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PII: S2950-2535(24)00033-9
DOI: https://doi.org/10.1016/j.ajoint.2024.100033
Reference: AJOINT 100033

To appear in: *AJO International*

Received date: 17 December 2023
Revised date: 3 May 2024
Accepted date: 22 May 2024

Please cite this article as: Gellause Kololi , Emmanuel E. Okenwa-Vincent , Tecla Jerotich Sum , Factors Influencing Contact Lenses Uptake among School-Going Children and Teenagers with Myopia Attending Selected Eye Clinics in Kenya, *AJO International* (2024), doi: https://doi.org/10.1016/j.ajoint.2024.100033

Highlights:

- Contact lenses offer clarity and social benefits in Kenyan kids with myopia.
- Contact lens use is less in Kenyan youth with myopia.
- Fear of ocular injury limits the use of contact lenses among Kenyan youth with myopia.
- Vision clarity boosts the use of contact lenses among Kenyan youth with myopia.
- More contact lens related information is needed in Kenya

ORIGINAL RESEARCH

Factors Influencing Contact Lenses Uptake among School-Going Children and Teenagers with Myopia Attending Selected Eye Clinics in Kenya

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Running title: Contact lens uptake in Kenyan kids with myopia

Declarations of interest: none

Availability of data and material: The datasets used and analyzed during this study can be made available from the corresponding author upon reasonable request.

Consent to participate: All participants for this study signed written consent and/or assent to participate in the study.

Consent for publication: No identifying information of participants, as detailed in ICMJE Recommendations, has been included in this paper.

Abstract

Objective: Contact lens (CL) use for myopia correction among children and teenagers has become a focal point of global interest. Yet, spectacles remain dominant for vision correction in this age group. This study investigated the factors affecting CL uptake among myopic school-going children and teenagers attending Kenyan eye clinics.

Study Design: Cross-sectional study.

Methods: A survey conducted across 13 Kenyan eye clinics, involving myopic participants aged 8-19 years. Data collection employed a mixed-method using validated semi-structured questionnaires that also included a 3-level Likert scale to elicit responses regarding factors that influenced the uptake of CLs. Analysis techniques included descriptive statistics, chi-square, and Cramer's V.

Results: 85 participants, with a mean age of 13.4 ± 2.1 years, who were more of females (54.1%) were included in the study. While CL uptake was low (17.6%), spectacles remained the preferred myopia correction method among the participants. Factors favoring CL preference were appropriate visual clarity with CL (59%), enhanced self-esteem and social acceptance (64%). Major barriers to CL uptake were fear of eye injuries (60%), limited CL knowledge (55%), and fewer CL professionals (48%). Eye care professionals were the primary CL information source. A weak association was observed between spectacles' perceived bulkiness and CL uptake (Cramer's V: 0.223, p=0.121). However, vision clarity (Cramer's V: 0.387, p=0.002) and social acceptance (Cramer's V: 0.351, p=0.005) showed stronger associations with CL uptake in children and teenagers in the study.

Conclusion: While information gaps and limited professional availability hinder CL uptake among Kenyan students, benefits like better vision clarity and improved social acceptance promote their use. Efforts to address information gaps and highlight CL advantages are recommended to foster broader acceptance.

Keywords: contact lenses, myopia, children, teenagers, eye care practitioners, awareness campaigns, affordability.

Introduction

The prevalence of contact lens (CL) wear has gained global recognition, with an estimated 125 million individuals worldwide utilizing CLs to address refractive errors, among whom about 45 million, already living in the United States (US) alone, as of 2014.[1] This demographic encompasses children and teenagers seeking CLs as a corrective measure, reflecting an expanding trend.[2,3] Notably, data from the US Center for Disease Control indicates that

approximately 14.5% of CL users in the US fall between the age of 12 to 17 in 2016.[4] Recent surveys conducted in the US reveal gender-based disparities, with a higher prevalence of girls (35.9%) compared to boys (29.1%) wearing CLs or glasses for corrective purposes within the age group of 6 to 17 years.[5] Moreover, research tracking of CL prescribing trends in Europe since the 1990s has underscored distinct prescription patterns for children and adolescents in comparison to adults.[6–8] However, despite remarkable advancements in CL materials and manufacturing, rendering CLs superior to spectacles for addressing myopia in youngsters, the global preference for spectacles endures.[9] This preference persists due to the limited awareness among individuals about the advantages of CLs, which include convenience, safety, and effectiveness.[10,11] As a result, the adoption of CLs among children remains constrained, necessitating a closer examination of the influencing factors.

Numerous studies have identified pivotal determinants that influence patient preference, attitude, and the propensity to adopt CLs.[12,13] These determinants encompass obstacles such as inadequate information, financial constraints, practitioner attitudes, and the availability of CLs.[14] Simultaneously, factors such as enhanced appearance, comfort, athletic competence, and visual clarity have emerged as potent motivators for the adoption of CLs.[15–17] In the context of addressing the factors influencing CL uptake among school-going children and teenagers, it becomes essential to acknowledge the dynamic interplay of individual attitudes, and external influences.[18,19] Although enhanced awareness and knowledge are essential, it is increasingly evident that these alone may not sufficiently alter individual behavior.[20]

Understanding these complexities prompts a categorization of factors into CL service, institutional, and individual-related domains to unravel the intricacies of CL adoption.[21] These domains encompass aspects such as service availability, appropriateness, accessibility, affordability, and individual compliance, while also considering broader social determinants of health, such as education, employment, and socioeconomic status.[22] Hence, this study seeks to delve into the factors influencing CL uptake among school-going children and teenagers with significant myopia attending selected clinics in Kenya. Through this exploration, the study aims to provide comprehensive insights into the decision-making processes surrounding CL adoption within this demographic, thereby contributing to a more nuanced understanding of the multifaceted factors driving or hindering the acceptance of CLs. Before now, this understanding has never been explored in Kenya.

Methods

This nationwide study was conducted across multiple cities and towns in Kenya, targeting eye clinics that offer spectacle and CL services. An initial mapping identified 23 such clinics, with 13 agreeing to participate after follow-up. Using a descriptive cross-sectional approach within an observational research design framework, the study collected responses from school-aged children and teenagers with myopia attending the selected CL clinics. A power analysis established a requirement of at least 60 participants from a sampling frame of 23 CL practices, including privately-owned and faith-based facilities. Thirteen of these who gave consent to participate in the study, spanning urban and suburban locations including Nairobi city and other towns, were purposively selected. The calculated sample size was aimed at achieving 80% power for a two-tailed hypothesis test at an alpha level of 0.05, sufficient to detect a 10% difference pertinent to the study's objectives. From the participating facilities, a list of patients with myopia, defined as -0.50 diopters (D) or worse and meeting the study's selection criteria, was compiled. Eligibility required the presence of patients and their legal guardians at the eye care facility during a 30-day study period. All patients who received their legal guardians' assent were purposively included in the study.

Participants aged 8 to 19 years with significant myopia, defined for this study as spherical equivalent (SE) of $\geq \left| 0.50D \right|$ in one or both eyes, were recruited. Significant myopia was categorized into low or mild ($SE \geq \left| 0.50D \right|$), moderate ($SE \geq \left| 3.00D \right|$), and high ($SE \geq \left| 5.00D \right|$), in line with conventional epidemiological approach in research for defining ocular refractive errors [23,24]. This categorization, based on clinical records and practitioner diagnoses, informed the inclusion of patients visiting the selected clinics during the study month. Exclusions were applied to those with uncorrected refractive errors not pertaining to myopia, prosthetic eyes, surgically removed eyes, ocular co-morbidities, use of bandage/therapeutic CLs, ocular pathologies affecting the cornea, and refractive or corneal surgeries unrelated to myopia correction. The intent was to isolate the study to myopic ocular morbidity. Participants who did not assent or whose guardians did not consent, as well as those with speech or hearing impairments, an inability to provide sound judgment, or lacking legal representation, were also excluded.

Data collection employed a mixed-method approach using validated semi-structured questionnaires. The instruments, translated into Swahili for clarity, featured multiple-choice questions to gather socio-demographic data, prevalence of CL usage, and clinical history. A 3-level Likert scale was utilized for 26 items to elicit responses regarding factors that are CL services specific, as well as those that are at institutional, and at individual level that influenced the uptake or rejection of CLs. Descriptive analysis was applied to closed-ended responses, while open-ended responses were summarized and categorized to provide deeper insights into participants' perceptions, presented as multiple responses in percentages. Research assistants, trained in ethics and data management, facilitated questionnaire administration, supervised participants, and ensured data collection integrity.

Data entry was performed using Excel, with the databases coded, password-protected, and securely stored. Statistical analysis using SPSS (IBM v.25) included a chi-square test to assess the association between CL uptake and the identified influencing or inhibiting factors. The strength of the association was quantified using Cramer's V test, which, as a derivative of the chi-squared test, was employed to measure the association between two asymmetric categorical variables. It normally generates values between 0 and 1, with 0 indicating no association and 1 indicating perfect association. For this study, the extent of association, as measured by chi-square and Cramer's V tests, was analyzed in terms of participants' agreement levels with pre-identified factors both influencing and hindering CL uptake – categorized in three levels as "No idea (0)", "Disagree (1)", or "Agree (2)" – against actual uptake – defined dichotomously as "Yes (1)" or "No (0)" responses.

Compliance with all human research requirements as per the Helsinki Declaration was ensured, including obtaining necessary approvals from the National Commission for Science Technology (NACOSTI P/21/14780) and ethical clearance from an accredited Institutional Ethics Review Committee (MMUST/IERC/029/2021). Participant privacy, confidentiality, and voluntary participation were prioritized. Consent involved approval from the participants' legal guardians, who were provided with a simplified informed consent document translated into Swahili, and assent from the participants, regardless of age. Participants were assured of their right to withdraw at any time without coercion or inducement. Selection criteria were fair and aligned with the approved standards for this study. All participants, regardless of their study

completion status, had equal access to potential benefits, and findings were disseminated equitably among stakeholders.

Results

Demographic Characteristics of Participants

A total of 85 children and teenagers from 13 participating eye clinics across Kenya were registered for this study. The questionnaire aimed at school-going children and teenagers yielded responses from 46 females (54.1%) and 39 males (45.9%). The participants' ages ranged from 9 to 18 years, with a mean age of 13.4 ± 2.1 years. The most common age group in this study was 13 to 15 years (49.4%). As depicted in Table 1, even though most (89.4%) of the participants had mild to moderate myopia, nearly 46.0% of all the participants indicated a higher preference for CL as a means of correcting their myopia, while actual CL uptake was 17.6% - of this, 60% were females. Importantly, while over half of the participants (54.1%) reported receiving information about CL from their practitioners, 50.6% had spectacle glasses as their current means of myopia correction.

Factors Promoting CL Uptake among School-Going Children and Teenagers

Table 2 presents the details of factors that positively promoted the uptake of contact lenses among the study participants. While majority (71.8%) of them agreed that the bulkiness of spectacles – defined in terms of facial dimension of the spectacle frames – was an important factor promoting their adoption of CLs, the study revealed weak associations between this factor and actual CL uptake (Cramer's V: 0.223, p=0.121). Conversely, other promoting factors, such as improved clarity with CL wear (58.8%, Cramer's V: 0.387, p=0.002), reduced self-esteem with spectacle wearing (43.5%, Cramer's V: 0.413, p=0.001), and enhanced social influence and acceptance with CLs (63.5%, Cramer's V: 0.351, p=0.005), demonstrated moderately strong associations with CL uptake among the study participants. Overall, the study found that all factors identified by respondents as positively promoting their CL uptake exhibited weak to moderately strong associations with actual uptake, all of which were statistically significant ($p<0.05$). The only exception was the perception of spectacles as bulky (too wide), and the impact of spectacles in limiting respondents' participation in physical activities, where the association was both weak and non-significant.

Factors Hindering CL Uptake among School-Going Children and Teenagers

In this study, we further explored the participants' perceived barriers to CL uptake (Table 3). As demonstrated, while the majority (60.0%) of these participants agreed that they feared using CLs could harm their eyes, the study also found that this fear presented a significant moderate association (Cramer's V: 0.494, p<0.001) with CL uptake as a barrier. Other barriers that participants agreed had significant moderate associations with their CL uptake included lack of CL practitioners (48.2%, Cramer's V: 0.486, p<0.001), users satisfied with glasses (47.1%, Cramer's V: 0.409, p=0.001), parental hindrance (51.8%, Cramer's V: 0.539, p<0.001), perception that using CL will require a lot of training (49.4%, Cramer's V: 0.403, p=0.001), cost of CL (44.7%, Cramer's V: 0.294, p=0.026), longer distances to eye clinics offering the service (52.9%, Cramer's V: 0.307, p=0.018), and ocular discomfort (41.2%, Cramer's V: 0.468, p<0.001). Conversely the study also found that high cost of traveling to clinics as a barrier had a weak strength of association with uptake of CL (50.6%, Cramer's V: 0.241, p=0.085).

Discussions

Socio-Demographic Distribution of CL Use

In this study, we observed that even though slightly over 50% of the children and teenagers who participated in it were females – thus aligning with previous studies[19,25–27] in more female representation, most (50.6%) of all the participants in the study preferred using spectacle glasses as their method of myopia correction. Nonetheless, CL uptake was 17.6% despite the fact that the study was conducted within settings that were CL practicing facilities. Again, actual uptake was more among female participants (Table 1), a trend that is consistent in literature,[1,25,26] and alluding to females demonstrating over time positive attitude towards CL wear as a method of their refractive error correction.[28] Notwithstanding, nearly 32% of the participants had never employed any form of optical correction for their myopia, defined as significant at -0.50D or worse, in any eye,[23,24] for this study. A parallel to our current study may be drawn elsewhere in Kenya, where a school-based survey found that majority of the secondary school teenagers in the study with refractive errors primarily used spectacles as their preferred means of correction.[29] In another study examining attitudes and beliefs about CL use among adolescents (12-18 years) in Italy and the Iberian region, only one-third were CL users[27] despite keen interest from both

participants and their parents. Although the CL uptake in the Italian study was higher than uptake in our current study, the findings in both studies underscored the need for more comprehensive CL education in the community. This is also true in our case, where most of our study participants had limited access to CL information, besides information from their CL practitioners. These findings are further corroborated by previous studies in Ghana[30] and the UK,[31] where practitioners consistently emerged as the leading source of CL information, surpassing other sources like the internet and print media. Consistently, in our current study, media sources also emerged as the other important source of CL information, next to CL practitioners. Evidently, CL practitioners play a pivotal role in advancing CL awareness. Engaging patients in meaningful conversations can boost their inclination towards CLs. This sentiment was recently also echoed by Yang et al.,[32] who emphasized the enhanced opportunities for better CL conversions with existing non-CL users.[32]

Factors Influencing Contact Lens Uptake among School-Going Children and Teenagers

The convenience of CL care emerged as a significant motivator for their preference over glasses. This is consistent with findings from a Canadian study[33] emphasizing the benefits of CL in children and teenagers. Additionally, our research highlighted improved self-esteem and peer influence as dominant determinants in CL uptake.[34] Similarly, it underscored the negative impact of wearing spectacles on children's self-esteem compared to the positive effects of CL use. Moreover, our findings suggest that enhanced vision clarity with CL wear considerably influences its uptake among myopic children and teenagers. Studies have previously indicated that clarity and comfort remain paramount for CL users.[14] Additionally, "improved social influence and acceptance" due to CL wear was a significant uptake determinant, as three out of five participants agreed they would prefer CL based on the improved social influence and acceptance benefits derived from it. This is echoed by Walline et al.,[15] who found enhanced self-perception with CL wear in children. Conversely, negative perceptions from spectacle wear had previously been reported to lead to non-compliance due to potential peer bullying, especially in urban settings.[34]

Furthermore, while over one-third (36.5%) of participants in this study indicated that they were aware that myopia and CL information was available on their service providers' official websites, thus, creating a boost to their confidence in CL uptake, another third (30.6%)

responded to the contrary. Previous studies[35,36] have shown, having targeted video or written information accessible by patients from a variety of information channels such as use of hospital websites, have positive effect in enhancing patients' perceived ease and usefulness of a given service. Our current study concurs with these suggestions, based on the responses of a-third of the study participants that agreed that information on myopia and CL they received from their eye care service providers' websites boosted their confidence to uptaking CL. Leveraging therefore on this finding, the investigators believes that utilization of websites and social media by eye care practitioners to inform their patients on CL-related product development, pricing, offers, and learning materials to enable a continuous meaningful interaction will boost patients' knowledge on myopia and CL. Consequently, and as previously shown elsewhere,[36] embracing such online health promotional activities presents not only opportunity for boosting confidence to CL uptake among prospective patients, but also will create a safe practitioner-patient conversational environment for CL education during routine eye examination.

Barriers to Contact Lens Uptake among School-Going Children and Teenagers

The predominant barrier to CL uptake identified in this research was fear of CL-related ocular complications, as also noted by Abokyi *et al.*,[30] in Ghana. Historically, this apprehension has been linked to inadequate information about CL's safety in children.[3] This is a valid concern as over half (55.3%) of our study respondents highlighted their lack of general CL knowledge, which nonetheless, was weakly associated with participants actual uptake of CL (Table 3). The finding thus emphasizes the responsibility of practitioners to educate patients about CL safety advancements, as previously suggested by Alonso *et al.*[37] Additionally, Falahati-Marvast and colleagues,[38] had also suggested that a patient's ability to know and understand the reason for uptaking CL service is essential to promote not only an easier acceptance of service among non-users but also a better compliance after uptake of service.

An additional barrier was the scarcity of professional CL practitioners, with nearly 48% of participants highlighting this issue. In Kenya, despite the rapidly increasing presence of Optometrists, not many of them have the capacity, nor are employed in facilities practicing CL care.[39] Consistently, and as earlier alluded in the study from Yang et al.,[32] CL practitioners play a crucial role in influencing parental decisions about myopia management for their children.[32] Hence, with few Optometrists in Kenya practicing professional CL care, many children and

teenagers have fewer opportunities for uptaking CL option for their myopia management. Consistent with the foregone access to CL information concern, was access to CL service concern, where about half (50.6%) of the participants in this study indicated that they had difficulty in their effort to obtain CL service due to high cost of traveling to reach their nearest clinic. Although this factor did not have a significant association (*p=0.085*) with participants' actual CL uptake, the key concern for those who expressed this as a barrier, was that the clinics were far from their place of regular residence. Distance has previously been shown in a western Kenyan study to be a determinant in the access to, and utilization of healthcare.[40] Accordingly, Olusanya and team in a study conducted in southwest Nigeria,[41] further affirmed that nearness of a patient to an eye clinic resulted to more utilization of the services. The team noted that integrating primary and secondary eye care services could lower distance barriers to access and utilization of essential eye services by children and teenagers.[41]

High cost of CL was another significant barrier to CL uptake; parents, as the primary financial supporters of children's healthcare, often determine the feasibility of treatments.[18,27] Moreover, practitioners have voiced concerns about parents' financial capacity to sponsor such interventions.[32] Just over half of the respondents indicated that glasses were a cheaper alternative and easier to access, with further analysis showing a significant moderate association between this factor and uptake. In an effort to maintain current users, strategies aiming to reduce patients switching to alternatives on basis of opportunity cost should be put in place. As a previous study has shown, having customers pay for monthly CL plans and professional care does improve loyalty and compliance among the general population.[42]

In this study, parental approval in order for children and teenagers to uptake of CL was found to have the highest strength of association (Table 3) with uptake of CL as compared to other factors pre-identified for this study. Regardless of the high interest by children, parents have been shown to have initial fear that CL was less safe for children.[27] Additionally, ocular discomfort when using CL was equally found to have nearly as a significant moderate association with uptake of contact lens. Besides this finding being consistent with reports of previous studies,[43,44] which highlighted the role of ocular discomfort as a major reason for dropout by users, the finding of this present study also observed that about half of the respondents felt the need for more trainings for them to effectively use CL. Thus, underscoring the importance of patients' education and training on the ease and correct use of CLs to boost

uptake among this population group. As much as detailed analysis revealed significant moderate association between complaints of ocular discomfort while using CLs with uptake (Table 3), the investigators felt a need for a review of the quality and level of CL fitting and dispensing in Kenya, however, this was outside the scope of this present study. Nonetheless, the investigators attributed the participants complaint of ocular discomfort to a possible gap in the quality of information on proper CL handling provided to the participants while being dispensed, as has previously been shown elsewhere.[45,46] Thus, not only indicating the need for continuing practitioner education on safety and approaches to CL management in children and teenagers, but also improved user training. This has been highlighted in an earlier study, elsewhere, where the importance of proper training by practitioners and users on safety and appropriacy of use for children and teenagers, particularly for those with no previous history of CL use, was emphasized.[47]

In summary, this study highlights a consistent gender participation of female majority in line with earlier studies,[25–28] with glasses being the predominant choice for myopia correction. The uptake of CL, regardless of having more female participants' uptake, was notably low, compared to finding elsewhere in Europe.[27] In this case, pre-identified factors like; parental approval concern, fear of CL harming the eye, paucity of CL practitioners, and complaint of ocular discomforts while using prescribed CLs, among others, emerged as important barriers in this study. Significantly, eye care practitioners – in this case, CL practitioners – emerged as the chief informants on CL (Table 1), underscoring their influence on patients' decisions surrounding CL uptake. Despite children and teenagers expressing a preference for CL, their actual low-usage did not align with this inclination, suggesting that external factors, especially those linked to parents and practitioners, could be restrictive. The motivating factors enhancing CL uptake included the improved clarity of vision they offer, the associated rise in self-esteem as opposed to wearing spectacles, and the inconvenience associated with glasses. Among these drivers, superior visual clarity and the sociocultural benefits of wearing CL were particularly salient. Conversely, apprehensions about potential eye injuries from CL and financial burdens were the primary impediments to their wider acceptance. While concerns about ocular harm, primarily rooted in knowledge gaps, showed a significant association with CL uptake, or lack thereof, financial concerns exhibited a weaker link to CL uptake. It's worth noting, however, a few limitations of this study: the predominance of female participants might have influenced the

overall outcomes, and the reliance on self-reported data may have introduced biases. Additionally, the geographical focus on selected eye clinics in Kenya may limit the generalizability of the findings to broader contexts. Besides this, myopia categorization relied on clinical records or practitioner diagnosis, which means determination and confirmation of refractive findings were done by multiple practitioners, from the 13 different study locations, rather than one. This presented a potential bias in reporting thus posing as a significant limitation to the study. Nonetheless, given these findings, we recommend that targeted awareness campaigns be initiated to address knowledge gaps about CL safety and benefits. Additionally, strategies to make CL more affordable or provide financial assistance can be explored to mitigate cost-related concerns, thereby promoting broader uptake.

Acknowledgement: The corresponding author hereby acknowledges, on behalf of all co-authors, the support received from the optometrists who assisted in data collection for this study, Masinde Muliro University's IERC, and NACOSTI.

Declaration: The corresponding author hereby declares, on behalf of all co-authors, that this manuscript is not under simultaneous consideration for publication in another journal nor has it been published elsewhere. The corresponding author further declares, on behalf of the co-authors, that this manuscript has been read and approved by all the authors, and that the requirements for authorship have been met by all the authors. Each author of this manuscript believes it represents honest work.

Authors' contributions: GK – Conception and design of the study; acquisition of data; analysis and interpretation of data; drafting and critical revising of the article for important intellectual content. EEO-V – Conception and design of the study; acquisition of data; analysis and interpretation of data; drafting and critical revising of the article for important intellectual content; and Supervision of study. TJS – Conception and design of the study; acquisition of data; analysis and interpretation of data; drafting and critical revising of the article for important intellectual content; and Supervision of study. All authors have approved the final submitted version of the article.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of interest/competing interests: The authors declare no conflict nor competing interest in the publication of this paper.

Ethics approval: Approval for this study was obtained from the Institutional Ethics Review Committee of Masinde Muliro University of Science and Technology institutional approval number, MMUST/IERC/029/2021; and the Kenyan National Commission for Science, Technology and Innovation (NACOSTI) (Permit no. NACOSTI/P/21/14780).

Consent to participate: All participants for this study signed written consent and/or assent to participate in the study.

Declaration of Generative AI and AI-assisted technologies use:

During the preparation of this work the authors used chatGPT-4™ in order to grammar check the manuscript, edit sentence structure, and improve readability of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

References

1. Cope JR, Collier SA, Rao MM, et al. Contact lens wearer demographics and risk behaviors for contact lens-related eye infections- United States, 2014. *MMWR Morb Mortal Wkly Rep* 2015;64(32):865-70.

2. Stapleton F, Jalbert I, Cole N, Keay L. The epidemiology of contact lens-related infiltrates. *Optom Vis Sci* 2007;84(4):257-272. http://dx.doi.org/10.1097/OPX.0b013e3180485d5f

3. Bullimore MA. The safety of soft contact lenses in children. *Optom Vis Sci* 2017;94(6):638-646. http://dx.doi.org/10.1097/OPX.0000000000001078.

4. Cope JR, Collier SA, Nethercut H, Jones JM, Yates K, Yoder JS. Risk behaviors for contact lens–related eye infections among adults and adolescents- United States, 2016. *MMWR Morb Mortal Wkly Rep* 2017;66(32). http://dx.doi.org/10.15585/mmwr.mm6632a2

5. Girls B. Percentage of children aged 6–17 years who wear glasses or contact lenses, by sex and age group- National Health Interview Survey, 2016. *MMWR Morb Mortal Wkly Rep* 2017;66(34):917.

6. Morgan PB, Efron N. A decade of contact lens prescribing trends in the united kingdom (1996-2005). *Cont Lens Anterior Eye* 2006;29:59–68. https://doi.org/10.1016/j.clae.2006.02.008

7. Efron N, Morgan PB, Woods CA. Survey of contact lens prescribing to infants, children, and teenagers. *Optom Vis Sci* 2011;88(4):461–8. https://doi.org/10.1097/OPX.0b013e31820efa0f

8. Bowen M, Hancock B, Cordiner M. UK optometric contact lens practice with children and young people. *Contact Lens Anterior Eye* 2015;38. https://doi.org/10.1016/j.clae.2014.11.101

9. Kumari R, Chaudhry M, Sharma D. Conversion to contact lens from spectacles - A study about the practitioner's influence/initiative. *Indian J. Sci. Res* 2017;13(1):131–6.

10. Walline JJ, Long S, Zadnik K. Daily disposable contact lens wear in myopic children. *Optom Vis Sci* 2004;81(4):255–9. https://doi.org/10.1097/00006324-200404000-00011

11. Li L, Moody K, Tan DTH, Yew KC, Ming PY, Long QB. Contact lenses in pediatrics study in Singapore. *Eye Contact Lens* 2009;35(4):188-95. https://doi.org/10.1097/ICL.0b013e3181abb5bb

12. Plowright AJ, Maldonado-Codina C, Howarth GF, Kern J, Morgan PB. Daily disposable contact lenses versus spectacles in teenagers. *Optom Vis Sci* 2015;92(1):44–52. https://doi.org/10.1097/OPX.0000000000000454

13. Sarath R, Jannitha PA, Pavan KV. Preferential and non-preferential reasons for opting contact lens. *Indian Journal of Fundamental and Applied Life Sciences* 2011;21(3):221-7. https://www.cibtech.org/J-LIFE-SCIENCES/PUBLICATIONS/2011/Vol%201%20No%203/36%20%20MS%20JLS-01-03-040%20Ravi%20Opting%20Lens.pdf

14. Thite N, Naroo S, Morgan P, Shinde L, Jayanna K, Boshart B. Motivators and barriers for contact lens recommendation and wear. *Contact Lens Anterior Eye* 2015;38:41–41. https://doi.org/10.1016/j.clae.2014.11.069

15. Walline JJ, Jones LA, Sinnott L, et al. Randomized trial of the effect of contact lens wear on self-perception in children. *Optom Vis Sci* 2009;86(3):222–32. https://doi.org/10.1097/OPX.0b013e3181971985

16. Rah MJ, Walline JJ, Jones-Jordan LA, et al. Vision specific quality of life of pediatric contact lens wearers. *Optom Vis Sci* 2010;87(8):560-6. https://doi.org/10.1097/OPX.0b013e3181e6a1c8

17. Walline JJ, Jones LA, Chitkara M, et al. The Adolescent and Child Health Initiative to Encourage Vision Empowerment (ACHIEVE) study design and baseline data. *Optom Vis Sci* 2006;83(1):37–45. https://doi.org/10.1097/01.opx.0000195566.94572.eb

18. Logan NS, Shah P, Rudnicka AR, Gilmartin B & Owen CG. Childhood ethnic differences in ametropia and ocular biometry: the Aston Eye Study. *Ophthalmic Physiol Opt* 2011;31:550–58. https://doi.org/10.1111/j.1475-1313.2011.00862.x

19. Sindt C, Riley C. Practitioner attitudes on children and contact lenses. *Optom (St Louis Mo)* 2011;82:44–5. https://doi.org/10.1016/j.optm.2010.11.001

20. Mackian S. A review of health seeking behaviour: problems and prospects. England: Health Systems Development Programme, University of Manchester; 2003.

21. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: conceptualizing access at the interface of health systems and populations. *Int J Equity Health* 2013;2:1-9. https://doi.org/10.1186/1475-9276-12-18

22. Marmot M. Social determinants of health inequalities. *Lancet* 2005;365(9464):1099–104. https://doi.org/10.1016/S0140-6736(05)71146-6

23. World Health Organization. The impact of myopia and high myopia. Report of the Joint World Health Organization–Brien Holden Vision Institute Global Scientific Meeting on Myopia, University of New South Wales, Sydney, Australia, 16–18 March 2015. https://www.iapb.org/learn/resources/the-impact-of-myopia-and-high-myopia/; Accessed 25th April 2024.

24. Cumberland PM, Bountziouka V, Rahi JS. Impact of varying the definition of myopia on estimates of prevalence and associations with risk factors: time for an approach that serves research, practice and policy. *British Journal of Ophthalmology* 2018;102:1407-1412. https://doi.org/10.1136/bjophthalmol-2017-311557.

25. Wagner H, Richdale K, Mitchell GL, et al. Age, behavior, environment, and health factors in the soft contact lens risk survey. *Optom Vis Sci*. 2014;91(3):252-261. https://doi.org/10.1097/OPX.0000000000000164.

26. Noach TB, Metsing TI, Booysen D. Attitude and behaviour of soft contact lens wearers toward compliance in Gauteng, South Africa. *Afr Vis Eye Health*. 2023;82(1). https://doi.org/10.4102/aveh.v82i1.822

27. Zeri F, Durban JJ, Hidalgo F, Gispets J. Attitudes towards contact lenses: A comparative study of teenagers and their parents. *Contact Lens Anterior Eye* 2010;33(3):119-23. https://doi.org/10.1016/j.clae.2009.12.009

28. Riley C, Chalmers RL. Survey of contact lens-wearing habits and attitudes toward methods of refractive correction: 2002 versus 2004. *Optom Vis Sci*. 2005;82(6):555-561. https://doi.org/10.1097/01.opx.0000167104.81142.40

29. Nyamai LA, Kanyata D, Njambi L, Njuguna M. Knowledge, attitude and practice among students attending public high schools in Nairobi county. *JOECSA* 2016;20(1):35–41. https://joecsa.coecsa.org/index.php/JOECSA/article/view/124

30. Abokyi S, Ilechie A, Abokyi S. Knowledge, usage and barriers associated with contact lens wear in Ghana. *Contact Lens Anterior Eye* 2017;40(5):329–34. https://doi.org/10.1016/j.clae.2017.05.006

31. Brogan R. Survey reveals opportunity for contact lens conversation - Optician [Internet]. 2014. Available from: https://www.opticianonline.net/news/survey-reveals-opportunity-cl-conversation

32. Yang A, Pang BY, Vasudevan P, Drobe B. Eye care practitioners are key influencer for the use of myopia control intervention. *Front Public Health* 2022;10:854654. https://doi.org/10.3389/fpubh.2022.854654

33. Paquette L, Jones DA, Sears M, Nandakumar K, Woods CA. Contact lens fitting and training in a child and youth population. *Contact Lens Anterior Eye* 2015;38(6):419–23. https://doi.org/10.1016/j.clae.2015.05.002

34. Jellesma FC. Do glasses change children's perceptions? Effects of eyeglasses on peer- and self-perception. *European Journal of Developmental Psychology* 2013;10(4):449-60. https://doi.org/10.1080/17405629.2012.700199

35. Chatterjee A, Strong G, Meinert E, Milne-Ives M, Halkes M, Wyatt-Haines E. The use of video for patient information and education: A scoping review of the variability and effectiveness of interventions. *Patient Educ Couns* 2021;104(9):2189–99. https://doi.org/10.1016/j.pec.2021.02.009

36. Sillence E, Briggs P, Harris P, Fishwick L. How do patients evaluate and make use of online health information? *Soc Sci Med* 2007;64(9):1853-62. https://doi.org/10.1016/j.socscimed.2007.01.012

37. Alonso S, Yela S, Cardona G. Are patients sufficiently informed about contact lens wear and care? *Optom Vis Sci* 2022;99(12):853-8. https://doi.org/10.1097/OPX.0000000000001964

38. Falahati-Marvast F, Alipour F, Farokhzadian J, Ahmadian L. Determining the information needs of contact lens wearers for better education and more support: a qualitative study. *BMC Ophthalmol* 2021;21(1):325. https://doi.org/10.1186/s12886-021-02085-0

39. MoH. Kenya: National Strategic Plan for Eye Health and Blindness Prevention: 2020-2025. http://guidelines.health.go.ke/#/category/23/445/meta; Accessed 24th April 2024.

40. Rono HK, Macleod D, Bastawrous A, Wanjala E, Gichangi M, Burton MJ. Utilization of secondary eye care services in western Kenya. *Int J Environ Res Public Health* 2019;3371(16). https://doi.org/10.3390/ijerph16183371.

41. Olusanya BA, Ashaye AO, Owoaje ET, Baiyeroju AM, Ajayi BG. Determinants of Utilization of Eye Care Services in a Rural Adult Population of a Developing Country. *Middle East Afr J Ophthalmol* 2016;23(1):96–103. https://doi.org/10.4103/0974-9233.164621

42. Patel NI, Naroo SA, Eperjesi F, Rumney NJ. Customer loyalty among daily disposable contact lens wearers. *Contact Lens Anterior Eye* 2015;38(1):15–20. https://doi.org/10.1016/j.clae.2014.08.003

43. Pucker AD, Tichenor AA. A review of contact lens dropout. *Clin Optom* 2020;12:85–94. http://doi.org/10.2147/OPTO.S198637

44. Alzahrani O, Alshehri FA, Alali AO, et al. Contact lens practices and knowledge of complications and its association with refractive error in Saudi Arabia. *Cureus* 2021;13(1). http://doi.org/10.7759/cureus.12786

45. Donshik PC, Ehlers WH, Anderson LD, Suchecki JK. Strategies to better engage, educate, and empower patient compliance and safe lens wear: compliance: what we know, what we do not know, and what we need to know. *Eye Contact Lens*. 2007;33(6 Part 2 of 2):430-433. http://doi.org/10.1097/ICL.0b013e318157f62a

46. Lievens C, Cilimberg K, Moore A. Contact lens care tips for patients: an optometrist's perspective. *Clin Optom* 2017;9:113-121. https://doi.org/10.2147/OPTO.S139651

47. Paquette L, Jones DA, Sears M, Nandakumar K, Woods CA. Contact lens fitting and training in a child and youth population. Contact Lens Anterior Eye 2015;38(6):419-23. https://doi.org/10.1016/j.clae.2015.05.002

Tables

Table 1. Socio-demographic distribution of participants in the study (n = 85).

	Distribution
Socio-Demographic Variables	n (%tages)
Age	
Children 8 - 12 years	28 (32.9)
Teenagers 13 - 15 years	42 (49.4)
Teenagers 16 - 18 years	15 (17.6)
Gender	

Females	46 (54.1)
Males	39 (45.9)
Participants' current means of RE correction	
Glasses	43 (50.6)
Contact lens	15 (17.6)
Refractive surgery	0 (0.0)
No correction	27 (31.8)
Participants' source of CL information	
Eye care practitioners	46 (54.1)
Friends	16 (18.8)
Parents	6 (7.1)
Media	17 (20.0)
Myopia categorization (spherical equivalent)	
Mild myopia (≥ | 0.50D |)	50 (58.8)
Moderate myopia (≥ | 3.00D |)	26 (30.6)
High myopia (≥ | 5.00D |)	9 (10.6)
Participants' preference for correction	
Contact lens	39 (45.9)
Glasses	46 (54.1)
Actual uptake (gender-specific)	
Males	6 (40.0)
Females	9 (60.0)

n – Frequency; %tages – percentage share; RE – Refractive Error; CL – Contact Lens;

Table 2. Test of association between positive influencers and contact lens uptake (N = 85).

Indices of Actual Uptake of CL	* **Extent of Agreement to pre-identified positive influencing factors**					
	No idea	**Disagree**	**Agree**	X^2 –test	p-value	Cramer's V
	Glasses are bulky (spectacle size)					
No	3	20	47	5.46	0.121	0.223
Yes	0	1	14			
Total n_i (%tage)	3 (3.5)	21 (24.7)	61(71.8)			

	There is useful CL information and tutorials on my hospital website					
No	26	24	20	10.38	0.005	0.355
Yes	2	2	11			
Total n_i (%tage)	28 (32.9)	26 (30.6)	31 (36.5)			
	Spectacles limit participation in physical activities					
No	10	22	38	7.55	0.057	0.260
Yes	0	2	13			
Total n_i (%tage)	10 (11.8)	24 (28.2)	51 (60.0)			
	It is easy to take care of CL					
No	16	17	37	11.67	0.013	0.319
Yes	1	0	14			
Total n_i (%tage)	17 (20.0)	17 (20.0)	51 (60.0)			
	Improved self-esteem with CL wear					
No	16	17	37	12.33	0.001	0.393
Yes	1	0	14			
Total n_i (%tage)	37 (43.5)	27 (31.8)	21 (24.7)			
	Reduced self-esteem with spectacle wearing					
No	19	27	24	18.31	0.001	0.413
Yes	2	0	13			
Total n_i (%tage)	21 (24.7)	27 (31.8)	37 (43.5)			
	Improved clarity with CL wear					
No	26	9	35	18.13	0.002	0.387
Yes	0	0	15			
Total n(%tage)	26 (30.6)	9 (10.6)	50 (58.8)			
	Improved social influence and acceptance in CL					
No	25	6	39	15.41	0.005	0.351
Yes	0	0	15			
Total n_i (%tage)	25 (29.4)	6 (7.1)	54 (63.5)			
	Spectacles is a bother while engaging outdoors					
No	21	9	40	9.28	0.029	0.288
Yes	1	0	14			
Total n_i (%tage)	22 (25.9)	9 (10.6)	54 (63.5)			

* Multiple responses; CL – contact lens; n_i – Frequency of responses; (%tage) – Percentage of responses; Uptake – No CL uptake (No), Actual uptake (Yes)

Table 3. Test of association between barrier factors and contact lens uptake (N = 85).

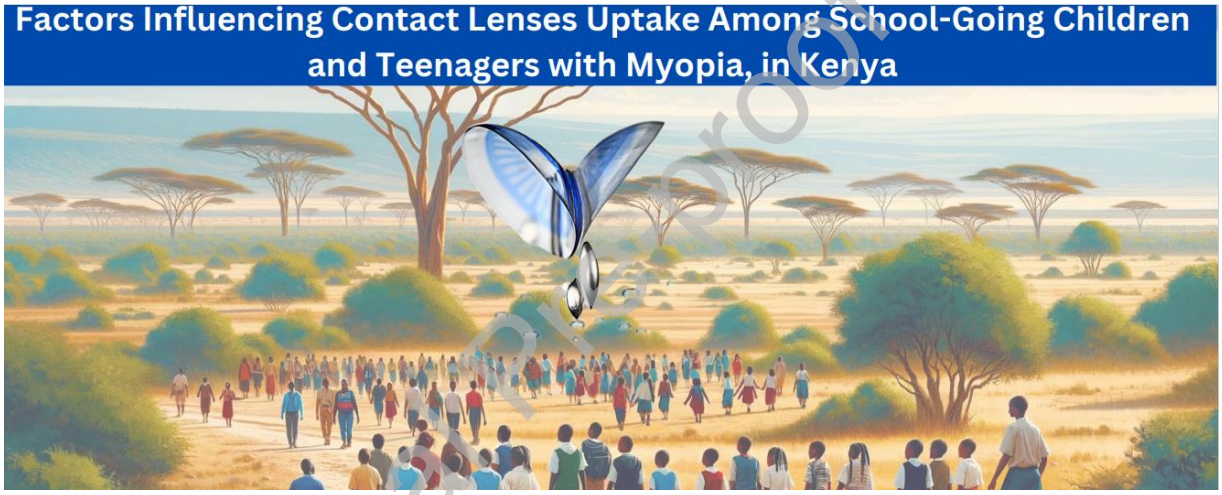
Indices of Actual Uptake of CL	* **Extent of Agreement to pre-identified barrier factors**			X^2 –test	p-value	Cramer's V
	No idea	**Disagree**	**Agree**			
	Lack of general knowledge on contact lens					
No	5	22	43	6.70	0.034	0.282
Yes	1	10	4			
Total n_i (%tage)	6 (7.1)	32 (37.6)	47 (55.3)			

	CL is expensive					
No	9	25	36	8.17	0.026	0.294
Yes	3	10	2			
Total n_i (%tage)	12 (14.1)	35 (41.2)	38 (44.7)			
	CL not easily available					
No	8	22	40	7.70	0.024	0.297
Yes	2	10	3			
Total n_i (%tage)	10 (11.8)	32 (37.6)	43 (50.6)			
	Fear of ocular injury when using CL					
No	1	20	49	19.66	< 0.001	0.494
Yes	3	10	2			
Total n_i (%tage)	4 (4.7)	30 (35.3)	51 (60.0)			
	Parents' approval hinder CL use					
No	8	18	44	29.08	< 0.001	0.539
Yes	1	14	0			
Total n_i (%tage)	9 (10.6)	32 (37.6)	44 (51.8)			
	A lot of training needed to use CL					
No	6	23	41	15.82	0.001	0.403
Yes	4	10	1			
Total n_i (%tage)	10 (11.8)	33 (38.8)	42 (49.4)			
	Lack of CL practitioners					
No	7	22	41	25.08	< 0.001	0.486
Yes	1	14	0			
Total n_i (%tage)	8 (9.4)	36(42.4)	41(48.2)			
	Satisfied with using glasses					
No	7	24	39	15.87	0.001	0.409
Yes	1	13	1			
Total n_i (%tage)	8 (9.4)	37 (43.5)	40 (47.1)			
	High cost of travelling to get services					
No	11	21	38	4.77	0.085	0.241
Yes	1	9	5			
Total n_i (%tage)	12 (14.1)	30 (35.3)	43 (50.6)			
	Clinics are very far from our home					
No	5	24	41	8.65	0.018	0.307
Yes	0	11	4			
Total n_i (%tage)	5 (5.9)	35 (41.2)	45 (52.9)			
	Ocular discomfort when using CL					
No	15	20	35	22.65	< 0.001	0.468
Yes	2	13	0			
Total n_i (%tage)	17 (20.0)	33 (33.8)	35 (41.2)			

	Glasses are a cheaper option					
No	7	17	46	17.23	< 0.001	0.452
Yes	1	12	2			
Total n_i (%tage)	8 (9.4)	29 (34.1)	48 (56.5)			

* Multiple responses; CL – contact lens; n_i – Frequency of responses; (%tage) – Percentage of responses; Uptake – No CL uptake (No), Actual uptake (Yes)

Graphical abstract



Investigating myopia correction choices in Kenyan youth, this study examines preferences for spectacles versus contact lenses among 85 participants. Despite a 60% concern over eye injuries and a 48% lack of access to specialists, the benefits of contact lenses, including 59% better vision and 64% increased self-esteem, tend to sway opinions. The research underscores a strong link between lens use and perceived visual and social gains, advocating for informative programs to facilitate wider lens adoption.

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.