

Economic Evaluation in Eye Care: The Missing Link in Pakistan's Ophthalmic Strategy

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Evidence-based medicine (EBM) is now the standard of care; however, it does not adequately address costs or the impact of interventions on patients' quality of life.¹ To bridge this gap, value-based medicine (VBM) has emerged as a complementary approach that integrates patient-centered outcomes with economic considerations.² Within this framework, health economics provides a systematic method to evaluate the cost, efficiency, and overall value of healthcare by linking clinical outcomes with financial implications, quality of life, life expectancy, and return on investment.²

A key component of VBM is economic evaluation, which compares the costs and consequences of different treatment strategies.³ It offers structured evidence to policymakers and healthcare planners, enabling informed decisions about which interventions deliver the greatest benefit for a given level of expenditure. Four principal approaches are commonly used: cost-minimization, cost-benefit, cost-effectiveness, and cost-utility analyses.³

Cost-minimization analysis compares alternative interventions with equivalent clinical outcomes to identify the least costly option. In contrast, cost-benefit analysis assigns monetary values to both costs and outcomes, allowing direct assessment of overall value. For example, cataract surgery not only restores vision but also facilitates return to work, thereby enhancing both individual income and national productivity. Building on this, cost-effectiveness analysis, one of the most widely used methods, relates costs to clinical outcomes such as years of vision gained or disability prevented. Cost-utility analysis further refines this by incorporating patient-perceived quality of life, expressed as quality-adjusted life years (QALYs). Consider an example of early glaucoma which reduces

utility to 0.97 and advanced glaucoma to 0.52 caused by visual disability. Any treatment which will prevent progression to advanced disease over eight years will gain 3.6 QALYs ($0.97-0.52= 0.45 \times 8$ years).^{4,5} Although universal thresholds for cost-effectiveness are lacking, such measures provide a robust basis for comparing interventions.

In high-income settings, health economics is well established and deeply embedded in decision-making processes. Organizations such as National Institute for Health and Care Excellence ensure that major healthcare decisions are guided by formal economic evaluations, while global bodies like World Health Organization and World Bank incorporate economic analysis into health policy frameworks. In contrast, Pakistan allocates approximately 2.9% of its GDP to health, with only 0.9% from the public sector.⁶ This limited investment leads to high out-of-pocket expenditures and restricted access to care. Despite a substantial burden of preventable blindness, cost-effective interventions such as cataract surgery, refractive correction, and early glaucoma detection remain underutilized at the population level due to the absence of structured financing and strategic prioritization.

The economic burden of vision impairment is both substantial and multifaceted, including direct medical costs, informal caregiving, and significant productivity losses. Notably, indirect costs, particularly those related to lost productivity and caregiver burden, often exceed direct healthcare expenditures.⁷ As disease severity increases, so does the economic burden, highlighting the importance of early detection and prevention. Global analyses suggest that investments in cataract and refractive services can yield returns as high as \$28 for every \$1 spent in low- and middle-income countries.⁸

Despite such compelling evidence, health economics in ophthalmology within Pakistan remains underdeveloped and underutilized. While data on the burden of blindness are available, rigorous studies on cost-effectiveness, cost-utility, and budget impact are

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scarce. Key metrics such as quality-adjusted life years (QALYs), disability-adjusted life years (DALYs), and cost-effectiveness ratios are seldom incorporated into policymaking.⁹ Even large-scale initiatives, including cataract campaigns and NGO-led programs, are rarely evaluated using formal economic frameworks, and up-to-date national estimates of the cost of blindness.

Consequently, decision-making in both general healthcare and ophthalmology in Pakistan is often driven by clinical need, service availability, and donor priorities rather than economic evidence. Although the healthcare system comprises public services, private providers, and a strong network of non-governmental organizations, emerging approaches, such as teleophthalmology, community-based screening, and task-shifting, have not been adequately evaluated from an economic perspective. This is particularly important given that eye care must compete with other health priorities for limited resources, despite its high potential for economic returns.

Regional experiences demonstrate the tangible benefits of integrating economic evaluation into eye care. Studies from India have shown that providing spectacles to presbyopic workers leads to measurable productivity gains. For example, tea-pickers in Assam who received presbyopic correction demonstrated significantly higher daily output, resulting in substantial economic benefits over a harvesting season.¹⁰ Such evidence highlights the broader socioeconomic impact of relatively simple interventions.

For Pakistan, a deliberate and strategic shift is needed. Integrating health economics into ophthalmic research, clinical practice, and policy planning is essential. This includes building capacity in economic evaluation methods and promoting collaboration between clinicians and health economists. Future research should prioritize comparative evaluation of glaucoma treatments, economic assessment of diabetic retinopathy screening, and updated national estimates of the economic burden of blindness.

Health economists must play a central role in leading these efforts, conducting rigorous evaluations, identifying barriers to equitable access, and informing evidence-based policy decisions. Such work can support the development of locally relevant treatment guidelines that align clinical effectiveness with affordability.

Ultimately, the challenge extends beyond the

burden of disease to the misalignment between limited health investment and largely preventable causes of visual disability. Efficient resource allocation remains critical. By bridging the gap between clinical practice and economic evaluation, health economics can serve as a transformative tool for ophthalmology in Pakistan, enhancing efficiency, promoting equity, and ensuring sustainable access to vision-saving interventions. Even in the absence of increased overall health spending, strategic reallocation of existing resources can yield considerable gains in both visual outcomes and overall quality of life.

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