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REVIEW

Media-based health promotion for child eye health education: A mini review

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ABSTRACT

Background: Childhood visual impairment, largely stemming from preventable or correctable conditions such as uncorrected refractive errors, remains a significant global public health challenge. School-based vision screening programs are effective for identification, but their impact is often limited by poor parental and child adherence to follow-up care and recommended preventive behaviors. Health promotion interventions utilizing various media formats have emerged as a strategy to bridge this gap. This mini-review synthesizes evidence from the past decade on the effectiveness of media-based health promotion for educating children and their caregivers about eye health.
Methods: Drawing on peer-reviewed literature, this review examines the impact of digital, broadcast, and specialized print media on outcomes including spectacle compliance, referral adherence, and knowledge improvement.
Results: Evidence indicates that culturally tailored interventions utilizing diverse media channels can significantly improve eye health behaviors. The review identifies that successful interventions are characterized by cultural relevance, community engagement in development, and the strategic use of multiple media platforms to create reinforcing messages. Key findings from the literature include a 12% reduction in myopia incidence through combined health education and outdoor activity programs, the cost-effectiveness of musical messaging in improving referral adherence, and the potential of digital platforms for delivering scalable education.
Conclusion: However, challenges remain in ensuring long-term behavior change and addressing the needs of children with disabilities. Future research should focus on comparative effectiveness studies, long-term sustainability, and the integration of innovative technologies with personalized education to maximize the public health impact of these interventions.

Keywords: child eye health, health promotion, media intervention, myopia prevention

Introduction

The global burden of childhood visual impairment presents a substantial public health challenge, with far-reaching implications for educational attainment, quality of life, and long-term socioeconomic potential.[1] Approximately 19 million children are visually impaired worldwide, with uncorrected refractive errors representing a leading cause of avoidable vision loss.[2,3] The prevalence of conditions such as myopia is increasing at an alarming rate, particularly in East Asia, underscoring the urgent need for effective preventive strategies . Projections from the World Health Organization suggest that by 2050, nearly 5 billion people could be myopic, highlighting the scale of this emerging crisis.[4–6]

School-based vision screening programs have been widely implemented as a cost-effective approach to early identification of eye conditions.[7,8] However, the pathway from screening to effective treatment or

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preventive action is fraught with obstacles.[9,10] Studies across diverse settings, including high-income countries and low- and middle-income countries (LMICs), consistently report suboptimal adherence to follow-up referrals and poor compliance with recommended treatments, such as spectacle wear. For instance, research from sub-Saharan Africa indicates referral adherence rates ranging from 30% to 45% following school screenings.[11] Common barriers include parental misconceptions about children's vision needs, logistical difficulties in accessing care, concerns about treatment costs, and deep-seated sociocultural beliefs surrounding eye health and spectacle use.[12–14]

Health promotion interventions that leverage various media formats offer a promising avenue for addressing these barriers.[15–17] Traditional approaches such as posters and pamphlets have demonstrated limited effectiveness, often relying on passive information delivery and assuming literacy levels that may not be universal.[18] In contrast, media-based interventions—ranging from digital messaging and social media platforms to culturally embedded broadcast media—can deliver engaging, accessible, and repeated health messages directly to children and their families.[16,19] These interventions have the potential to not only increase knowledge but also shift attitudes, reinforce supportive social norms, and ultimately drive behavior change.[19,20]

This mini-review aims to synthesize the evidence from the past decade on the effectiveness of media-based health promotion interventions for improving child eye health. Specifically, it examines the impact of diverse media channels on key outcomes, including knowledge acquisition, adherence to preventive behaviors, and compliance with referral and treatment recommendations. By analyzing successful intervention models and identifying persistent gaps, this review seeks to inform the development of evidence-based, scalable strategies for promoting child eye health in diverse global contexts.

Method

A comprehensive literature search was conducted to identify peer-reviewed articles published between January 2014 and December 2024. The search strategy employed databases including PubMed, Web of Science, and Scopus, utilizing combinations of keywords such as “child eye health,” “health promotion,” “health education,” “media intervention,” “digital health,” “mHealth,” “spectacle compliance,” and “referral adherence.” The search was limited to English-language publications involving children and adolescents (ages 3-18). Additional articles were identified through manual reference list screening of included studies and relevant systematic reviews. This mini-review prioritizes evidence from systematic reviews, meta-analyses, and randomized controlled trials to ensure the credibility of synthesized findings.

Results

Media platforms for eye health promotion

Contemporary health promotion for child eye health has evolved to encompass a diverse array of media platforms, each offering distinct advantages for reaching target audiences. These platforms range from simple printed materials to sophisticated digital interventions, with effectiveness often determined by the fit between the medium, the message, and the target population's characteristics.

Digital and mobile-based interventions

The proliferation of mobile technology has created unprecedented opportunities for delivering health education directly to caregivers. Mobile-based interventions, including Short Message Service (SMS) and messaging application-based education, represent a scalable and low-cost approach to health promotion.[21,22] The 2021 cluster randomized trial in Guangzhou, China, involved 1,440 grade 1 students across 12 primary schools, delivering weekly WeChat messages via class group chats to parents on eye behaviors like outdoor time and screen limits. It reduced 2-year myopia incidence to 19.5% in the intervention group (vs. 24.4% control) and slowed spherical equivalent shift by 0.14 D, though axial length changes were similar. This used existing class chats for practical parent tips integrable into routines.[23]

The evidence supporting digital reminders extends beyond preventive education to clinical follow-up. A recent RCT tested WeChat reminders and education for 110 children post-congenital ectopia lentis surgery in China, boosting 3-month follow-up to 83.6% (vs. 41.8% standard care). The intervention group had higher amblyopia treatment starts and parental knowledge gains (58.2% to 73.1% accuracy). It supports continuity in pediatric eye care but long-term adherence needs more study.[24] These findings suggest that smartphone-

based tools can effectively support continuity of care in pediatric eye conditions, though questions remain about their capacity to sustain long-term follow-up adherence.

Broadcast media and culturally embedded messaging

Broadcast media, particularly radio, offers unique advantages for reaching communities with varying literacy levels and limited access to digital platforms. The Zanzibar Arts for Children's Eyesight II (ZANZI-ACE II) pilot trial represents an innovative application of culturally embedded musical messaging to improve child eye health service uptake. This intervention delivered culturally tailored songs through school loudspeakers and community radio stations, embedding key eye health messages within familiar and engaging musical formats. The theoretical underpinning drew on social learning theory, positing that repeated exposure to engaging songs would normalize positive eye health behaviors, overcome barriers such as forgetfulness and stigma, and reinforce supportive social norms across home and school environments.[25]

Results from this pilot trial demonstrated substantial improvements in referral adherence. Among 374 referred children, adherence reached 69.8% in the group receiving combined school and community broadcasts, compared to 42.9% in the group receiving only community broadcasts. The intervention proved highly cost-effective, with the school broadcast phase costing US$4.65 per referred child accessing services and the community broadcast reaching individuals at US$0.29 per person. No adverse events or contamination were reported, supporting the feasibility of scaling this culturally resonant approach.[25]

Specialized print and interactive materials

While digital and broadcast media offer broad reach, specialized print materials remain valuable for addressing the needs of specific populations.[26] The development of easy-to-read (ETR) health education materials for children and adolescents with intellectual disabilities exemplifies targeted approaches to reducing health information inequality.[27] Evidence supports this concern across multiple dimensions. Rosen-Reynoso et al.[28] found that 35.3% of families of children with special health care needs encounter difficulties or delays in obtaining services, with disparities falling "most heavily on children from racial/ethnic minority backgrounds, those in poverty, and those with complex emotional/behavioral or developmental needs."

Similarly, interactive print materials have been developed to support treatment engagement among young children with amblyopia. The "Lazy Eye" early remedy education book series combines storybooks with playful training modules, inviting children to identify with a protagonist who wears an eye patch while completing puzzles and exercises that strengthen eyesight. This approach addresses the psychological barriers to patching treatment—fear, discomfort, and rejection—by embedding therapeutic exercises within an engaging narrative framework, transforming potentially aversive treatment into an interactive game.[29]

Evidence of effectiveness

Improving knowledge, attitudes, and practices

Health education interventions consistently demonstrate positive effects on eye health knowledge, attitudes, and practices among children and their caregivers. A scoping review of school-based eye health interventions in LMICs identified seven studies, with five (71%) incorporating eye health education components. These educational interventions, often combined with promotional activities and media reminders, proved effective in improving knowledge and shifting attitudes toward eye care and spectacle use. The review highlighted, however, that only one study measured referral adherence, indicating a significant gap in the evidence base regarding whether improved knowledge translates into actual health-seeking behavior.[30]

The MyopiaEd trial's primary outcome focuses on measurable behavior change, including increased outdoor activity time, reduced screen exposure, correct near-work habits, and adherence to recommended eye examinations. By defining specific behavioral criteria for success, this research aims to demonstrate not merely whether education works, but through which mechanisms and under what conditions it produces meaningful change.[31]

Enhancing adherence to preventive behaviors and treatment

Evidence for the effectiveness of health education in preventing myopia progression is particularly robust. A systematic review and meta-analysis examining interventions for myopia prevention and control in children found that health education and outdoor activities were the most effective strategies, achieving a 12% reduction in myopia incidence (incidence rate ratio = 0.88; 95% CI: 0.81-0.96).[32] The analysis of 12

high-quality studies comprising 6,342 cases demonstrated that interventions significantly slowed myopia progression even among genetically high-risk children, though the absolute effect was weaker than in the general population. Critically, adherence to intervention protocols emerged as a key determinant of effectiveness, with higher adherence groups experiencing better control of myopia progression.[32]

Regarding treatment compliance, the provision of free spectacles combined with health education appears particularly effective. The LMIC scoping review identified that eye health education and free spectacles were most effective in increasing spectacle compliance, while education combined with promotional interventions improved knowledge, attitudes, and practices.[30] This finding aligns with evidence from the ZANZI-ACE II trial, where culturally resonant messaging addressing parental misconceptions and stigma surrounding spectacle wear contributed to improved referral adherence.[25]

Increasing service uptake and referral completion

The ultimate measure of health promotion effectiveness is whether it increases appropriate utilization of eye care services. The ZANZI-ACE II trial provides compelling preliminary evidence that media-based interventions can substantially improve referral adherence following school vision screening. The effect size of 0.26 during the school broadcast phase and 0.21 during the community broadcast phase represents a meaningful improvement in service uptake. The cost-effectiveness analysis, showing modest costs per child reached and per referred child accessing care, supports the potential for scalability in resource-limited settings.[25]

However, important questions remain about long-term effectiveness. Commentary accompanying the CEL social media intervention trial noted that while short-term gains in follow-up were impressive, previous trials have demonstrated that phone reminders did not improve five-year follow-up rates. This suggests that maintaining long-term engagement may require different strategies than those effective for short-term adherence, potentially including automated systems, artificial intelligence integration, or hybrid approaches combining mobile interventions with targeted clinical care.[24]

Discussion

The evidence synthesized in this review demonstrates that media-based health promotion interventions can effectively improve child eye health outcomes across diverse contexts. Successful interventions share several common characteristics. First, cultural relevance appears paramount. The ZANZI-ACE II intervention's effectiveness stemmed directly from its co-creation with community members—children, parents, teachers, musicians, and local leaders—ensuring that messages resonated with local experiences and addressed culturally specific barriers.[25] Similarly, the “Lazy Eye” book series addresses the universal psychological challenges of patching treatment through narrative identification, making its effectiveness potentially transferable across cultural contexts.[29]

Second, multi-platform approaches that reinforce consistent messages across different environments demonstrate enhanced effectiveness. The combination of school-based and community broadcasts in Zanzibar ensured that children received reinforcing messages both at school and at home, engaging parents while normalizing eye health within the broader community.[25] This ecological approach, addressing individual, family, and community level factors simultaneously, aligns with social learning theory and health promotion best practices.

Third, interventions that move beyond information provision to address practical and psychological barriers show greater impact on behavior change. The provision of free spectacles addresses economic barriers; simplified ETR materials address cognitive and literacy barriers; and engaging narratives address fear and stigma.[29,30] Effective interventions recognize that knowledge alone is insufficient and design comprehensive strategies that address the full spectrum of barriers to eye health.

For practitioners designing eye health promotion programs, several evidence-based recommendations emerge. When selecting media platforms, consider the target population's literacy levels, technology access, and cultural preferences.[27] In low-literacy settings, broadcast media and audio-enhanced materials may prove more effective than printed materials.[33] Engage community members in intervention development to ensure cultural relevance and acceptability, recognizing that externally imposed messages may face resistance or removal from community spaces. Combine media-based education with practical support—such as free spectacles or facilitated referrals—to address both informational and structural barriers to care.[31]

For policymakers, investment in media-based health promotion should be viewed as a cost-effective complement to school vision screening programs. The modest costs of broadcast interventions, particularly

when amortized across large populations, represent excellent value for improving referral adherence and ensuring that screening investments translate into improved health outcomes. However, policymakers should also recognize that media interventions require ongoing investment and periodic renewal to maintain engagement and address evolving cultural contexts.[34–37]

Conclusion

Media-based health promotion interventions represent a powerful tool for improving child eye health outcomes, particularly when designed with cultural sensitivity, developed through community engagement, and delivered through reinforcing multi-platform strategies. Evidence from the past decade demonstrates that these interventions can improve knowledge, shift attitudes, enhance adherence to preventive behaviors and treatment, and increase appropriate utilization of eye care services. The most effective interventions recognize that information alone is insufficient and address the full spectrum of barriers—economic, logistical, psychological, and cultural—that prevent children from accessing needed eye care. As digital technologies continue to evolve and broadcast media maintain their reach, the potential for scalable, cost-effective health promotion interventions will only expand. Realizing this potential requires sustained research attention to comparative effectiveness, long-term sustainability, and the development of inclusive approaches that reach the most vulnerable children. By building on the evidence synthesized in this review, practitioners, policymakers, and researchers can work together to ensure that all children have the opportunity to achieve optimal visual health and its associated benefits for learning, development, and quality of life.

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