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Original Research Article

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 periorbital 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 24hours); 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)	31years (1-89)	33years (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.

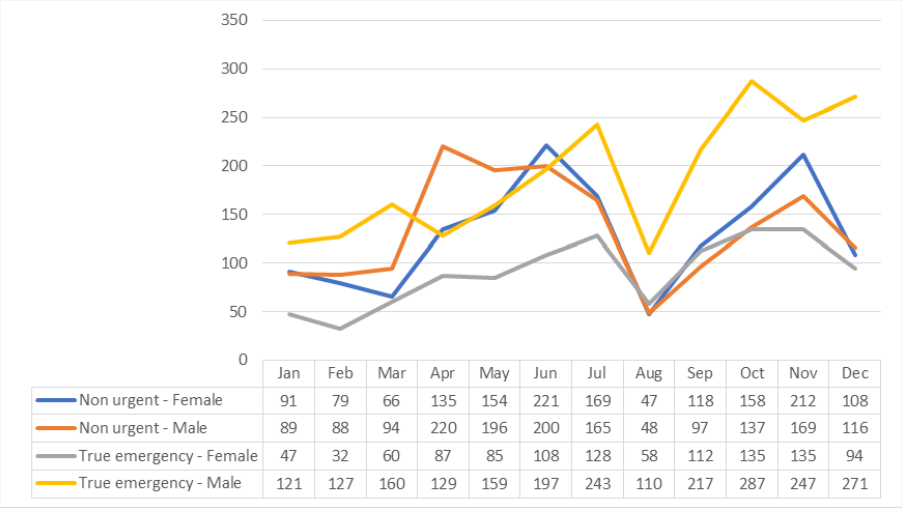

Figure 1: line chart showing month wise cases in ED

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. (Ethic 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.

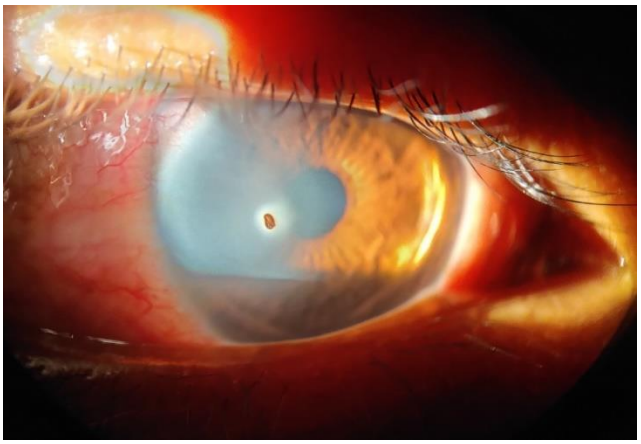

Figure 2: Corneal foreign body

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)
SUBCONJUNCTIVALHEMORRHAGE	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)
EPISCLERITIS	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)

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)**

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; Uscher-Pines *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; Kinderan *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; (Kinderan *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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