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Demography of Ocular Trauma in Pediatrics Patient, A Systematic Review

Nadia D. Quartantri
Faculty of Medicine, University of Brawijaya, Indonesia
quartantrinadia@yahoo.co.id

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Abstract
Ocular injuries are the most common cause of acquired monocular blindness in children. Eye injuries in childhood are largely preventable but unfortunately remain common. We sought to perform a systematics review of demography ocular trauma in children over the past fifth years. A systematic review was performed on PubMed and Scopus search term "Pediatrics", "Trauma" and "Ocular". Four articles identified between 2017 and 2021 specifically addressed for ocular trauma in pediatrics. A total 1039 patients were included in these four studies. The incidence of close globe injury is higher than open globe injury, two journals claim that the most incidence of ocular trauma occur in home, the two others claim that outside/street is the most common place, the incidence in male group is higher than female and incidence ocular trauma mostly occur in 2-14 years old age group. Overall, the average of close globe injury incidence is 65,8% and the average of open globe injury is 22,4%. The most common injury occur in pediatric trauma is close globe injury.

Keyword: Ocular; Trauma; Pediatric; Demography;

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Introduction

Ocular trauma, once described as a neglected disorder, has recently been highlighted as one of the major etiology of monocular and non-congenital visual impairment and blindness in all part of the world. Eye trauma constitutes 7% of all bodily injuries and 10%–15% of all eye diseases (Acar et al. 2011). Eye injuries in childhood are largely preventable but unfortunately remain common (Pizzarello 1998). According to WHO, at least 55 million people worldwide suffer significant eye trauma each year, and up to half of those eye injuries occur in children (N�grel and Thylefors 1998). Previous studies have reported that between 20%-50% of ocular injury hospital admissions are for children (Acar et al. 2011). Most of the childhood eye injury occur in recreational environments and are caused by physical mechanisms such as toys or artifacts that can be easily manipulated by children. Trauma in adults, however, usually occur due to occupational accidents (Cariello et al. 2007; Cely Quir�z and D�Antone n.d.; Pardhi et al. 2015; Parver et al. 1993).

Because of the difficulty in classifying the different types of ocular trauma injuries, the International Society of Ocular Trauma of the United States Eye Injury Registry had formulated a standardized terminology for eye injury to facilitate a uniformed definition to characterize the clinical condition. The Birmingham Eye Trauma Terminology (BETT) system provided definitions for the commonly used eye trauma terms (Kuhn et al. 2004).

Materials and method

A literature was performed using PubMed MeSH and Scopus search term “Pediatrics” “Trauma” and “Ocular”. All the journals qualified with Sc imago. All articles were reviewed for inclusion such as children under 18 years old, using retrospective cohort study and cross-sectional study methodology, The classification of eye injuries was based on the Birmingham Eye Trauma Terminology (BETT).

The aim of this study was to know the demography of ocular trauma in children such as most common type of eye injury, place of injury, age at injury and the gender distribution.

Results

From four studies that examined conclude that the most common injury occur in pediatric trauma is close globe injury, there are 2 journals claim that the most incidence of ocular trauma occur in home, the others claim that outside/street is the most common place, the incidence in male group is higher than female and incidence ocular trauma mostly occur in 2-14 years old age group.

Kajo Bucan et al reviewed There were 353 children hospitalized, 82% of boys (mean age 11 years) and 18% of girls (mean age 10 years). The majority of traumas occurred in the outside environment (70%, n = 249), followed by occurrences at home (17%, n=60), and at a school/nursery (8%, n=28). With regard to the type of injury, there were 299 (85%) closed eye injuries and 54 (15%) open eye injuries. The largest number of injuries (39%) occurred

among children aged 10–14 years, followed by those aged 5–9 years (34%), and those aged 15–18 years (19%); the fewest injuries occurred among children aged 0–4 years (8.5%) (Bu an et al. 2017).

Edita Puodžiuvienė et al reviewed A total of 268 cases of pediatric ocular trauma. The age of children ranged from 6 months to 17.5 years. Boys were more likely to suffer ocular injury than girls. Home was the leading place of eye injury (60.4%), followed by outdoors (31.7%), school (5.2%) and sporting area (2.2%). CGI were found to be the most common type of eye injury (53.4%; n = 143). OGI accounted for 28.7% (n = 77) overall, followed by ocular burns (9.3%) and non-globe injures such as eyelid lacerations, lacrimal system injury (8.6%). The study population was divided into three age groups: < 7 years (27.2%, n = 73), 7– 12 years (36.6%, n = 98) and 13–18 years (36.2%, n = 97) old (Puod�iuvien et al. 2018).

Shazia Qayum et al reviewed of total 357 patients, 271 (76%) were below the age of 12 years; 41.1% of children with ocular trauma belonged to age group 2-6 years. The male to female ratio was 2.9:1. Out of the 357 patients, 242 (67.8%) presented with closed globe injury and 115 (32.2%) with open globe injury. Home was the most common place of injury (47.8%), followed by streets (17.9%) and playground (14.9%). The largest number of injuries (41,18%) occurred among children aged 2-6 years, followed by those age 7-12 years (33,89%), and those aged 13-16 years (24,09%); the fewest injuries occurred among children aged 0-1years (0,84%) (Qayum, Anjum, and Rather 2018).

Valeria D'Antone et al reviewed 61 cases of eye injuries were recorded the highest percentage 67.21% (41 cases) were male and 32,79% (20 cases) were female. The greatest number of injuries occurred in the 6 to 10-year-old group with 39.34% (24 of the cases), followed by the 11 to 15-year-old group − 36.06% (22 cases); the fewest injuries occurred among children aged 1-5 years 24,59 % (15 of cases). When analysing the place where eye injury occurs, the highest proportion occurred in the street with 32.79% (20 participants) followed by 26.23% (16 cases) which occurred at home. Of the total of 61 patients, 35 involved closed-globe injuries, 9 were OGI and 17 were without globe involvement (D'Antone et al. 2021).

Discussion

In general, children are more susceptible to eye injuries because they have immature motor skills and limited common sense. They have a natural curiosity and are often seen imitating without regard to the risks and outcomes. Although most eye injuries are avoidable by simple preventive measures, many children suffer visual impairment that can affect their psychosocial development.

Overall, the most common injury occur in paediatric trauma is close globe injury. Closed globe injury occurred three times more frequently than open globe injury, and this is similar to results reported elsewhere (Lee et al. 2008). Analysis of OGI showed that penetrating wounds were the most common type of open globe injury which is consistent

with results from other studies (Hosseini et al. 2011; Thompson et al. 2002). And 2 of 4 journals claim that contusion was the most common type of closed globe injury.

The place at injury in four journals reviewed has two different conclusions. Edita et al and Shazia et al claimed that ocular injury occurred most commonly occur at home. A study conducted by Aghadoost et al showed that most injuries happened at home (Aghadoost, Fazel, and Aghadoost 2012). In Canada, eye injuries occurred at a number of locations, with the majority occurring at home, followed by schools and other residences (Podbielski et al. 2009). Kajo Bućan et al and Valeria D'Antone et al claimed that ocular injury most commonly occurs outside the house (Street, school, sport area). The present study showed that ocular injury occurred most commonly in the outside environment, with the home as a second most common site (Shoja, 2006). It speaks in favour of possible lack of adult supervision while children play outside.

From all journals conclude that boys are at higher risk for eye injuries. Multiple studies indicate that ocular trauma is more common in boys than in girls (Grin, Nelson, and Jeffers 1987). Similar to other studies, most eye injuries occurred among boys which could be attributed to their more active behaviour and their tendency to spend more time outdoors compared to the girls (Noorani et al. 2010). Attribute this tendency to boys generally having a more aggressive and violent nature compared to girls. Children ocular trauma study in Iran, state that in their society, boys are generally given more freedom, allowed to play outside without parental supervision and are even encouraged to show aggressive behavior in comparison to girls (Miratashi 2006). One United Kingdom study found that the reason for boys being overrepresented in ocular injuries compared to girls is due to the more adventurous and aggressive nature of boys (MacEwen, Baines, and Desai 1999). The above could be probable attributable reasons for the disparity of prevalence of eye injuries between the two genders.

From all journals conclude that incidence ocular trauma mostly occurs in 2-14 years old age group. At these ages, toddlers (2-6 years old) are discovering their world and exploring their surroundings. A higher incidence of trauma in school-aged children was present since they spent most of their time in school where they were more exposed to the environment and were more physically active. There was also less parental guidance in schools or recreational centres (Rizal 2014). The reason for the 5-9 year age group being more prone to eye injuries is because children in this age range are often more independent than pre-schoolers, but less mature and responsible than teenagers (Podbielski et al. 2009). Shoja et al noted that a majority (58.3%) of injuries were seen in the 7–12 year of age group (Miratashi 2006). The higher incidence of ocular trauma in this age group is consistent with a study published by Sofi et al (Sofi, Wani, and Keng 2012). The prevalence of childhood ocular trauma being lower in age group <2 years has been explained by greater parental care and children being less exposed to outer world (Saxena et al. 2002).

Author	Journal	Year	Total Patient	Close Globe Injury	Open Globe Injury
(Bu an et al. 2017)	Journal of Global Health	2017	353	299 (85%)	54 (15%)
(Puod&#xfffd;iuvien et al. 2018)	BMC Ophtalmology	2018	268	143 (53.4%)	77 (28.7%)
(Qayum, Anjum, and Rather 2018)	Chinese Journal of Traumatology	2018	357	242 (67.8%)	115 (32.2%)
(D'Antone et al. 2021)	BMC Ophtalmology	2021	61	35 (57%)	9 (14%)

Conclusion

In a systematic review of pediatrics ocular trauma, four studies with 1039 total patients were identified. The average of close globe injury incidence is 65,8% and the average of open globe injury is 22,4%. The most common injury occur in pediatric trauma is close globe injury.

References

Acar, Ugur et al. 2011. "A New Ocular Trauma Score in Pediatric Penetrating Eye Injuries." *Eye* 25(3): 370–74.

Aghadoost, Davood, Mohammad Reza Fazel, and Hamid Reza Aghadoost. 2012. "Pattern of Pediatric Ocular Trauma in Kashan." *Archives of Trauma Research* 1(1): 35.

Bu an, Kajo et al. 2017. "Epidemiology of Ocular Trauma in Children Requiring Hospital Admission: A 16 year Retrospective Cohort Study." *Journal of global health* 7(1).

Cariello, Angelino Julio et al. 2007. "Epidemiological Findings of Ocular Trauma in Childhood." *Arquivos brasileiros de oftalmologia* 70(2): 271–75.

Cely Quir z, L, and V A D Antone. "Epidemiological Characterization of Ocular Trauma in Patients Admitted to the Optometry Service in the South of Santa Rosa, Bolivar in 2015-2016. 2016." *Available on: https://pdfs. semanticscholar. org/70f4/2348795f8adab07a631c2999e4fed4ef623a. pdf*.

D'Antone, Valeria et al. 2021. "Pediatric Ocular Trauma From A Tertiary Public Hospital in Colombia: Epidemiological Characterization."

Grin, Trudi R, Leonard B Nelson, and John B Jeffers. 1987. "Eye Injuries in Childhood." *Pediatrics* 80(1): 13–17.

Hosseini, Hamid et al. 2011. "Clinical and Epidemiologic Characteristics of Severe Childhood Ocular Injuries in Southern Iran." *Middle East African journal of ophthalmology* 18(2): 136.

Kuhn, Ferenc, Robert Morris, C D Witherspoon, and V Mester. 2004. "The Birmingham Eye Trauma Terminology System (BETT)." *Journal francais d'ophtalmologie* 27(2): 206–10.

Lee, CHSW, W Su, Lan Lee, and M Yang. 2008. "Pediatric Ocular Trauma in Taiwan." *Chang Gung medical journal* 31(1): 59.

MacEwen, Caroline J, Paul S Baines, and Parul Desai. 1999. "Eye Injuries in Children: The Current Picture." *British journal of ophthalmology* 83(8): 933–36.

Miratashi, M R Shoja A M. 2006. "Pediatric Ocular Trauma." *Acta Medica Iranica*: 125–30.

Noorani, Sorath, Jamshed Ahmed, Aurangzeb Shaikh, and Ziauddin Ahmed Shaikh. 2010. "Frequency of Different Types of Paediatric Ocular Trauma Attending a Tertiary Care Paediatric Ophthalmology Department." *Pakistan Journal of Medical Sciences* 26(3).

N�grel, A-D, and B Thylefors. 1998. "The Global Impact of Eye Injuries." *Ophthalmic epidemiology* 5(3): 143–69.

Pardhi, Chandrakishor Hemraj et al. 2015. "Pattern of Pediatric Ocular Trauma in Rural Area of Marathwada." *Journal of Clinical Ophthalmology and Research* 3(3): 127.

Parver, Leonard M et al. 1993. "Characteristics and Causes of Penetrating Eye Injuries Reported to the National Eye Trauma System Registry, 1985-91." *Public health reports* 108(5): 625.

Pizzarello, Louis D. 1998. "Ocular Trauma: Time for Action." *Ophthalmic epidemiology* 5(3): 115–16.

Podbielski, Dominic W, Michael Surkont, Nasrin N Tehrani, and R Savithiri Ratnapalan. 2009. "Pediatric Eye Injuries in a Canadian Emergency Department." *Canadian journal of ophthalmology* 44(5): 519–22.

Puod�iuvien, Edita, Giedr Jok bauskien, Monika Vieversyt, and Kirwan Asselineau. 2018. "A Five-Year Retrospective Study of the Epidemiological Characteristics and Visual Outcomes of Pediatric Ocular Trauma." *BMC ophthalmology* 18(1): 1–9.

Qayum, Shazia, Rashid Anjum, and Shagufta Rather. 2018. "Epidemiological Profile of Pediatric Ocular Trauma in a Tertiary Hospital of Northern India." *Chinese journal of traumatology* 21(2): 100–103.

Rizal, Sentro Oftalmologico Jose. 2014. "Epidemiology and Visual Outcomes of Pediatric Ocular Trauma Cases in a Tertiary Hospital." *Philipp J Ophthalmol* 39: 27–32.

Saxena, Rohit et al. 2002. "Pattern of Pediatric Ocular Trauma in India." *The Indian Journal of Pediatrics* 69(10): 863–67.

Sofi, A R, Junaid S Wani, and Manzoor Q Keng. 2012. "Profile of Children with Ocular Trauma." *JK-Practitioner* 17(1–3): 44–50.

Thompson, C G, N Kumar, F A Billson, and F Martin. 2002. "The Aetiology of Perforating Ocular Injuries in Children." *British journal of ophthalmology* 86(8): 920–22.