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# Prevalence of Ocular Disorders among Pediatric Patients in Kano State, Nigeria

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**Abstract**
**Background:** Ocular disorders refer to the anatomical and physiological deviation of the eye from its normal appearance. **Aim:** This is a retrospective study carried out to determine the prevalence of ocular disorder among pediatric patients that attended Aminu Kano Teaching Hospital, Murtala Muhammad Specialist Hospital and Abdullahi Wase Teaching Hospital in Kano state, Nigeria. **Methods**: This study was conducted using purposive sampling on 369 persons clinical records aged 0-15 years over a 2 year period (2018 – 2020).Clinical records of patients, data record form, case notes and pen were used as research materials. Data was collected from clinic register regarding Age, Gender, and Ocular disorder diagnosed. Patients were grouped according to age range: preschool age (0-5 years), school age (6-10 years) and older age (11-15 years). Collected data were stored and analysed using SPSS software version 20 and analyses of variables tested in the chi-square with a P value less than 0.05 considered statistically significant. **Results:** The ocular prevalence of 59.7% was found.The prevalence of ocular disorders was more in males 212 (57.5%) than in females 157 (42.5%). The major causes of ocular disorders were ocular trauma 87 (23.6%), refractive errors 81 (22.0%) and allergic conjunctivitis 52 (14.1%). Allergic conjunctivitis was more prevalent in 0-5 years. **Conclusion**: The findings established that ocular trauma, refractive errors and allergic conjunctivitis were the commonest causes of ocular disorders. We therefore suggest appropriate school eye health education, community enlightenment and compulsory pre-school comprehensive eye examination to identify and intervene in prevention of childhood eye disorders in Kano State.

**Keywords:** *Prevalence, Ocular Disorders, Pediatric*
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## Introduction

Visual impairment is a serious disability in children and its management is a priority of the World Health Organization's vision 2020 campaign, "The Right to Sight". (Gilbert, et al., 2001) Ocular disorders refer to the anatomical and physiological deviation of the eye from its normal appearance. Ocular disorder is a term used when referring to any condition that interfere with the ability of the eye to function properly and/or that negatively affect the visual clarity of the eye. (Onakpoya, et al.,2009) Ocular disorders include refractive errors, cataract, proptosis, conjunctivitis, strabismus, macular degeneration, glaucoma, corneal opacity, retinal detachment, vitamin A deficiency, night blindness, keratoconus and dry eye. Globally more than 90% of the visually impaired people live in the developing countries with children below 15 years constituting about 40% of the Nigerian population according to population division of United Nations Secretariat.

The common eye diseases among children in United States of America were strabismus, amblyopia and optical problems, (Castenes,2003). Conjunctivitis, trauma, refractive error and trachoma were the main disorders seen in a tertiary center in Ethiopia, North Africa. (Demissie, 2014). Ajaiyeoba

(1994) reported that trachoma (33.7%), refractive errors (6.3%) and non-trachomatous conjunctivitis (5.9%) were the most common childhood disorders. (Isawunmi,2003) found that refractive errors, vernal conjunctivitis, eye injuries and corneal inflammation were leading causes of childhood eye morbidity. Onakpoya, et al., (2009) in their findings identified vernal conjunctivitis, refractive error and sub conjunctival hemorrhage as the most common ocular disorder.

In 2005, (Kehinde, et al.,2005) found allergic conjunctivitis, refractive error and infective conjunctivitis in this order in the Northern region. Abah , et al. (2011) found refractive error, allergic conjunctivitis, glaucoma suspect and colour deficiency as childhood eye morbidity.

Eberechukwu, et al. (2017) stated that ocular disorder in childhood is an important cause of medical consultation, investing in the prevention and treatment of ocular health problems will reduce the economic and social burden characteristics of late intervention.Childhood ocular disorders require early detection and intervention to avoid visual deprivation. In developing countries such as ours a high proportion of children die within a few years of going blind, either from systemic complications of the condition causing blindness (vitamin A deficiency , measles, meningitis, congenital rubella), or because poor parents have greater difficulty in caring for ocular disorders in children (Gilbert, et al.,2001). Without proper data, it is difficult to make a case for early intervention.

However, there is limited information on ocular disorders in pediatric patients in Kano State. The present study aimed at investigating ocular disorders arising from pediatrics and its treatment.

**Materials and Methods**

This research work was conducted in three different facilities (Aminu Kano Teaching Hospital, Murtala Muhammad Specialist Hospital and AbdullahiWaseNasarawa Hospital in Tarauni, Kano Municipal and Nasarawa Local Government areas of Kano State respectively.

Aminu Kano Teaching Hospital located in Tarauni local government covers an area extending between latitude 11:58 min N and Latitude 11.59 min N as well as between longitude 8.35min E. It has a population of 21.224, as at 2006 census. Murtala Muhammad Specialist Hospital Located in Kano Municipal with a population of 365,525 at 2006 census and an area of 17km$^2$ and 13 wards coordinates. 11:57min 07N, 832 min 25E / 11.95 / 94 N and 8.54 028E. AbdullahiWaseNasarawa Hospital located in Nasarawa local government with an area of 34km$^2$, coordinate; 11.58min 37N.833min 45E / 11.97694 N8.56 250E.

The research was a retrospective study on prevalence of ocular disorders among pediatric patients that attended Aminu Kano Teaching Hospital, MurtalaMuhammed Specialist Hospital and AbdullahiWaseNasarawaHosptial. These three referral hospitals situated in three senatorial zones of Kano State have qualified optometrists and ophthalmologists.

Patients medical records were reviewed for two(2) years(2018 to 2020). Data was collected from clinic register regarding Age, Gender, and Ocular disorder diagnosed. The collected data was recorded and stored appropriately. Patients were grouped according to age range: preschool age (0-5 years), school age (6-10 years) and older age (11-15 years). (Biwas, et al., 2012) Pediatric patients aged 0 – 15 years of age with ocular disorders that attended the three approved hospitals constituted the study population.

Purposive sampling technique was employed during selection of patients' case folders and Cochran's formula was used to determine the sample size of 369 subjects. Clinical records of patients, data record form, case notes and pen were used as research materials.The case note analysis was the research instrument used. Collected data was analysed using statistical

package of social sciences (SPSS software) version 20. The test of variables was carried out using Chi-square test, and a P value less than 0.05 was considered statistically significant.

Results were presented in tables and pie charts. Ethical approval was obtained from the thesis committee of Optometry department Bayero University Kano and ethics Committee Ministry of Health, Kano State.

**Results:**

A total number of participants seen were three hundred and sixty nine (369). The age range used was zero to fifteen (0-15) years. The prevalence of ocular disorders among pediatric patients in Kano State was 59.7%.

**Table 1:** *Demographic distribution of pediatric patients according to age and gender*

| Age Group (years) | Gender | | Frequency (n) | Percentage (%) |
|---|---|---|---|---|
| | Male | Female | | |
| Pre-School (0-5) | 60 | 45 | 105 | 28.5 |
| School Age (6-10) | 72 | 54 | 126 | 34.1 |
| Older Age (11-15) | 80 | 58 | 138 | 37.1 |
| **Total** | **212** | **157** | **369** | **100.0** |

**Table 1:** The older age (11-15 years) had the highest percentage of ocular disorders 138 (37.1%) followed by school age (6-10 years) and preschool age (0-5 years) with (34.1%) and (28.5%) respectively.

This table 1 shows the demographic distribution of pediatrics patients according to Age and Gender. The male (57.5%) had a higher frequency than female (42.5%) resulting in male: Female. ratio of 1.4:1. Male had the highest frequency of consultation (57.5%).

**Table 2:** *Prevalence of ocular disorders among pediatric patient in kano state*

| Ocular Disorders | Frequency (n) | Percentage (%) |
|---|---|---|
| Ocular trauma | 87 | 23.6 |
| Refractive error | 81 | 22.0 |
| Allergic conjunctivitis | 52 | 14.4 |
| Eyelid and eye lash disorders | 27 | 7.3 |
| Lens disorders | 18 | 4.9 |
| Bacterial conjunctivitis | 17 | 4.6 |
| Ocular tumour | 11 | 3.0 |
| Corneal ulcer | 6 | 1.6 |
| Choroidal detachment | 6 | 1.6 |
| Endophthalmitis | 6 | 1.6 |
| Glaucoma | 5 | 1.4 |
| Corneal opacity | 5 | 1.4 |
| Allergic conjunctivitis + simple astigmatism | 4 | 1.1 |
| Conjunctivitis | 4 | 1.1 |
| Buphthalmos | 4 | 1.1 |
| Anterior Staphyloma | 4 | 1.1 |
| Orbital Cellulitis | 4 | 1.1 |
| Dacryocystitis | 3 | 0.8 |
| Uveitis | 3 | 0.8 |
| Sub-conjunctivalhaemorrhage | 3 | 0.8 |
| Nystagmus | 3 | 0.8 |
| Blepharophimosis syndrome | 2 | 0.5 |

| | | |
|---|---|---|
| Bilateral N.L.D obstruction | 2 | 0.5 |
| Recurrent conjunctivitis | 2 | 0.5 |
| Anterior leucoma + choroidal detachment | 1 | 0.3 |
| Anophthalmia | 1 | 0.3 |
| Chronic dacryocystitis | 1 | 0.3 |
| Bilateral congenital maculopathy | 1 | 0.3 |
| Allergic conjunctivitis + ptosis | 1 | 0.3 |
| Bacterial conjunctivitis + simple astigmatism | 1 | 0.3 |
| Hypopyon | 1 | 0.3 |
| Pseudophakia + nystagmus | 1 | 0.3 |
| Peri-orbital cellutlitis | 1 | 0.3 |
| Xerophthalmia | 1 | 0.3 |
| **Total** | **369** | **100.0** |

The table 2 shows that 23.6% had ocular trauma, 22.0%, refractive error and 14.4% allergic conjunctivitis as major causes of ocular disorders in pediatric patients while eye lid and eyelash disorders, lens disorder, bacterial conjunctivitis and ocular tumour had 7.3%, 4.9%, 4.6% and 3.0% respectively. Corneal ulcer, corneal opacity buphthalmos,nystagmus, recurrent conjunctivitis, anophthalmia and others had 6%, 5%, 4%, 3%, 2% and 1% respectively.

**Table 3:** *Pattern of ocular disorders across age groups*

| Ocular Disorders | Preschool Age (0-5 years) | School Age (6-10years) | Older Age (11-15 years) | Total |
|---|---|---|---|---|
| Ocular trauma | 17 | 37 | 33 | 87 |
| Refractive error | 15 | 24 | 42 | 81 |
| Allergic conjunctivitis | 20 | 17 | 15 | 52 |
| Eyelid and eye lash disorders | 11 | 8 | 8 | 27 |
| Lens disorders | 11 | 4 | 3 | 18 |
| Bacterial conjunctivitis | 5 | 6 | 6 | 17 |
| Ocular tumor | 8 | 2 | 1 | 11 |
| Corneal ulcer | 1 | 3 | 2 | 6 |
| Choroidal detachment | 3 | 3 | 0 | 6 |
| Endophthalmitis | 0 | 3 | 4 | 6 |
| Glaucoma | 0 | 2 | 3 | 5 |
| Corneal opacity | 3 | 2 | 1 | 5 |
| Allergic conjunctivitis + simple astigmatism | 0 | 1 | 2 | 4 |
| Conjunctivitis | 1 | 2 | 3 | 4 |
| Buphthalmos | 0 | 3 | 1 | 4 |
| Anterior Staphyloma | 3 | 1 | 1 | 4 |
| Orbital Cellulitis | 0 | 1 | 1 | 4 |
| Dacryocystitis | 0 | 0 | 3 | 3 |
| Uveitis | 0 | 1 | 2 | 3 |
| Sub-conjunctivalhaemorrhage | 0 | 0 | 3 | 3 |
| Nystagmus | 1 | 1 | 1 | 3 |
| Blepharophimosis syndrome | 1 | 1 | 0 | 2 |
| Bilateral N.L.D obstruction | 2 | 0 | 0 | 2 |
| Recurrent conjunctivitis | | 2 | 0 | 2 |
| Anterior leucoma + choroidal detachment | 0 | 1 | 0 | 1 |

| | | | | |
|---|---|---|---|---|
| Anophthalmia | 1 | 0 | 0 | 1 |
| Chronic dacryocystitis | 0 | 0 | 1 | 1 |
| Bilateral congenital maculopathy | 1 | 0 | 0 | 1 |
| Allergic conjunctivitis + ptosis | 1 | 0 | 0 | 1 |
| Bacterial conjunctivitis + simple astigmatism | 0 | 0 | 1 | 1 |
| Hypopyon | 0 | 1 | 0 | 1 |
| Pseudophakia + nystagmus | 0 | 1 | 0 | 1 |
| Peri-orbital cellutlitis | 1 | 0 | 0 | 1 |
| Xerophthalmia | 0 | 1 | 0 | 1 |
| **Total** | **105** | **126** | **138** | **369** |

Table 3, determined the prevalence of ocular disorders across age group and their significant relationship among pediatric patients in Kano State.

**Table 4:** *Pattern of ocular disorders among gender*

| Ocular Disorders | Male | Female | Total |
|---|---|---|---|
| Ocular trauma | 60 | 27 | 87 |
| Refractive error | 38 | 43 | 81 |
| Allergic conjunctivitis | 29 | 23 | 52 |
| Eyelid and eye lash disorders | 16 | 11 | 27 |
| Lens disorders | 11 | 7 | 18 |
| Bacterial conjunctivitis | 13 | 4 | 17 |
| Ocular tumour | 4 | 7 | 11 |
| Corneal ulcer | 5 | 1 | 6 |
| Choroidal detachment | 4 | 2 | 6 |
| Endophthalmitis | 4 | 2 | 6 |
| Glaucoma | 3 | 2 | 5 |
| Corneal opacity | 2 | 3 | 5 |
| Allergic conjunctivitis + simple astigmatism | 2 | 2 | 4 |
| Conjunctivitis | 2 | 2 | 4 |
| Buphthalmos | 2 | 2 | 4 |
| Anterior Staphyloma | 2 | 2 | 4 |
| Orbital Cellulitis | 3 | 1 | 4 |
| Dacryocystitis | 1 | 2 | 3 |
| Uveitis | 0 | 3 | 3 |
| Sub-conjunctivalhaemorrhage | 3 | 0 | 3 |
| Nystagmus | 1 | 2 | 3 |
| Blepharophimosis syndrome | 1 | 1 | 2 |
| Bilateral N.L.D obstruction | 1 | 1 | 2 |
| Recurrent conjunctivitis | 2 | 0 | 2 |
| Anterior leucoma + choroidal detachment | 1 | 0 | 1 |
| Anophthalmia | 0 | 1 | 1 |
| Chronic dacryocystitis | 0 | 1 | 1 |
| Bilateral congenital maculopathy | 0 | 1 | 1 |
| Allergic conjunctivitis + ptosis | 1 | 0 | 1 |
| Bacterial conjunctivitis + simple astigmatism | 0 | 1 | 1 |

| | | | |
|---|---|---|---|
| Hypopyon | 0 | 1 | 1 |
| Pseudophakia + nystagmus | 1 | 0 | 1 |
| Peri-orbital cellutlitis | 0 | 1 | 1 |
| Xerophthalmia | 0 | 1 | 1 |
| **Total** | **212** | **157** | **369** |

Table 4, determined the prevalence of ocular disorders across gender and their significant relationship among pediatric patients in Kano State.

**Discussion**

Young children with onset vision impairment can experience delayed motor, language, emotional, social and cognitive development, with lifelong consequences. School-aged children with vision impairment can also experience lower levels of educational achievement and a common cause of non-congenital unilateral blindness (WHO, 1992). Children are particularly at risk of ocular injury due to decreased ability to detect and avoid potential hazards. Most childhood eye injuries are sustained during unsupervised play and domestic activities (Adeoye, 2002).

The prevalence of ocular disorders among pediatric patients in Kano State was 59.7% with ocular trauma (23.6%) most prevalent followed by refractive error (22.0%) and allergic conjunctivitis (14.1%).

The older age group had higher frequency in agreement with (Onakpoya and Adeoye, 2009) but differs with study done by (Bodunde and Onabolu, 2004; Ezegwuii and Onwasigwe, 2005) in which pediatric ocular injuries were third and fourth. Ajaiyeoba (1994) in Ibadan found refractive error as more frequent. Dangerous objects and large agrarian nature of some of the communities may predispose the children to injuries from twigs and farming activities which could be responsible for high frequency of pediatric ocular trauma in the environment.

The male preponderance in this study is in line with the work of Onakpoya and Adeoye (2009). This could be because males engaged in behaviour that exposed them to the risk of injuries (http://injuryprevention.bmj.com). Onakpoya and Adeoye(2009) in their findings reported high incidence of injuries among school aged children in agreement with what is found in this study. This group represents an adventurous age group, so more vulnerable.

Kwari et al., (2000) in Kaduna found that open globe injuries were more common against the findings in this study were closed globe injuries were more common. Adeoye(2002) collaborated this finding. This could be due to lack of facilities, late presentation to eye centers and poor socio-economic status of the parents of the children involved. Allergic conjunctivitis was one of the most common causes of ocular disorders in agreement with Nwosu (1999) who reported allergic conjunctivitis as the most common ocular disorder in children. Bekibele and Olusanya, (2006) allured to the fact that rural living is a risk factor for development of allergic conjunctivitis in children.

Wood (1999) found that allergic conjunctivitis was a leading cause of absenteeism from school due to its discomfort, chronicity and reoccurrence. (Isawunmi, 2003) postulates that adequate management can bring symptoms under control and prevent potentially blinding complications and absenteeism from school. The higher prevalence of refractive error in females in this study is in agreement with Onakpoya and Adeoye, (2009) studies with young females reporting visual problems more than males. Yorston, (1991) reported that refractive errors affected childhood development, given 80% of learning in children as sight dependent. In the absence of regular pre-school or school eye-screening, many children with refractive error go unnoticed.

The higher prevalence reported in older children could be due to better articulation

and communications skill. Adeoye, et al.(2005) advocated for school health services to regularly screen for refractive error and adequate referral of affected children for early intervention to prevent development of amblyopia and prevent poor performance in school. Bodunde & Onabolu (2004) called for school eye health education to remove the myth that eye glass use in children will further destroy their eyes to make room for early presentation to eye facilities.

**Conclusion**

This study identified that the prevalence of ocular disorder in pediatric patient in Kano State was 59.7% and the most common causes were ocular trauma, followed by refractive error and allergic conjunctivitis. The findings showed that the highest frequency of consultation was recorded among older age group, and among males.

The result also indicated that ocular trauma was more common among school age group (6-10 years), refractive error more common among older age group (11-15 years) while allergic conjunctivitis was more prominent among pre-school age group (0-5). Ocular trauma and allergic conjunctivitis were more common in male while refractive error was more common in female in this study.

We recommend further study of predisposing factors to eye injuries in children in this region with provision of mandatory community and school eye health programmes to reduce ocular disorders in pediatric children.

Early presentation for early identification and intervention should be encouraged.

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