

Awareness, knowledge, and perception of strabismus among parents and caregivers of children attending the paediatric eye clinic at the Kenyatta National Hospital, Kenya

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Abstract

Background: Strabismus, a common eye condition affecting children, can lead to various complications, emphasising the need for early detection and management. This study aimed to assess parental knowledge, awareness, and perception of strabismus at the paediatric eye clinic of Kenyatta National Hospital in Nairobi, Kenya.

Methods: This was a cross-sectional study done in the paediatric eye clinic at Kenyatta National Hospital between 17th July 2023 and 4th August 2023. A consecutive sampling method was used to select parents/caregivers who were interviewed using a structured questionnaire.

Results: The study involved all the recruited 96 parents and caregivers (88.5% females, 93.8% parents). A high level of awareness was found in 40.6% of respondents, significantly associated with a family history of strabismus ($p < 0.001$) and eye disease ($p < 0.001$). Only 42.7% correctly defined strabismus, with heredity being the most recognised cause (33.3%) and dehydration frequently mistaken as one (21.9%). Treatment options were correctly identified by 56.3% for glasses, 49.0% for surgery, and 44.8% for eye muscle exercise. Relatives/friends (47.9%) and internet/social media (40.6%) were common knowledge sources. Participants highly appreciated parents' roles, especially in early detection (99.0%) and compliance with treatment (96.9%). Both sexes showed moderate knowledge, with no significant difference based on education level. Positive attitudes towards strabismus management were notably observed, particularly among mothers, despite identified misconceptions and underestimation of its psychosocial and economic impacts.

Conclusion: Nearly half of caregivers demonstrated high awareness of strabismus, with most showing adequate treatment knowledge, though significant gaps persisted in recognising early signs and understanding causes. Importantly, the majority maintained positive perceptions of strabismus management, suggesting a foundation for targeted educational interventions.

Key words: Strabismus, awareness, knowledge, perception

Introduction

Strabismus is a common ocular condition characterised by the misalignment of one or both eyes, leading to impaired binocular vision, reduced visual acuity, and psychosocial challenges, particularly in children(1–3). Often referred to as “crossed eyes”, strabismus involves deviations in eye position—inward, outward, upward, or downward—disrupting proper alignment with the observed object. Proper ocular alignment depends on several factors,

including neuromuscular coordination of the extraocular muscles, intact cranial nerves (oculomotor, trochlear, and abducens), and functional brainstem and supranuclear pathways(1,2). Any disruption in these components can result in strabismus and the loss of binocular single vision (BSV), which relies on both motor and sensory fusion for optimal visual integration(1,2,4).

Strabismus is associated with various complications,

including diplopia, asthenopia, stereopsis impairment, and cosmetic concerns, which can significantly impact a child's psychosocial well-being, self-esteem, and social interactions(1,2). Early detection and intervention are crucial to mitigate these effects, with treatment options ranging from corrective lenses and vision therapy to surgical correction(1,2). However, despite the availability of these treatments, disparities exist in how parents seek and pursue care for their children. Parental awareness, understanding, and perceptions of strabismus play a critical role in determining the timing of medical consultation, which influences treatment outcomes and prognosis(5). Unfortunately, inadequate knowledge, misconceptions, and cultural beliefs among parents remain significant barriers to timely intervention(1,2).

This study explored parents' perspectives, awareness, and understanding of strabismus and its implications for their children's eye health. By identifying gaps in parental knowledge and misconceptions, the study sought to highlight factors that influence healthcare-seeking behaviour and treatment adherence. The findings sought to provide valuable insights for developing targeted educational interventions to improve early diagnosis and management of strabismus, ultimately enhancing visual and psychosocial outcomes for affected children(4).

Materials and methods

Study design

A cross-sectional mixed-method study was performed from 17th July 2023 to 4th August 2023. Both quantitative and qualitative methods were used.

Study setting

The study site was the eye clinic at Kenyatta National Hospital, Nairobi, Kenya.

The eye clinic sees an average of 50 children weekly, and an estimated 17 patients with strabismus are seen each week at the clinic.

Study participants

A case was defined as any caregiver, whether biologically related to the child or not, who lived with and provided daily care to a child under 18 years old. Parents included the child's biological mother or father, as well as adoptive parents. The inclusion criteria consisted of all adult caregivers (male or female) of children below 18 years, regardless of whether the child had a strabismus diagnosis. Exclusion criteria applied to parents or caregivers who were not of sound mind and thus unable to participate in the study.

Sample size determination

The following formula for sample size was used to estimate the minimum sample size: (7)

$$n = (Z^2 (1-p)) / e^2$$

Where:

Z^2 = Variable with a standard normal distribution (at 5% type 1 error ($P < 0.05$)) it is 1.96 (7)

p = Assumption that 50% (8,9) of the study population had enough KAP about strabismus.

e = margin of error (20% of 50% = 10%)

n = minimum sample size = 96

Data Collection and Analysis

The primary investigator and a research assistant administered a paper-based, pretested questionnaire (available in English and Kiswahili) to eligible respondents, achieving a 100% response rate. The questionnaire assessed caregivers' knowledge, awareness, and perceptions of strabismus in their children. Collected data were securely entered into an encrypted Microsoft Excel 2019 spreadsheet, cleaned, and analysed using SPSS version 28. Descriptive statistics summarised demographic characteristics, with frequencies and percentages for categorical variables and mean \pm standard deviation for continuous data. Awareness was determined based on a perfect score (100%) across five key questions. Knowledge was evaluated using Bloom's criteria, with scores categorised as inadequate (<50%), moderate (50–80%), or excellent (>80%). Perception was measured using 3- and 5-point Likert scales, with responses recoded (negative statements reversed) and averaged scores above the mean indicated positive perception, while those below reflected negative perception.

Associations between variables were analysed using the Chi-square test and Fisher's exact test, with statistical significance set at $p < 0.05$ and a 95% confidence level.

Recruitment and consenting process

The recruitment process for this study involved identifying potential participants who met the inclusion criteria at the eye clinic of Kenyatta National Hospital. Consecutive sampling was used to select participants as they presented to the clinic on the days when the study was being conducted. When the participants agreed to participate in the study, they were asked to sign a written consent form. For participants who were illiterate or had limited literacy, the researcher/research assistant read out the consent form to them and obtained their verbal consent.

Ethical considerations

The ethical approval was sought from the Kenyatta National Hospital- University of Nairobi Ethics and Research Committee (KNH-UoN ERC) and granted on 19th May 2023. Patient anonymity was maintained through the use of coded questionnaires and secure data handling procedures. Access to the data was restricted to the primary investigator and authorised research assistants, all of whom strictly adhered to confidentiality and Data Protection Act guidelines. Informed consent was obtained from participants before the study.

Results

Most (93.8%) of the interviewed participants were parents, and 88.5% were women. Six participants were grandparents, and 2 were aunts. The mean age of the participants was 34.5 (SD±8.6) years.

Family history of eye disease

The findings indicated that 42.0% of the parents/caregivers had a family history of eye disease.

Family history of strabismus

Only 21 (22.0%) of the respondents had a history of strabismus in their family.

Awareness of strabismus among the parents and caregivers
Awareness of strabismus among parents and caregivers is shown in Table 1. The findings showed that 88.5% had heard about strabismus before and among those who knew about it, an equally high percentage believed that parents or caregivers could detect it. However, only 65.6% believed strabismus could be detected by either a paediatrician or a general practitioner.

Table 1: The awareness of parents and caregivers about strabismus

Variables	Number of participants (n=96)	Percentage (%)
Heard about strabismus before		
Yes	85	88.5
No	11	11.4
Strabismus can be detected by parents/caregivers		
Yes	85	88.5
No	2	2.1
Not sure	9	9.4
Strabismus be detected by a general practitioner or pediatrician		
Yes	63	65.6
No	27	28.1
Not sure	6	6.3
Strabismus can only be detected by an eye doctor		
True	32	33.3
False	57	59.4
I do not know	7	7.3
Group affected by strabismus		
Only children	14	14.6
Both adults and children	68	70.8
I do not know	14	14.6

The level of awareness regarding strabismus was low in 59.4% and high in 40.6% of the 96 respondents. A family history of eye disease and strabismus was associated with a high level of awareness ($p<0.001$).

Knowledge about strabismus among the parents and caregivers.

Table 2 shows that 42.7% of the participants correctly defined strabismus as abnormal deviation/misalignment of the eyes. More than half of the respondents were able to correctly identify the presence of strabismus and direction.

Table 2: Knowledge about strabismus definition, recognising the different types and discriminating normal eyes

Variables	Number of participants (n=96)	Percentage (%)
Definition of strabismus		
Correct (abnormal deviation/misalignment of eyes)	41	42.7
Incorrect	55	51.3
Identification of presence and type of strabismus		
Image 1 (Normal Eyes)		
Yes (Incorrect)	21	21.9
No (Correct)	75	78.1
Image 2 (RE esotropia)		
Yes (Correct)	86	89.6
No (Incorrect)	10	10.4
RE Esotropia (n =86)*		
Correct	80	93.0
Incorrect	6	7.0
Image 3 (BE esotropia)		
Yes (Correct)	82	85.4
No (Incorrect)	14	14.6
BE esotropia (n =82)*		
Correct	31	37.8
Incorrect	51	62.2
Image 4 (LE exotropia)		
Yes (Correct)	86	89.6
No (Incorrect)	10	10.4
LE exotropia (n =86)*		
Correct	65	75.6
Incorrect	21	24.4
Image 5 (LE hypertropia)		
Yes (Correct)	93	96.9
No (Incorrect)	3	3.1
LE hypertropia (n =93)*		
Correct	67	72.0
Incorrect	26	28.0
Image 6 (RE hypotropia)		
Yes (Correct)	95	99.0
No (Incorrect)	1	1.0
RE hypotropia (n =95)*		
Correct	80	84.2
Incorrect	15	15.8

*Only those parents/caregivers who correctly identified the presence of a squint were able to proceed to identify the type of squint based on the direction of deviation.

When presented with different photographs, participants most frequently recognised unilateral esodeviation (93.0%), followed by hypotropia (84.2%), exotropia (75.6%), and hypertropia (72.0%). Bilateral esodeviation was the least recognised type (37.8%). Notably, 78.1% of participants could correctly identify normal eye alignment.

Causes of strabismus as established by parents/caregivers

The findings of this study revealed that heredity was the most correctly identified cause of strabismus by 33.3% of the 96 participants, and the least identified was trauma (5.2%). Causes which were incorrectly identified included dehydration by 21.9% of the respondents, prematurity (18.8%), infection (16.7%) and exposure to sunlight (12.5%).

Treatment options for strabismus

The respondents were also asked to identify treatment options available for strabismus. Some participants correctly

identified the treatment options- glasses 56.3%, surgery 49.0%, eye muscle exercise 44.8%, patching 24.0%. While others incorrectly chose laser therapy, 15.6%.

Sources of information for strabismus

Respondents most frequently reported learning about strabismus from relatives/ friends (47.9%), followed by media (40.6%), doctors (36.5%), and other sources (11.5%).

Among the 96 participants, 66.7% demonstrated excellent understanding of strabismus, 21.9% moderate and 11.5% poor understanding.

Table 3 displays the association between parent/caregiver characteristics and level of knowledge. Having a family history of the condition was the only statistically significant association ($p=0.001$).

Table 3: Association between parent/caregiver characteristics and level of knowledge

Variables	Knowledge		p-value
	Excellent, n(%)	Poor, n(%)	
Sex			
Male	6(9.4)	5(15.6)	0.498
Female	58(90.6)	27(84.4)	
Employment status			
Employed	33(51.6)	16(50.0)	0.529
Unemployed	31(48.4)	16(50.0)	
Highest education level			
Primary	11(17.2)	9(28.1)	0.182
Secondary	23(35.9)	14(43.8)	
Tertiary	30(46.9)	9(28.1)	
Relationship with child			
Parent	61(95.3)	29(90.6)	0.670
Grandparent	2(3.1)	2(6.3)	
Aunt	1(1.6)	1(3.1)	
Family history of eye disease			
Yes	28(43.8)	12(37.5)	0.662
No	36(56.3)	20(62.5)	
Family history of strabismus			
Yes	20(31.3)	1(3.1)	0.001
No	44(68.8)	31(96.9)	

There was no statistically significant association found between awareness level and knowledge of strabismus ($p=0.509$). Perception of strabismus among parents and caregivers.

Table 4 summarises key perceptions of treatment outcomes of strabismus. Nearly all respondents agreed that early treatment improves outcomes (99.0%), while 97.9% believed strabismus is more effectively managed at a younger age. Additionally, 85.4% expressed concerns that the condition may deteriorate without timely intervention.

Table 4: Perception of treatment

Variables	True	False	I do not know
	n(%)	n(%)	n(%)
There is no treatment for strabismus	7(7.3)	83(86.5)	6(6.3)
Early treatment leads to better outcomes	95(99.0)	0(0.0)	1(1.0)
Strabismus is better treated at a younger age	94(97.9)	1(1.0)	1(1.0)
Strabismus worsens if left untreated	82(85.4)	3(3.1)	11(11.5)
The cause should be treated to prevent relapse	78(81.3)	4(4.2)	14(14.6)

Table 5 presents participants' perceptions of strabismus complications, concerns about psychosocial impacts, visual consequences, and potential financial burdens on families.

Table 5: Perception of complications of strabismus and impact

Variables	Strongly disagree n (%)	Disagree n (%)	I do not know n (%)	Agree n (%)	Strongly agree n (%)
Strabismus reduces visual acuity	8(8.3)	1(1.0)	10(10.4)	12(12.5)	65(67.7)
Strabismus can cause double vision	5(5.2)	1(1.0)	26(27.1)	12(12.5)	52(54.2)
Strabismus can lead to 'lazy eye'	3(3.1)	1(1.0)	18(18.8)	12(12.5)	62(64.6)
Strabismus can lead to a form of disability	17(17.7)	6(6.3)	7(7.3)	28(29.2)	38(39.6)
Having a strabismus can lead to stigmatization of the child	3(3.1)	0(0.0)	5(5.2)	10(10.4)	78(81.3)
A child with a strabismus can have a negative impact on the family	10(10.4)	2(2.1)	6(6.3)	13(13.5)	65(67.7)
Strabismus can lead to anxiety and depression in the child	3(3.1)	0(0.0)	3(3.1)	11(11.5)	79(82.3)
A child with a strabismus can be an economic burden on the family	6(6.3)	0(0.0)	2(2.1)	14(14.6)	74(77.1)
Having a strabismus can contribute to school failure	10(10.4)	2(2.1)	4(4.2)	8(8.3)	72(75.0)

Table 6 presents participant responses on the perceived importance of key aspects in strabismus management, including prevention, early detection, diagnosis, treatment efficacy, compliance, follow-up, and social support. Most participants rated these aspects as very important.

Table 6: Perceived role of parents in strabismus management

Variables	No opinion n (%)	Not important at all n (%)	Moderate n (%)	Very important n (%)
Prevention	5(5.2)	10(10.4)	5(5.2)	76(79.2)
Early detection	1(1.0)	0(0.0)	0(0.0)	95(99.0)
Diagnosis	1(1.0)	1(1.0)	4(4.2)	90(93.8)
Treatment efficacy	2(2.1)	0(0.0)	2(2.1)	92(95.8)
Compliance with treatment	1(1.0)	0(0.0)	2(2.1)	93(96.9)
Follow-up	1(1.0)	0(0.0)	1(1.0)	94(97.9)
Social support	1(1.0)	0(0.0)	0(0.0)	95(99.0)

Caregivers showed generally positive overall perceptions (61.5%), with significant variation across domains. Parental roles in squint management received the most favourable views (77.1% positive). However, treatment outcomes elicited the strongest negative perceptions, with 69.8% expressing unfavourable views—the highest negative response rate among all variables assessed.

This is demonstrated in Figure 1.
(The overall perception scores were calculated as an average of the perception variables as described in the methods.)

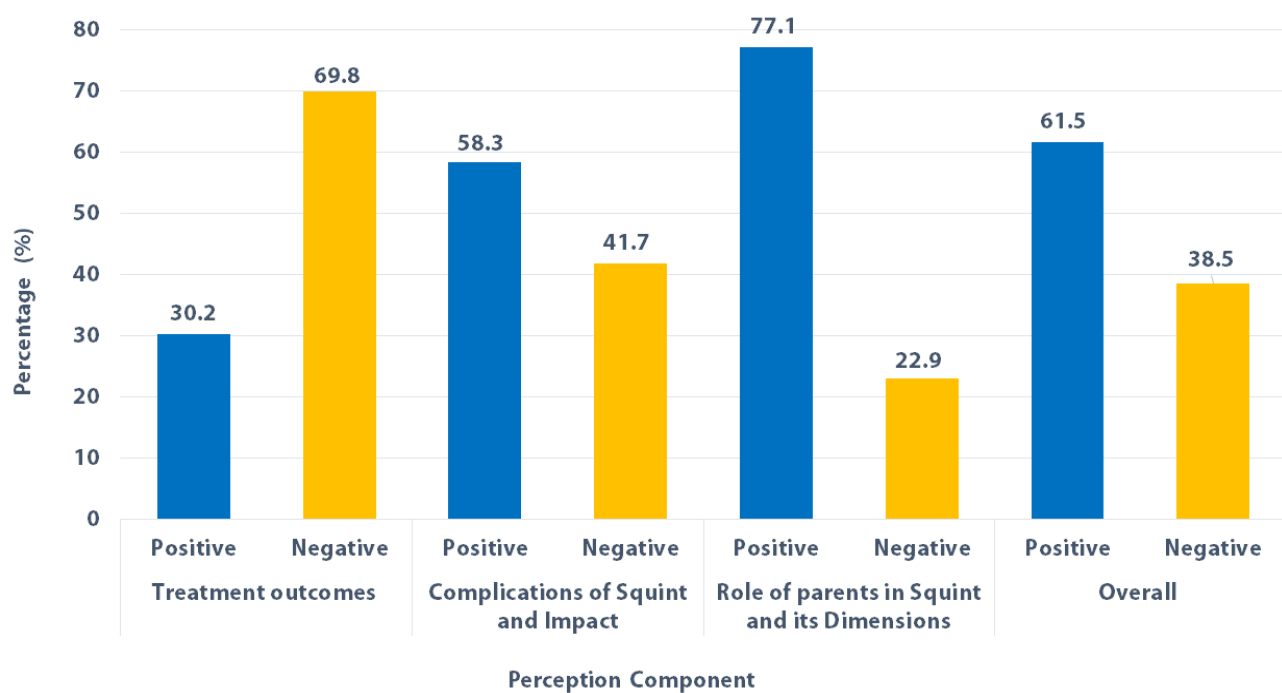


Figure 1: The different components of perception of parents/caregivers on strabismus (n=96)

Participant characteristics associated with the form of perception of strabismus

A positive perception of strabismus exhibited a statistically significant association with a family history of strabismus ($p = 0.011$), level of awareness ($p = 0.035$), and participants' knowledge level ($p = 0.004$).

Discussion

This study revealed critical gaps in caregiver awareness and understanding of strabismus. While nearly half demonstrated excellent awareness, a substantial proportion struggled to accurately define the condition, and misconceptions, such as linking strabismus to vision loss or eye immobility, were widespread. Notably, family history of strabismus or eye disease emerged as a strong predictor of awareness, whereas formal education did not, suggesting that lived experience plays a more pivotal role than academic background.

Knowledge levels were uneven, with two-thirds of caregivers displaying proficiency, yet a small fraction exhibited poor understanding. Recognition of strabismus types was skewed, with unilateral esotropia being the most familiar, while other forms like bilateral esotropia and vertical deviations were seldom identified. Treatment awareness was similarly inconsistent: over half recognised glasses or surgery as interventions, but fewer than a quarter were aware of patching therapy. The reliance on informal sources like relatives or media, rather than healthcare

providers, may explain these disparities(8).

Perceptions significantly influenced health-seeking behaviour. Although the vast majority believed parents could detect strabismus, a third thought only specialists could do so—a misconception that may delay diagnosis. While nearly all participants acknowledged the benefits of early intervention and social support, misunderstandings about causes persisted, with only a third correctly identifying heredity as a factor. These findings underscore the urgent need for community-based education initiatives, leveraging credible sources to dispel myths and promote early detection. Enhancing access to accurate information could bridge existing gaps, fostering timely management and improving outcomes for children with strabismus.

In conclusion, the study found that while nearly half of caregivers demonstrated a high level of awareness of strabismus and most possessed moderate-to-excellent knowledge about its types and treatments, significant gaps remained in recognising early signs and understanding its causes. Importantly, most caregivers and parents maintained a positive overall perception of strabismus management. This partial yet optimistic understanding, coupled with the disconnect between treatment knowledge and diagnostic/causal awareness, highlights the need for targeted educational programs to build on existing positive attitudes while improving comprehensive understanding and early detection of the condition.

Study Limitations

While this study provided valuable insights into parental awareness, knowledge and perception of strabismus, several limitations highlight opportunities for future research. These include limited assessment of psychosocial and economic impacts on families, insufficient exploration of factors influencing treatment decisions and intervention effectiveness and the cross-sectional design, which precluded analysis of evolving perceptions over time.

Addressing these limitations through more comprehensive and longitudinal studies would strengthen evidence for holistic strabismus management strategies.

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References

1. Kanukollu VM, Sood G. Strabismus. StatPearls [Internet]. 2022 Aug 8 [cited 2022 Nov 7]; Available from: <https://www.ncbi.nlm.nih.gov/books/NBK560782/>
2. Venkata K. Strabismus Article [Internet]. [cited 2023 Jan 11]. Available from: <https://www.statpearls.com/ArticleLibrary/viewarticle/29513>
3. Satterfield D, Keltner JL, Morrison TL. Psychosocial Aspects of Strabismus Study. Archives of Ophthalmology [Internet]. 1993 Aug 1 [cited 2024 Feb 8];111(8):1100–5. Available from: <https://jamanetwork.com/journals/jamaophthalmology/fullarticle/640327>
4. Fazal A. Review of outcome of horizontal childhood strabismus surgery at Kenyatta National Hospital and Kikuyu Eye Unit [Internet]. 2014 [cited 2022 Nov 3]. Available from: <http://erepository.uonbi.ac.ke/handle/11295/80923>
5. Ebeigbe JA, Martin Emedike C. Parents' awareness and perception of children's eye diseases in Nigeria. J Optom [Internet]. 2017;10:104–10. Available from: www.journalofoptometry.orghttp://dx.doi.org/10.1016/j.optom.2016.06.0011888-4296/
6. Geta K, Bejiga A. Knowledge, attitude and practice towards strabismus in Cheha District, Central Ethiopia. Ethiopian Journal of Health Development [Internet]. 2012 Dec 12 [cited 2022 Nov 24];25(3):212–5. Available from: <https://www.ajol.info/index.php/ejhd/article/view/83814>
7. Alrasheed SH, Naidoo KS, Clarke-Farr PC. Childhood eye care services in South Darfur State of Sudan: Learner and parent perspectives. African Vision and Eye Health. 2016 Apr 19;75(1).
8. Rahi JS, Manaras I, Barr K. Information sources and their use by parents of children with ophthalmic disorders. Invest Ophthalmol Vis Sci [Internet]. 2003 Jun 1 [cited 2024 Feb 7];44(6):2457–60. Available from: <https://pubmed.ncbi.nlm.nih.gov/12766043/>

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