AlQalam
Alq J Med App Sci
https://journal.utripoli.edu.ly/index.php/Alqalam/index eISSN 2707-7179

Original article

Ocular Manifestation of the Pediatric Age Group in Almarj

Marwa Amish[1]*, Yasmena Abdulhadi[2]

[1]*Department of Ophthalmology, Faculty of Medicine Almarj, University of Benghazi, Benghazi, Libya*
[2]*Department of Ophthalmology, Faculty of Medicine, University of Benghazi, Benghazi, Libya*

ARTICLE INFO

Corresponding Email. *dr.marwa.amish@gmail.com*

Received*: 26-02-2024*
Accepted*: 28-04-2024*
Published*: 04-05-2024*

Keywords*. Astigmatism, Visual Acuity, Refractive Errors, Children.*

ABSTRACT

Children are disproportionately affected by visual disorders like refractive errors, amblyopia, and strabismus. Early intervention and vision screening are crucial. The study aims to investigate the ocular manifestation among children of the age group 4–15 years. A cross-sectional study conducted at Marj Teaching Hospital in 2024 examined 100 children with ophthalmological conditions. The examinations included slit lamp examinations, visual acuity assessments, spherical refractive error measurements, and dilated retinal exams. The study examined children aged 4-15 years old, with 59% being male and 43% female. Diagnosis revealed a range of ocular conditions, with astigmatism being the most common at 48%. There were significant differences in visual acuity between males and females ($p<0.001$), particularly in left eye visual acuity without glasses. There was no significant difference in visual acuity between age groups when wearing or not wearing glasses. However, there was a trend towards better right-eye visual acuity for children aged 4-10 years compared to those aged 11-15 years ($p<0.001$). Refractive errors with a higher prevalence of simple astigmatism in females compared to males. High hypermetropia was only present in females, suggesting some differences in refractive errors between males and females, particularly hypermetropia. The study emphasizes the significance of regular eye examinations for detecting and addressing visual impairments, and calls for further research into factors contributing to these conditions, particularly male-female differences, to improve eye health and quality of life. we highly advocate assessing the visual acuity of preschool children in order to prevent amblyopia.

Cite this article. *Amish M, Abdulhadi Y. Ocular Manifestation of the Pediatric Age Group in Almarj. Alq J Med App Sci. 2024;7(2):315-321. https://doi.org/10.54361/ajmas.2472016*

INTRODUCTION

The World Health Organization prioritized the management of childhood visual impairment in the agenda of VISION 2020 [The Right to Sight]. A joint policy statement on child vision screening has been established by the American Academy of Pediatrics, the American Association for Pediatric Ophthalmology and Strabismus, and the American Academy of Ophthalmology [1]. The variability of preschool vision screening regulations can be attributed to the divergent policies implemented across different countries [2,3].

Early intervention is crucial for children's visual development, as reduced vision can impact education, health, social outcomes, and quality of life. Untreated conditions can lead to amblyopia and visual impairment. Vision screening is especially important for children under seven years old, as they are at risk of functionally low vision [3–7].

Children also are susceptible to several ocular conditions. Such as conjunctivitis is a common eye condition, classified by etiology, chronicity, severity, and tissue involvement. It is most common in infectious and bacterial forms with more than 50% of conjunctivitis cases being bacterial in origin. Allergic conjunctivitis, a type I hypersensitivity reaction, is common in children and presents in approximately 1 in 5 children [8].

Eyelid margin disease is also common in the general population. Blepharitis onset in pediatrics typically occurs between 3 and 5 years, but diagnosis is often delayed due to missed or misdiagnosed cases. It is a 12% to 15% referral reason in children [8]. Research shows that children are most affected by visual disorders such as refractive errors, amblyopia, and strabismus [9–15]. There is a lack of accurate and reliable data on the pattern of pediatric eye disorders at Marj Teaching Hospital [ophthalmology outpatient clinic], a description of the pattern of eye disorders in children is essential [16]. Also, there are few hospital-based studies on the pattern of pediatric eye disorders in other countries [17,18].

Given the variation in study designs, sample sizes, the effects of different geographical and socioeconomic situations, and the relative importance that can change over time, we wanted to document the pattern of eye disorders in a pediatric population in Marj. The findings obtained from this hospital-based study are needed for planning and evaluating preventive and curative services for children to reduce severe visual impairment and blindness.

METHODS

Study design

This was a hospital-based cross-sectional study. Ethical approval and permission to conduct the study were obtained from the Research and Publication Committee. Study confidentiality was maintained by masking each patient's name on the data format sheets.

Inclusion and exclusion criteria

Patients who visited ophthalmology outpatient clinic in AlMarj Teaching Hospital in 2024 aged between 4 and 15 years old were included in this study. While, we excluded participants aged less than 4y for their lack of cooperation in undergoing the ophthalmic investigations or subjects older than 15y [n=100]. After the exclusion criteria were applied, 100 children among whom accepted the invitation and completed the examination.

Ophthalmological examinations

The children underwent a slit lamp exam for inspection of the eyelids, conjunctiva, cornea, anterior chamber, iris, lens, and pupil. The presence of lid abnormalities, such as blepharitis, chalazion, conjunctivitis bacterial, Vira, allergic, corneal abnormalities such as keratitis and corneal abrasions, and cataracts, was recorded.

Furthermore, visual acuity was assessed with Tumbling Echart. Amblyopia was diagnosed based on a two-line difference in visual acuity between the eyes. Spherical refractive error and total astigmatism were measured with an auto refractometer [TOPCON Autokerato-refractometer; TOPCON, Japan]. A dilated retinal exam was conducted on the patients. The Hirschberg corneal reflex was used quickly to check ocular alignment. A cover-uncover test was performed to diagnose strabismus and heterophoria.

A direct ophthalmoscope, 90 Diopter Volk, both were used to examine the posterior segment after dilatation of both pupils using 1% Mydriacyl. Cycloplegic refraction was routine.

Statistical analysis the data analyzed using IBM Statistical Package for Social Sciences [SPSS] version 25. Descriptive statistics such as frequencies and percentages were calculated and appropriate statistical tests such as the Chi-square tests and student t-test were applied to detect any significant association at 95% confidence interval.

Statistical analysis

Descriptive statistics were used by using Microsoft excel.

RESULTS

A total 100 children from Al Marj included in this study, The results showed that the majority of the children examined were in the age group of 4-10 years old, accounting for 59% of the total samples. The male to female ratio was 1.3:1, with slightly more males participating in the study. Overall, 57% of the children were male and 43% were female (Figure 1).

There were numerous ocular conditions, with astigmatism being the most common at 48%, followed by hypermetropia at 47% and myopia at 11%. Other diagnoses included amblyopia, squint, bacterial and allergic conjunctivitis, chalazion, blepharitis, corneal abrasion, cataract due to trauma, and myopic change (Table 1). Interestingly, there were

significant differences in visual acuity between males and females, particularly when it came to visual acuity without glasses in the left eye (Table 2).

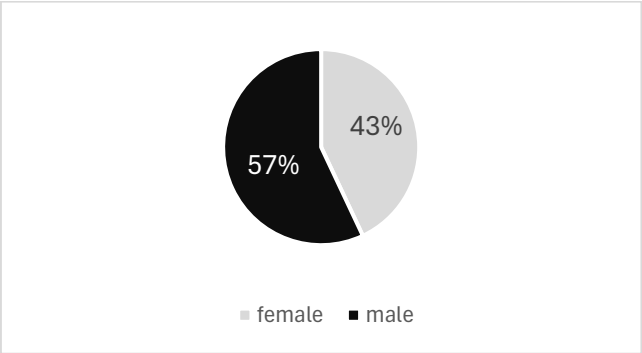

Figure 1. Male and female ratio

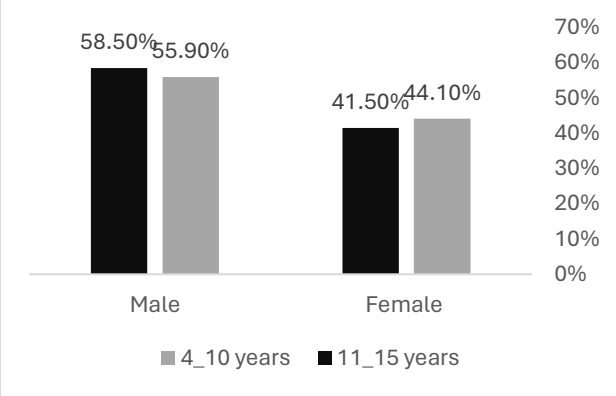

Figure 2. Age groups of the study population

Table 1. Diagnosis data of the patients

Diagnosis	N	%
Myopia	11	11.0
Astigmatism	48	48.0
Hypermetropia	47	47.0
Amblyopia	18	18.0
Squint	16	16.0
Bacterial conjunctivitis	12	12.0
Allergic conjunctivitis	13	13.0
Chalazion	7	7.0
Blepharitis	2	2.0
Corneal abrasion	2	2.0
Cataract due to trauma	2	2.0
Myopic change	3	3.0

Table 2. Visual acuity of the study children according to sex

Visual acuity	Male M ± SD	Female M ± SD	P value
Visual acuity without	0.662 ± 0.369	0.524 ± 0.373	0.077
Visual acuity e out	0.694 ± 0.356	0.541 ± 0.374	0.047*
Visual acuity e glasses	0.794 ± 0.272	0.67 ± 0.345	0.057*
Visual acuity e glasses	0.828 ± 0.247	0.695 ± 0.341	0.032*

*M=Mean, SD= standard deviation, * statistical significance*

Overall, the results show that there was no significant difference in visual acuity between the different age groups when wearing or not wearing glasses. However, there was a trend towards better visual acuity in the right eye for children aged 4-10 years compared to those aged 11-15 years (Table 3). The distribution of refractive errors according to sex showed that there was a higher prevalence of simple astigmatism in females compared to males as seen in (Table 4), although the difference was not statistically significant. Interestingly in (Table 5), a high hypermetropia was only present in females, with a statistically significant P value of 0.013.

Table 3. Visual acuity of the study children according to age groups

Visual acuity	4-10 Years M ±	11-15 years M ± SD	P
Visual acuity without glasses Rt	0.645 ± 0.359	0.546 ± 0.392	0.212
Visual acuity e out glasses Lt	0.635 ± 0.362	0.617 ± 0.385	0.811
Visual acuity e glasses Rt	0.771 ± 0.294	0.7 ± 0.331	0.287
Visual acuity e glasses Lt	0.79 ± 0.268	0.745 ± 0.335	0.485

*M=Mean, SD= standard deviation, * statistical significance*

Table 4. Refractive error distribution according to sex

Refractive error	Male	Female	P value
Simple myopia	1[1.8%]	3[7.0%]	0.211
Moderate Myopia	1[1.8%]	2[4.7%]	0.395
High myopia	1[1.8%]	2[4.7%]	0.395
Simple astigmatism	21[36.8%]	22[51.2%]	0.11
Moderate astigmatism	1[1.8%]	1[2.3%]	0.678
Simple hypermetropia	9[15.8%]	6[14%]	0.515
Mild hypermetropia	9[15.8%]	6[14%]	0.515
Moderate hypermetropia	7 [12.3%]	11.6]5%]	0.787
High hypermetropia	0	6 [14%]	0.013*

** Statistical significance*

Table 5. Refractive error distribution according to age group

Refractive error	4-10 years	11-15 years	P value
Simple myopia	2[3.4%]	2[4.9%]	0.544
Moderate Myopia	1[1.7%]	2[4.9%]	0.365
High myopia	1[1.7%]	2[4.9%]	0.365
Simple astigmatism	26[44.1%]	17[41.5%]	0.479
Moderate astigmatism	1[1.7%]	1[2.4%]	0.654
Simple hypermetropia	12[20.3%]	3[7.3%]	0.063
Mild hypermetropia	7[11.9%]	8[19.5%]	0.22
Moderate hypermetropia	7[11.9%]	5[12.2%]	0.598
High hypermetropia	3[5.1%]	2[4.9%]	0.668

DISCUSSION

The prevalence of visual impairment in children is a significant worldwide public health problem, particularly in low-income and middle-income nations where it is more prevalent. The majority of low-income and middle-income nations exhibit a deficiency in the implementation of efficient screening programs and interventions for children who exhibit eye disorders. Consequently, there exists a necessity to broaden the provision of services to marginalized populations [17]. The sample for our study consisted of 100 children diagnosed with eye disorders. The participants consisted of 57% males and 43% females, with a male-to-female ratio of 1.3:1. The age range of the study participants spanned from 4 years to 15 years.

The incidence of REs in this study was 88%, with simple astigmatism being the most common among both males and females. Interestingly, high hypermetropia was only present in the female participants, indicating a potential sex difference in the prevalence of this refractive error, myopia accounts for 11%. Refractive error [RE] is the prevailing morbidity problem among children in the eastern province of Saudi Arabia, as indicated by multiple case studies. Similar disorders are also observed in North India, Ethiopia, and Nigeria [18]. Research on refractive errors among

children worldwide is inconsistent and influenced by age, gender, geography, and ethnicity [19,20]. Childhood myopia has a prevalence reaching 80% among adolescents in some Southeast Asian countries [21,22]. Hyperopia is more prevalent in the Americas. Early manifestation increases the risk of complications like amblyopia, cataract, glaucoma, retinal detachment, and myopic macular degeneration [23,24]. The prevalence of astigmatism and hypermetropia was found to be the highest, representing 48% and 47% of the refractive errors observed in our study. This finding aligns with a previous study that reported a higher prevalence of hypermetropia in children [25]. Also, in previous research conducted in Pakistan, where astigmatism was shown to be the most prevalent condition, accounting for 46.25% of cases [26].

The results of our investigation did not demonstrate any association between refractive error and gender or age groups, as shown in certain other studies [27]. However, the data obtained from other reports [28] were not uniform. These disagreements may suggest the presence of cultural and behavioral traits specific to various locations, such as a higher prevalence of sports participation among boys or a more conscientious approach to academic pursuits among girls were not uniform [28]. These disagreements may suggest the presence of cultural and behavioral traits specific to various locations, such as a higher prevalence of sports participation among boys or a more conscientious approach to academic pursuits among girls.

Over the past decade, there has been a significant shift in lifestyle, characterized by a rise in extracurricular activities [29], and a decline in the amount of time dedicated to household chores, outdoor pursuits, and sports [30,31]. This is supported by the notably lower incidence of myopia in rural and economically underdeveloped regions, where individuals spend more time outside and engaged in domestic tasks compared to urban areas [32,33]. Nevertheless, recent studies have failed to establish a definitive correlation between myopia and the amount of time spent on screens [34].

The total number of cases of squint registered was 16% which was somehow similar to the study done in Karachi found the squint rate was 15.2% in Sindh Government Hospital New Karachi [35]. The ability of the eyes and the brain to work together develops throughout childhood up to the age of about 8 years but particularly within the first two years of life. The study observed that ocular trauma was the least morbidity, the same as to previous findings where pediatric eye injuries were ranked as the third [36–38], or fourth most frequently reported condition [39].

This study provides support for previous findings that hypothesize allergic conjunctivitis to be the most prevalent surface condition in children. Communities that primarily rely on agricultural work and have a dusty environment may have a significant impact [25,37]. The current study reveals that corneal infections account for 12% of eye infections all of the cases were bacterial infections. These infections are well-known for their ability to cause corneal scars that result in blindness. This finding aligns with a previous study conducted in southwestern Nigeria, where corneal infections constituted over one-third of eye and adenxia infections [20]. This finding also is in line with the results published in a study conducted in Pakistan, where bacterial conjunctivitis was identified as the most prevalent infection of the eye [1].

The study found that cataracts account for 2% of pediatric ophthalmic disorders and it was due to trauma, in other studies cataract were due to rubella, heredity, and idiopathy being major causes [25,26,40]. Childhood cataracts pose challenges like preoperative assessment, anesthesia, and postoperative care, often affecting poor patients [25]. The study found that around 7 patients with Chalazion, and 2 with Blepharitis, as their ranking was lowest in previous studies [35,41]. Further research is needed to better understand the factors contributing to the occurrence of these conditions in pediatric patients in Libya. With larger sample size and broadening the geographical coverage of the study.

CONCLUSION

The study reveals various diagnoses like astigmatism, hypermetropia, and myopia, with some severe cases like cataracts. It shows significant differences in visual acuity between males and females, with simple hypermetropia prevalence increasing in children. Regular eye examinations are crucial for detecting and addressing visual impairments. and further research is needed to understand male-female differences and improve eye health and quality of life.

Acknowledgments

We thank Sara Bogazia [Department of Oral Biology, Ajdabiya University, Ajdabiya, Libya], for providing the data analysis and for the valuable English language editing of the manuscript.

Conflicts of Interest. The authors declare no conflicts of interest.

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المظاهر العينية لدى الأطفال في المرج

مروة عبد السلام عميش[1]*ياسمينة محمود[2]

[1]قسم طب العيون، كلية الطب المرج ، جامعة بنغازي، بنغازي، ليبيا
[2]قسم طب العيون، كلية الطب، جامعة بنغازي، ليبيا

الملخص

يتأثر الأطفال بشكل غير متناسب بالاضطرابات البصرية مثل الأخطاء الانكسارية والحول، بالإضافة الى الصدمات العينية. التدخل المبكر وفحص الرؤية أمر بالغ الأهمية. تهدف الدراسة إلى تقصي المظاهر العينية لدى الأطفال في الفئة العمرية 4-15 سنة. أجريت دراسة مقطعية في مستشفى المرج التعليمي عام 2024 لفحص 100 طفل يعانون من أمراض العيون. وشملت الفحوصات فحوصات المصباح الشقي، وتقييمات حدة البصر، وقياسات الخطأ الانكساري الكروي، وفحوصات الشبكية المتوسعة. فحصت الدراسة الأطفال الذين تتراوح أعمارهم بين 4 و15 سنة، 59% منهم ذكور و43% إناث. كشف التشخيص عن مجموعة من الحالات العينية، وكان اللانقطية هو الأكثر شيوعًا بنسبة 48٪. وكانت هناك فروق ذات دلالة إحصائية في حدة البصر بين الذكور والإناث[P<0.001]، وخاصة في حدة البصر بالعين اليسرى بدون نظارات. ولم يكن هناك اختلاف كبير في حدة البصر بين الفئات العمرية عند ارتداء النظارات أو عدم ارتدائها. ومع ذلك، كان هناك اتجاه نحو تحسين حدة البصر بالعين اليمنى لدى الأطفال الذين تتراوح أعمارهم بين 4 و10 سنوات مقارنة بمن تتراوح أعمارهم بين 11 و15 عامًا [P<0.001]. الأخطاء الانكسارية مع ارتفاع معدل انتشار اللانقطية البسيط لدى الإناث مقارنة بالذكور. كان طول النظر العالي موجودًا فقط عند الإناث، مما يشير إلى بعض الاختلافات في الأخطاء الانكسارية بين الذكور والإناث، وخاصة طول النظر. تؤكد الدراسة على أهمية فحوصات العين المنتظمة للكشف عن الإعاقة البصرية ومعالجتها، وتدعو إلى إجراء مزيد من الأبحاث حول العوامل التي تساهم في هذه الحالات، وخاصة الاختلافات بين الذكور والإناث، لتحسين صحة العين ونوعية الحياة. نحن نؤيد بشدة تقييم حدة البصر لدى الاطفال من أجل الوقاية من كسل العين.

الكلمات الدالة. الاستجماتيزم، حدة البصر، الأخطاء الانكسارية، الأطفال.