
| 21-30     | 562(17.69)     | 777(23.20)         | 1339(20.52)|
| 31-40     | 591(18.60)     | 764(22.81)         | 1355(20.76)|
| 41-50     | 398(12.53)     | 561(16.75)         | 959(14.70)|
| 51-60     | 330(10.39)     | 346(10.33)         | 676(10.36)|
| 61-70     | 242(7.62)      | 174(5.20)          | 416(6.37) |
**DISCUSSION**

HCEH covers a population of over 4.5 lakhs of Makwanpur district and surrounding area. On an average ED of HCEH manages 10 patients per day. There was a surge of COVID pandemic cases all over the world in 2020 and Nepal was no exception. The general OPD was hampered due to strict safety protocols and emergency department got more crowded.

In our study nearly half (48%) of emergency visits were non-urgent which is similar to 40% in Nancy, 44.3% in USA and 37% in systematic review in USA (Agrinier et al., 2018; Channa et al., 2016; Uschinger et al., 2013) It is more than 7.6% non-urgent consultation in a retrospective study in Spain (Galindo-Ferreiro et al., 2021). Routine cases are attracted by the early management and patients’ convenience of time in ED not knowing the disturbance to genuine ocular emergency patient care. The most common cause of ocular emergency was corneal foreign body in our study which is similar to study in Colombia, GMC, south India, LEI and Spain (Bajracharya et al., 2021; Galindo-Ferreiro et al., 2021; Galvis, 2019; Hassan et al., 2017; Tuladhar et al., 2018) but is different from study in USA where ocular contusion was most common (Cheung et al., 2014) and keratitis was common in Nigerian study. (Omotoye et al., 2016) Male patients are more active physically and prone to visit emergency more frequently than females. In our study male to female ratio was 1.47:1 which is similar to hospital based ocular emergency study in USA, Nigeria, 2.25:1 in western Nepal and 2.66:1 in Lumbini eye institute (Cheung et al., 2014; Kinderen et al., 2012; Omotoye et al., 2016; Tuladhar et al., 2018). Higher proportion of males were seen 5.4:1 in split-Dalmatian County (Karaman et al., 2004) and 4:1 in south India and west Bengal (Hassan et al., 2017; Sengupta et al., 2016).

However female patients were more common in Spain 0.92:1.(Galindo-Ferreiro et al., 2021) Mean age of cases presenting in ED in our study was 34 years which shows active lifestyle of young population who are prone to injury, similar to 28.28 years in Himalayan eye hospital; (Kinderen et al., 2012) 30.41 years in GMC and Nigeria; (Omotoye et al., 2016; Tuladhar et al., 2018) 26.71 years in south India (Hassan et al., 2017) and 21-30 years in LEI.(Bajracharya et al., 2021) Mean age was relatively higher in Spain 51.47 years and 45-65 years age group in USA.(Cheung et al., 2014; Galindo-Ferreiro et al., 2021) Adult population comprised 79% of the ocular trauma in west Bengal. (Sengupta et al., 2016) The ED visits were more in the month of October and November. These are the festival months in Nepal and people travel; indulge in leisure activities and also the start of harvesting season.

Our study is unique for evaluating the non-urgent cases in emergency department in Nepal. Its strength is its huge sample size and electronic data (reliable, reproducible and readily accessible). The limitations of the study are due to inherent properties of retrospective study. Data pertaining to circumstances of emergency visit which were not important for management were not recorded but would have been important in policy making.

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**Conflicting Interest:** Nil

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| Age group | Non-urgent (%) | True emergency (%) | Total (%) |
|-----------|----------------|--------------------|----------|
| 71-80     | 121(3.81)      | 78(2.33)           | 199(3.05) |
| 81-90     | 45(1.42)       | 11(0.33)           | 56(0.86) |
| 91-100    | 8(0.25)        | 0                  | 8(0.12)  |
| **Total** | **3177(100)** | **3349(100)**      | **6526(100)** |
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