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Original article

Global and African Challenges in Eye Health: A Narrative Literature Review

Enjeux mondiaux et africains de la santé oculaire : revue narrative de la littérature

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Résumé

La déficience visuelle et la cécité constituent un problème majeur de santé publique à l'échelle mondiale, affectant plus de deux milliards de personnes, dont près de 90 % vivent dans les pays à revenu faible et intermédiaire. L'Afrique subsaharienne porte une charge disproportionnée de maladies oculaires évitables, notamment la cataracte, le glaucome, la rétinopathie diabétique et le trachome. Cette revue narrative vise à synthétiser les données scientifiques récentes sur les enjeux mondiaux et africains de la santé oculaire, en mettant l'accent sur les déterminants socio-économiques, les systèmes de santé et les inégalités d'accès aux soins.

Une recherche documentaire a été réalisée dans PubMed, Scopus, Web of Science, les rapports de l'OMS, de l'Agence internationale pour la prévention de la cécité (IAPB) et de la Banque mondiale. Les études publiées entre 2000 et 2024 portant sur l'épidémiologie, l'organisation des services et les politiques de santé oculaire ont été incluses.

Les résultats montrent que plus de 80 % des déficiences visuelles sont évitables ou curables. Cependant, l'Afrique souffre d'un déficit critique en ressources humaines spécialisées, en infrastructures et en financement. Les barrières géographiques, financières et culturelles limitent l'accès aux soins oculaires. L'intégration de la santé oculaire dans les soins de santé primaires et la couverture sanitaire universelle demeure insuffisante.

La santé oculaire doit être reconceptualisée comme une priorité du développement. Le renforcement des systèmes de santé, la formation des ressources humaines et la mobilisation de financements durables sont indispensables pour atteindre les objectifs de l'OMS en matière de vision 2030.

Mots-clés : cécité, déficience visuelle, santé oculaire, Afrique, santé publique.

Abstract

Visual impairment and blindness constitute a major global public health issue, affecting over two billion people, nearly 90% of whom live in low- and middle-income countries. Sub-Saharan Africa bears a disproportionate burden of preventable eye diseases, including cataract, glaucoma, diabetic retinopathy, and trachoma. This narrative review aims to synthesize recent scientific data on global and African eye health challenges, focusing on socioeconomic determinants, health systems, and inequalities in access to care.

A literature search was conducted in PubMed, Scopus, Web of Science, as well as reports from the WHO, the International Agency for the Prevention of Blindness (IAPB), and the World Bank. Studies published between 2000 and 2024 on epidemiology, service organization, and eye health policies were included.

The results show that over 80% of visual impairments are preventable or curable. However, Africa suffers from a critical shortage of specialized human resources, infrastructure, and funding. Geographic, financial, and cultural barriers limit access to eye care. The integration of eye health into primary healthcare and universal health coverage remains insufficient.

Eye health must be reconceptualized as a development priority. Strengthening health systems, training human resources, and mobilizing sustainable funding are essential to achieving the WHO's Vision 2030 goals.

Keywords: blindness, visual impairment, eye health, Africa, public health.

Introduction

Vision is a fundamental determinant of quality of life, individual autonomy, economic productivity, and overall human development. Its loss or degradation has profound consequences, limiting access to education, employment, and social participation. According to the first World Report on Vision by the World Health Organization (WHO), more than 2.2 billion people worldwide live with visual impairment or blindness. Alarmingly, for at least one billion of these people, the visual impairment could have been prevented or has not yet been treated, highlighting a critical gap in the provision of eye care (1).

This burden of morbidity is distributed profoundly unequally across the globe. Low- and middle-income countries, particularly those in sub-Saharan Africa, bear the overwhelming majority of cases. This region faces a complex double epidemiological burden: on the one hand, the persistence of communicable eye diseases such as trachoma and onchocerciasis, often linked to poverty and precarious sanitary conditions; on the other hand, a rapid and worrying increase in non-communicable eye diseases, such as glaucoma, diabetic retinopathy, and age-related macular degeneration, which accompany the epidemiological transition and population ageing (2).

The situation is exacerbated by chronically underfunded and fragile health systems. The critical shortage of ophthalmologists and other qualified eye health personnel, the concentration of infrastructure in large urban centres at the expense of rural areas, and profound socioeconomic inequalities create almost insurmountable barriers to accessing care for millions of people. This narrative review aims to analyse in depth the global and specifically African challenges of eye health. By synthesising epidemiological data, structural challenges and intervention perspectives, we seek to inform public health policies and advocate for more effective and equitable strategies.

Methodology

A narrative literature review was conducted to synthesise current knowledge on the challenges of eye health at global and African levels. This approach was chosen for its ability to provide a broad and integrated overview of the subject, drawing on a diversity of sources.

This is therefore not a systematic review with meta-analysis.

- *Search Strategy*

The literature search identified 2,500 articles from international databases (PubMed, Scopus, Web

of Science and Google Scholar). After removing duplicates, 1,800 articles were retained. A first filtering based on titles and abstracts allowed 500 articles to be examined, of which 350 were excluded as not meeting the inclusion criteria.

In total, 150 articles were analysed in full text. After methodological evaluation and application of eligibility criteria, 90 articles were excluded.

Finally, 60 articles were retained for the final analysis in this narrative literature review.

Figure 1 summarises this approach with a simplified PRISMA flow diagram of article selection.

The search strategy combined several keywords in English and French, organised around four main axes: condition ("blindness", "visual impairment", "cécité", "déficience visuelle"), domain ("eye health", "santé oculaire"), geography ("Africa", "Afrique") and system ("public health", "health systems", "santé publique", "systèmes de santé").

- *Selection Criteria*

Inclusion criteria were defined to ensure the relevance and timeliness of the information. Publications in English or French, published between 1 January 2000 and 31 December 2024, were retained. This period was chosen to cover major initiatives such as "VISION 2020: The Right to Sight" and more recent developments. The types of documents included systematic reviews, epidemiological studies, health policy analyses, reports from international organisations and original articles on the epidemiology of eye diseases, organisation of eye care services, human resources, financing and eye health policies. Articles dealing only with purely clinical or surgical aspects without a public health perspective were excluded. The analysis of selected articles was carried out synthetically and narratively to identify the main themes and issues.

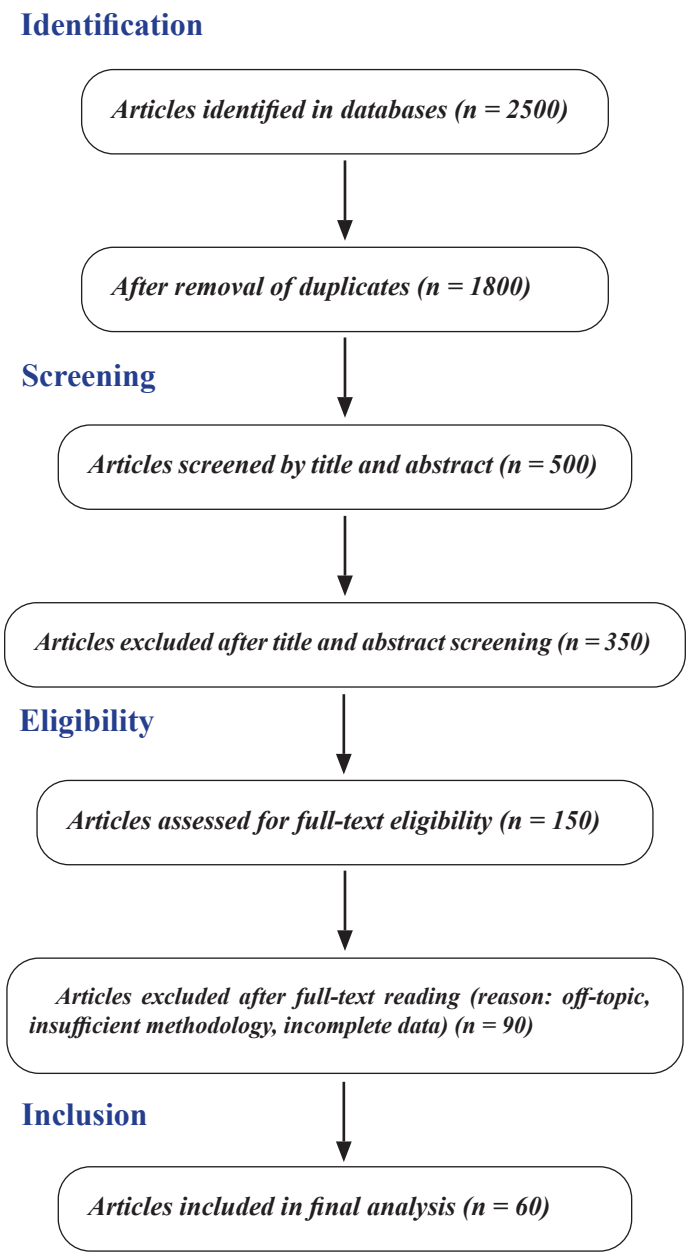

Figure 1: Simplified PRISMA flow diagram of article selection

Results

Analysis of the literature reveals a contrasting picture of global eye health, marked by significant progress but also by persistent and profound inequalities, particularly detrimental to the African continent. More than 80% of visual impairments are considered preventable or curable, which underscores the magnitude of systemic failure rather than medical inevitability.

Major Causes of Visual Impairment and Blindness in Africa

Untreated cataract remains the leading cause of blindness in Africa, representing approximately 50% of cases. Although cataract surgery is one of the most cost-effective interventions in medicine, access remains a major challenge for a large part of the African population due to its cost, distance from surgical centres, and lack of information (2). Glaucoma, often nicknamed the "silent thief of sight", is the second leading cause of irreversible blindness. Late detection, due to the absence of symptoms in early stages and lack of diagnostic equipment at primary level, leads to diagnoses at advanced stages where vision loss is already significant.

At the same time, diabetic retinopathy is experiencing alarming progression, following the increasing prevalence of diabetes on the continent. The lack of integration between diabetes management services and eye health services leads to insufficient screening and late management of visual complications. Finally, despite notable successes thanks to the "SAFE" strategy (Surgery, Antibiotics, Facial cleanliness, Environmental improvement), trachoma remains an important cause of infectious blindness in several endemic foci.

Global and African Epidemiological Burden

Sub-Saharan Africa has the highest prevalence rates of blindness in the world. In many regions, these rates exceed 1% of the population, whereas they are below 0.5% in most European and North American countries (3). This disparity reflects not only a difference in economic development, but also unequal access to basic public health interventions.

The burden of moderate to severe visual impairment is also disproportionately high, affecting the ability of millions of children to learn and adults to work, thus perpetuating the cycle of poverty.

Eye Health Systems in Africa: A Structural Deficit

The main bottleneck is the critical deficit in qualified human resources. The majority of African countries have less than one ophthalmologist per 250,000 inhabitants, and sometimes less than one per million, a ratio far from WHO recommendations (4). Moreover, these specialists are massively concentrated in capitals and large cities, leaving rural populations, who constitute the majority, largely deprived of specialised services. The lack of other eye health personnel, such as optometrists, ophthalmic nurses and cataract surgical technicians, exacerbates this shortage.

Infrastructure and equipment follow the same trend of centralisation and insufficiency. Modern technical platforms are rare outside large urban hospitals, and primary health centres are rarely equipped for basic screening of eye conditions. Supply chains for essential consumables (medicines, spectacles, intraocular implants) are often failing, leading to stock-outs and increased costs for patients.

Discussion

The results presented highlight a silent crisis in eye health in Africa, where millions of people are losing their sight from largely avoidable causes. This situation is not inevitable but the direct result of deep structural weaknesses and a lack of political prioritisation. The glaring inequalities observed between Africa and other regions of the world, as well as within African countries themselves, reflect interconnected socioeconomic and systemic determinants.

Inequalities and Socioeconomic Determinants of Eye Health

Poverty is both a cause and a consequence of blindness (5). Financial barriers are the most frequently cited obstacle by patients for not accessing care (6). In the absence of robust social protection mechanisms, ophthalmological care, particularly surgery, can lead to catastrophic expenditure for households, forcing them to choose between sight and other essential needs (7). Geographic barriers are equally important, with prohibitive travel times and costs to reach a care centre, a factor particularly critical in rural areas (8). Finally, cultural barriers, including fatalism towards age-related vision loss, distrust of modern medicine, or preference for traditional treatments, also delay the

seeking of appropriate care (9).

Weakness of Integration into Health Systems

Eye health has long been considered an isolated specialty, disconnected from the rest of the health system. This "silo" approach has led to its weak integration into primary health care (PHC) and national health strategies (10). Consequently, community health workers and nurses at basic health centres are generally not trained for screening, treatment of simple conditions, or referral of complex cases (11). Similarly, universal health coverage (UHC), when implemented, rarely includes a comprehensive basket of eye care services, leaving essential services such as the provision of spectacles or cataract surgery to the charge of patients, which hinders the objective of equitable access (12).

Perspectives and Strategic Levers for Action

Faced with these challenges, several strategic avenues emerge. The effective integration of eye care into Primary Health Care is the cornerstone of any sustainable solution, an approach designated as Integrated People-Centred Eye Care (IPEC) (13). This involves training and equipping frontline health workers to become sentinels for the visual health of their community. Strengthening human resources at all levels is also crucial. It is not only about training more ophthalmologists, but also developing intermediate cadres, such as higher technicians in ophthalmology, capable of performing delegated tasks (task-sharing) and extending the reach of services, a strategy that has proven its effectiveness (14,15).

Technological innovation, particularly telemedicine and artificial intelligence, offers unprecedented opportunities to overcome geographic barriers (16). Tele-ophthalmology platforms can enable remote screening for diabetic retinopathy or glaucoma, connecting rural patients to the expertise of urban specialists (17). Finally, public-private partnerships and strengthened international collaboration are essential to mobilise the sustainable funding needed to scale up effective interventions and to support research and development adapted to the African context (18).

Limitations of this narrative review: the absence of exhaustive data, particularly in some countries, publication bias, among others, are the limitations of this review.

Conclusion

Avoidable blindness and visual impairment in Africa represent much more than a health problem; they constitute a major health injustice and a considerable obstacle to human and economic development. The data are unequivocal: the majority of vision loss cases on the continent could be prevented or treated with existing and cost-effective interventions. The gap between what is medically possible and the reality experienced by millions of Africans is the symptom of chronic underinvestment and a lack of political will.

It is imperative to reconceptualise eye health not as a specialised niche, but as an essential component of public health, intrinsically linked to the fight against poverty, education, and the achievement of sustainable development goals. Investing in eye health is not an expense, but a strategic investment, economically rational and ethically necessary to build more just and prosperous societies.

At the end of this study, we deemed it important to formulate some recommendations:

- *For policymakers:* offer more opportunities for the training of ophthalmologists, higher technicians in ophthalmology, and opticians for screening and management of the most common and blinding eye pathologies at all levels of the health pyramid.
- *For populations:* consult eye health professionals as early as possible for rapid and effective management.

Ethical consideration: this narrative study does not contravene the Helsinki declaration, as no manipulation of living beings, whether animal or plant, was carried out.

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