

Health transition and eye care policy planning for people with diabetic retinopathy in south Asia

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Summary

The prevalence of type 2 diabetes (T2D), associated systemic disorders, diabetic retinopathy (DR) and current health policies in south Asian countries were analysed to assess country-specific preparedness to meet the 2030 Sustainable Development Goals. The south Asian countries were classified by human development index, socio-demographic index, multidimensional poverty indices, and eye health resources for epidemiological resource-level analysis. In south Asia, the prevalence of diagnosed and undiagnosed T2D in adults aged 40 years or above, was higher in Pakistan (26.3%) and Afghanistan (71.4%), respectively; India has the highest absolute number of people with DR, and Afghanistan has the highest prevalence of DR (50.6%). In this region, out-of-pocket spending is high (~77%). This Health Policy is a situational analysis of data available on the prevalence of DR and common eye diseases in people with T2D in south Asia and available resources to suggest tailored health policies to local needs. The common issues in the region are insufficient human resources for eye health, unequal distribution of available workforce, and inadequate infrastructure. Addressing these challenges of individuals with T2D and DR, a 10-point strategy is suggested to improve infrastructure, augment human resources, reduce out-of-pocket spending, employ targeted screening, and encourage public-private partnerships.

The Lancet Regional Health - Southeast Asia 2024;27: 100435

Published Online xxx
<https://doi.org/10.1016/j.lansea.2024.100435>

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Keywords: Diabetic retinopathy; South Asia; Eye care; Health policy; Health transition

Introduction

Significant advances in healthcare delivery over the last two decades have resulted in a global reduction in the prevalence of communicable disease from 46.4% in 1990 to 26.4% in 2019 (a 43.1% decrease) and under-5 mortality from 41.7 per 100,000 in 1990 to 18.6 per 100,000 by 2017 (a 55.3% decline).¹ Today, people live longer with reduced disability-adjusted life years (DALY) due to better health care and health delivery. On the contrary, there has been an exponential rise in morbidity and mortality due to several non-communicable diseases. Globally, from 1990 to 2019, the proportion of non-communicable diseases has

increased from 43.2% to 63.8% (a 47.7% increase).¹ The most visible change is the growing prevalence of diabetes. It is estimated that the prevalence of people with diabetes in the world (over 90% are type 2 diabetes [T2D]) is set to increase by 46%, from 537 million in 2021 to 783 million in 2045.² South Asia is one of the regions most affected, with an estimated 68% rise in diabetes prevalence between 2021 and 2045.³ Three of the eight countries in the region (India, Pakistan, and Bangladesh) are in the top ten countries with the highest number of people with diabetes. The total health expenditure due to diabetes in six of the eight countries of the International Diabetes Federation (IDF) South-East Asia region is US\$ 10.1 billion, and it is likely to increase by 50% to US\$ 15 billion in 2045.³ In the global context, south Asia has a low human development

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index, inadequate health facilities, and high out-of-pocket spending (OOPS). Concurrent with the increased prevalence of T2D, there is an increased prevalence of complications; the most common one is diabetic retinopathy (DR).^{4,5} Sight-threatening DR (STDR) remains the fifth most common global cause of moderate to severe visual impairment.⁶

While the prevention and management of people with T2D requires a combination of lifestyle changes and long-term healthcare management, multiple parallel initiatives must be considered to decrease ocular morbidities in people with diabetes. These include a stronger political commitment, identification and scale-up of effective interventions, human and institutional capacity development, and sustainable solutions to finance health systems to reduce health inequalities.⁷ As many high-income countries already practice, timely detection is best done by universal retinal screening.⁸ However, screening is not established in south Asia due to challenges such as illiteracy, poverty, inadequate human resources, insufficient health facilities, and sub-optimal financial allocation. Therefore, planning must include priority setting for each country, with an overarching goal of achieving universal eye healthcare coverage.

This Health Policy is a situational analysis of data available on the prevalence of DR and common eye diseases in people with T2D in south Asia and available resources to suggest tailored health policies to local needs.

Methods

South Asia comprises eight countries: Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. We collated diabetes and DR-related health information from the key informants of all south Asian countries. We selected the key informants from each country who either worked in primordial and primary prevention of diabetic retinopathy and were well-informed to collect and collate the required data. The required data points were selected following a common consensus, and the respective country representative gathered the information. The data included the prevalence of diabetes and DR, the spectrum of common eye diseases in people with diabetes, available health infrastructure to address the disease burden, the cost of health care, and finally, the KAP (Knowledge-Attitude-Practice) of people with diabetes. The essential questions of KAP were the knowledge of diabetes and DR, attitude toward diabetes control and lifestyle management and practice of regularly consulting diabetologists, ophthalmologists and retina specialists. The diabetes burden data was mainly obtained from the International Diabetes Federation (IDF Atlas, 2021),² recent population-based studies, and, when unavailable, from large hospital-based patient cohorts. The

country-specific population and economic data were collected from the World Bank sites.^{9–16} The KAP of people with diabetes was collected from published studies in south Asian countries.^{17–21} Using the human development index (HDI), socio-demographic index (SDI), multi-dimensional poverty index (MPI), OOPS, the current cataract surgical rate (CSR), and the human resource for eye health (HReH), we divided the eight countries of the region into four epidemiological transition level (ETL),²² and three resource levels (low, middle and high).

Definitions

- HDI measures a country's social and economic development. It is calculated from a long and healthy life, including life expectancy at birth, education, mean years of schooling, and a decent standard of living, including the gross national income (GNI) per capita.
- SDI is a composite measure of three factors: income per capita, average education of people aged 15 years and older, and total fertility rate of people aged <25 years (under 25). SDI is expressed on a scale of 0–1. On this scale, 0 is the lowest income per capita, lowest education, and highest fertility under 25; <0.53 is low SDI; 0.54–0.60 is middle SDI; and >0.60 is high SDI.
- MPI measures the non-income-based dimensions of poverty to provide a more comprehensive assessment of poverty and deprivation. It is calculated by multiplying the percentage of the poor population and the average percentage of the weighted indicators that poor people experience.
- DALY measures disease burden as a cumulative number of years lost due to ill health, disability, or early death.

$DALY = YLD \text{ (Years Lived with Disease)} + YLL \text{ (Years of Lost Life)}$

- ETL is a ratio of all-age DALYs due to communicable, maternal, neonatal, and nutritional diseases (CMNND) and all DALYs due to non-communicable diseases and injuries. ETL describes changing population patterns regarding fertility, life expectancy, mortality, and leading causes of death. It is divided into Low (0.56–0.75), Low Middle (0.41–0.55), High Middle (0.31–0.40), and High ETL (<0.31).

We also collected the current data on cataract surgery from the respective country website and national representatives. These were (i) the cataract surgical rate (CSR, the number of cataract surgeries done in a year in one million population) and the required CSR rate to reduce the backlog; (ii) the cataract surgical coverage (CSC, the proportion of cataract operated of those

requiring cataract surgery); and (iii) effective CSC (eCSC, the proportion of people with postoperative vision of 6/12 or better of those who received cataract surgery) were collected wherever available.

Findings

Most of the information was available in six countries; the data from two countries (Afghanistan and the Maldives) were scarce (Table 1). South Asia is home to a quarter of the world’s population. Over a third of people (34.9%; 389 million of 1.1 billion) with multidimensional poverty globally live in this region. All countries in this region rank between 73 (Sri Lanka) and 180 (Afghanistan) in HDI.

Stratification of south Asian countries

India has the largest land mass and is home to the highest population. The Maldives has a higher GDP per capita, life expectancy, and least poverty. Sri Lanka has a higher HDI and education. Based on the HDI, MPI, OOPS, health facilities, and HReH, two countries, Afghanistan and Pakistan, were categorised as low-income countries; the remaining six countries were categorised as middle-income countries. Currently, the spending for diabetes-related health care in South Asia is about US\$ 10 billion annually, and in many countries, people spend out-of-pocket.²

Burden of diabetes and other risk factors of diabetic retinopathy

Diabetes-related disease burden (diagnosed and undiagnosed diabetes), associated comorbidities (hypertension and obesity), and DR-related common health conditions are listed in Table 2.^{2,3,23–29} The prevalence of diabetes was higher in Sri Lanka (21.8%), and the prevalence of undiagnosed diabetes was high in India (53.1%). Hypertension and obesity were highest in Pakistan (52.6% and 57.9%, respectively). The prevalence of DR was highest in Afghanistan (50.6%).

Burden of cataract and rates of cataract surgery

The CSR was highest in India and lowest in the Maldives, but each country requires 1.29 to 3.42 times additional effort to reach an optimal level to meet the 2030 Sustainable Development Goals (SDG) targets. The same was true for eCSC (Table 3).³⁰ The CSC and eCSC were lowest in Bangladesh (69.0% and 30.8%, respectively).

The DR-related findings are arranged according to the TADDS (Tools for the Assessment of Diabetic Retinopathy and Diabetes Management System) seven-point reporting format.³¹

1. Priority, Policy, and Program

Four of eight countries (India, Nepal, Pakistan, and Sri Lanka) have national DR guidelines.

Country	Area Km ²	Population (2023)		GDP 2022 (US\$)	HDI (2019)		Life Expectancy (years) (2019)	Poverty MPI %	Extreme Poverty % (2022)	Primary (Secondary) School enrolment %	OOPS % (2020) World bank ^b		
		Land share in south Asia %	Share in south Asia %		Share in south Asia %	Per Capita (2020)						HDI	Inequality adjusted HDI
Afghanistan	652,864	12.504	42.24	2,179	20,136 (2020)	0.478 ^a	No data	180	63.2	55.9 (2016)	18	29 (49)	77.2
Bangladesh	148,460	2.843	172.95	8,922	460,751	0.661 ^b	0.465 ^a	129	74.3	24.6 (2019)	4	90 (54)	74.0
Bhutan	38,394	0.735	0.78	0.040	2,707	0.666 ^b	0.450 ^a	127	73.1	37.3 (2010)	4	85 (78)	15.42
India	3,287,263	62.961	1,428.62	73.702	3,468,566	0.663 ^b	0.538 ^a	132	70.8	16.4 (2021)	3	92 (68)	50.59
Maldives	298	0.005	0.52	0.026	5,900	0.747 ^c	0.568	90	79.6	0.7 (2017)	4	96 (NA)	16.91
Nepal	147,181	2.818	30.89	1.593	39,028	0.602	0.430 ^a	143	70.9	17.5 (2019)	8	94 (7.2)	54.17
Pakistan	881,913	16.891	240.48	12.406	376,493	0.544 ^a	0.386 ^a	161	69.3	38.3 (2018)	5	73 (45)	55.44
Sri Lanka	65,610	1.256	21.89	1.129	73,739	0.782 ^c	0.686	73	76.9	2.9 (2016)	5	98 (96)	46.58
Total	5,221,093	100	1,938.37	100	4,427,184	0.639	-	-	-	-	-	-	-

GDP: Gross Domestic Product; HDI: Human Development Index; MPI: Multidimensional Poverty Index; OOPS: Out of Pocket Spending. Extreme poverty = US\$ 1.9/day. ^aLow. ^bMedium. ^cHigh.

Table 1: South Asia demographic and developmental indices (Ref 9–16).

Country	Diabetes and associated common systemic diseases				DR and associated common ocular conditions	
	Diagnosed diabetes prevalence %	Undiagnosed diabetes %	HTN	Obesity %	DR %	Others %
Afghanistan ²⁹	12.13 (8.86–16.24)	9.7	NA	NA	50.6	Cataract: 27.8
Bangladesh ²³	12.5 (8.5–12.8)	44.4	24.6	5.2	36.1	Not available
Bhutan ²⁴	8.8 (7.8–9.7)	44.4	28%	11.4	Any: 12.5 STDR: 4.0	Lens opacity: 57.3 Glaucoma: 5.4
India ²⁵	8.3 (7.3–9.3)	53.1	35.5	General: 28.6 Abdominal: 39.5	12.5	
Maldives	6.7 (6.5–15.6)	35.9	NA	NA	NA	NA
Nepal ²⁶	8.5% (>40 years), 5.8% overall (STEPS, 2019) ^a	19.3	24.5%	4.3	19.3	Cataract: 62. Glaucoma: 5.9
Pakistan ²⁷	14.62 (10.65–19.09)	9.3	52.6	57.9	16.0	Lens opacity: 51.5%, Glaucoma: 7.1
Sri Lanka ²⁸	21.8 (20.1–23.5)	27.4	28.2%	BMI 25 to 29.9: 29.3% BMI >30: 9.7%	27.4	Cataract 66.7 Glaucoma 2.1

DR: Diabetic retinopathy; HTN: Hypertension; STDR: Sight-threatening diabetic retinopathy; NA: Not available. ^aSTEP wise approach to NCD risk factor surveillance (STEPS).

Table 2: Diabetes and eye health in South Asia (Ref 23–29).

2. Service delivery

Dedicated non-communicable disease (NCD) clinics are operational in four countries (Bangladesh, India, Nepal, and Sri Lanka); it was higher per million population in Nepal and Sri Lanka (51 and 46.4/million population, respectively) (Table 4). It is apparently planned in Pakistan but has not yet been implemented. Three providers, public, private, and voluntary, including not-for-profit organizations, share the eye care delivery in this region. The public health service varied from 10% (Nepal) to 100% (Bhutan); the private service varied from 20 to 25%, and voluntary service from 30% (Sri Lanka) to 70% (Nepal).³⁰

3. Health workforce

The number of ophthalmologists per million population was highest in Bhutan (20.0/million people), and retina specialists were higher in Nepal (1.8/million

people) (Table 4), close to a more populous country like India (18.8 and 1.1 per million, respectively).

4. Health Infrastructure and Technology

All countries use the required biochemical tests (blood glucose and glycated haemoglobin) to diagnose diabetes and have the required screening devices (mydriatic and non-mydriatic fundus cameras) to obtain the fundus images in people with DR. All countries also have the required infrastructure, the standard of care diagnostic devices (such as Fluorescein angiography and Optical Coherence Tomography), and trained personnel to administer DR-specific treatment (laser, intravitreal injection, and vitreoretinal surgery). However, the distribution of these services is not equitable, with a higher concentration of the facilities in urban areas compared to rural areas.

5 and 6. Health Promotion and KAP

Country	CSR/million people			CSC % PVA <3/60	eCSC %	
	Current	Desired	Required effort		Current	30% add for SDG
Afghanistan	NA	NA	NA	NA	NA	NA
Bangladesh	2625	9000	3.42x	69.0	30.8	40.1
Bhutan	2107	7000	3.32x	86.1	67.3	87.4
India	5945	9000	1.51x	93.0	69.7	90.6
Maldives	1440	7000	4.86x	86.0	65.2	84.8
Nepal	4360	7500	1.72x	85.0	62.3	81.0
Pakistan	5307	7500	1.29x	61.4	55.4	72.0
Sri Lanka	5380	9000	1.67x	78.0	59.7	77.6

CSR: Cataract surgical rate; CSC: Cataract surgical coverage; eCSC: Effective cataract surgical coverage; SDG: Sustainable Development Goal; NA: Not available.

Table 3: South Asia cataract service indices (Ref 30).

Country	Specialists (per million)		NCD Clinics n (per million [m])	Health Expenses (US\$)			
	Ophthalmology	Retina		Systemic/person diabetes-related #	DR- related/eye		Cataract surgery (Phaco)
					PRP- 3 sittings	Anti-VEGF- 5 injections	
Afghanistan	NA	NA	NA	143.1	NA	NA	NA
Bangladesh	1400 (8.1/m)	100 (0.6/m)	500 (2.9/m)	76.5	50	400	250
Bhutan	16 (20/m)	N = 1 (1.3/m)	20 (28.6/m)	194.7	No cost (Public)		
India	26,791 (18.8/m)	1529 (1.1/m)	6256 (4.4/m)	114.4	54.0	602	120
Maldives	NA	NA	NA	1867.4	NA	NA	NA
Nepal	480 (15.5/m)	55 (1.8/m)	1581 (46.4/m)	102.2	57	263	109
Pakistan	2300 (2.9/m)	46 (0.5/m)	a	80.1	54	150	69
Sri Lanka	64	12	1020 (51/m)	201.6	No cost (public)		
					90 (private)	300 (private)	250 (private)

DR: Diabetic retinopathy; NCD: Non-communicable disease; PRP: Pan-retinal photocoagulation; VEGF: Vascular endothelial growth factor; Phaco: Phacoemulsification; NA, Not available. ^aPlanned, not implemented.

Table 4: Health system and health expenses in south Asia (Ref ^{2,30}).

Data on KAP studies were available in five of eight countries (Bangladesh, India, Nepal, Pakistan and Sri Lanka).^{17–21} With a little language variation, the content/meaning of the questions was similar in all these studies. Broadly, the ‘knowledge’ questions were on diabetes, the impact of blood sugar and blood pressure, eye and retinal examinations, diabetic retinopathy, and treatment of diabetes and retinopathy. The ‘Attitude’ questions were on the need for regular eye check-ups, eye check-ups even when diabetes is controlled, and control of hypertension. The ‘Practice’ questions were on the frequency and interval of general and eye examinations, compliance with advised treatment, and lifestyle management. The KAP of people with diabetes was relatively less in Bangladesh (39.7%) and India (40.7%). In Sri Lanka and India, 65–69% of people were unaware of DR (Table 5).

7. Health Financing

The cost of cataract surgery and care for DR (pan-retinal photocoagulation and intravitreal anti-VEGF injections) are high (Table 4). Some countries in South Asia, such as Bhutan and, to a large extent, the Maldives

and Sri Lanka, have relatively good public health systems (Table 4). OOPS is high at ~ 77%–74% in Afghanistan and Bangladesh, respectively (Table 1). The cost of care for people with diabetes per person² is lowest in Bangladesh (US\$ 76.5) and highest in the Maldives (US\$ 1867.4) (Table 4). One-third of people in the South Asia region live below the poverty line; thus, they do not have the resources to fend for out-of-pocket expenses for their health care.³²

Discussion

The situational analysis shows that available strategies and resources do not adequately address the rising burden of diabetes and diabetic eye disease in south Asia. The WHO has recommended implementing integrated people-centered eye care (IPEC) that provides an appropriate and continuum of eye care from the community to the tertiary level.³³ To meet the 2030 SDGs, the WHO has identified two targets: refractive error (40% increase in effective refractive error coverage) and cataract surgery (30% increase in effective cataract surgery coverage).³⁴ Given the high prevalence of diabetes and DR, the WHO South-East Asia region

Country	Diabetes		Diabetic retinopathy	
	Study type	KAP	Study type	KAP
Bangladesh	Population-based	39.7% aware of diabetes	Hospital-based	50% unaware that eye screening was essential
India	Population-based	40.7% aware of diabetes	Hospital-based	65% unaware of DR
		9.6% had received DR screening		
Nepal	Population-based	65% aware of diabetes	Hospital-based	46.6% unaware of DR
		21% had good control of diabetes		44.4% had first retinal exam only after in-patient admission
Pakistan	Population-based	51.9% aware of diabetes	Population-based	56.8% visited ophthalmologists
				9.2% asked for retinal examination
Sri Lanka	Hospital-based	70% aware of diabetes	Hospital-based	69% unaware of DR

Table 5: Knowledge, Attitude, and Practices (KAP) towards diabetes and diabetic retinopathy (DR) in South Asia (Ref ^{17–21}).

#	Strategy	Action	Impact	Maximum Target Country
1	Improving the quantity and quality of cataract surgery.	Improving infrastructure and increased skilled HReH.	Improve the eye care delivery system	Maldives Bangladesh Bhutan
2	Empowering NCD clinics (a different terminology is used in Sri Lanka).	Biochemistry tests to detect diabetes in people >40 years Non-mydratiac fundus camera and 2-field fundus photography.	Detect diabetes and DR in people with undiagnosed and sub optimally controlled diabetes	Afghanistan Bangladesh Sri Lanka
3	Targeted screening in primary eye care facilities	People with known diabetes: Age >50 years, diabetes duration >6 years, SBP >140 mm Hg)	Reduce burden on the available skilled workforce.	Bhutan Nepal India
4	Empowering secondary eye care centers.	Equipping the secondary eye care facilities with retinal laser devices and training general ophthalmologists in PRP for treating eyes with PDR (without macular edema)	Improve people's compliance to treatment due proximity of treating centers Reduce burden on the tertiary (referral centers) Advocacy	All countries
5	Using AI technology in primary care facilities	Deployment of fundus camera with offline AI capabilities	Reduce the burden on the secondary (referral) centers	All countries
6	Reducing the cost of care	Reducing the cost of diagnostic tests and medicines.	Reduce out-of-pocket spending Improve compliance	Maldives India
7	Mandated health care	Annual health and eye check-ups mandated by the insurance (public or private) and at work places.	Early detection of DR Time-bound follow-up.	All countries
8	Advocacy for improved lifestyle	Use Health and Wellness Centers to reduce hypertension and obesity, and also increase awareness of diabetes and DR.	Migrate to holistic person-centric care from a disease-centric care.	Afghanistan Bangladesh Pakistan
9	Partnership and alliance	National level Public-Private partnership International alliance with organizations focussed on diabetes and allied diseases	Larger community reach and cross country learning	All countries
10	National registry and data base	Person and disease specific data digitization	Data management for policy planning	Afghanistan Bangladesh Bhutan Maldives

AI: artificial intelligence; DR: diabetic retinopathy; HReH: human resource for eye health; NCD: noncommunicable disease; PDR: proliferative diabetic retinopathy; SBP: systolic blood pressure.

Table 6: Health policy suggestions for care of people with diabetic retinopathy in south Asia.

action plan has added a third target on DR care (80% of people with diabetes are screened regularly for DR, and 80% of those screened with STDR are treated).³⁵

The main gaps in DR screening and treatment are the need for systematic screening and a planned pathway for the timely treatment of STDR. There are reports of the successful use of non-mydratiac fundus cameras for DR screening in India.³⁶ But, this approach in south Asia could result in many ungradable retinal images due to the high prevalence of cataracts.⁴ Agreeably, a direct translation of retinal screening programmes of mydratiac fundus photography for all patients with diabetes practised in some of the high-income countries is not immediately feasible in south Asia due to the high cost. Therefore, it may be technically easier to provide quality-assured annual DR screening using hand-held retinal cameras through dilated pupils for people with diabetes attending healthcare facilities.^{37,38} Another option, as reported from Sri Lanka, is a step-approach of using a non-mydratiac fundus camera (in the primary facility) for screening and a mydratiac fundus camera for the final diagnosis (in secondary and tertiary facilities).³⁹

Non-communicable Disease Clinic (NCD clinic) is a novel way of addressing people with NCDs, including diabetes. It is currently operational only in a few countries in south Asia. In addition to systematic DR screening, these clinics monitor DR-associated risks, such as hypertension and obesity, and patient education.^{40,41} Moreover, community-level public education and advocacy strategies such as the Health and Wellness clinics (India) and Healthy Life Centers (Sri Lanka) may also be implemented in all countries in the region to reduce the rates of undiagnosed diabetes.⁴²

Alternate strategies are based on risk-based DR screening that may be an immediate, cost-effective option in resource-limited regions.^{43,44} Prompt DR screening may be prioritised for those at higher risk of STDR; these are age >50 years, duration of diabetes >6 years, and systolic blood pressure >140 mmHg.⁴³ Using these criteria, targeted screening of this sub-population could detect STDR in 93.5% of people.⁴³ Lowering the age of DR screening to 40 years and consistently applying biochemical tests such as Cystatin C might also help detect people with STDR.⁴⁵

Insufficient HReH and unequal distribution of available workforce (rural areas are usually neglected) remain significant hurdles.⁴⁶ While the burden of DR screening can be reduced by employing allied health workers and an artificial intelligence-integrated grading algorithm, the deployment of trained retinal specialists in semi-urban and rural areas must also be addressed.⁴⁷

Cataract is the most common cause of visual impairment and blindness. The quantity and quality of cataract surgery are considered a surrogate measure of eye care services.⁴⁸ The CSR and eCSC are deficient in nearly all countries in the region (Table 3). To improve the ophthalmic service, every country in the region must work to bridge the infrastructure gap by investing in the WHO's six building blocks (service delivery, workforce, information, medical products, finance, and governance).⁴⁹ Policy setting, regulation, advocacy, strategic partnership, and incentives for good practice form part of good health governance.⁵⁰

Considering the data we have analysed on the economy, the health delivery system, and the growing prevalence of diabetes, we suggest ten strategies (Table 6). These include improving the quality and spread of eye care (strategies 1 to 4), use of technology (strategy 5), improved health finance (strategy 6), advocacy and policy change (strategies 7 and 8), partnership and alliance (strategy 9), and finally create a national and supranational database (strategy 10). These strategies will likely improve eye care delivery, detect people with diabetes early, reduce the burden on secondary and tertiary eye care facilities, reduce OOPS, improve cross-country learning, and help in country-specific policy planning. Every south Asian country needs a suitable policy change using the WHO guidelines.⁵¹

Strength and weakness

The data collected from the country-specific websites on the health infrastructure and economics from the United Nations Development Program (UNDP), International Monetary Fund (IMF), World Bank, and the IDF on diabetes prevalence and care are robust enough to suggest a good strategy for improved care of people with diabetes and diabetic eye disease.

This analysis does not include situations from every south Asian country because not all countries in the region have conducted the required studies. Of the two important goals of the 2030 SDGs, only cataract surgical coverage data were used in the analysis, not the refractive error coverage (REC) data; it was primarily because reliable data on REC was not available. The KAP on DR obtained from people visiting the hospital is subject to bias.

Conclusion

Eye care services in south Asia face challenges in improving DR screening and addressing the economic

implications of DR treatment. The region's cataract surgery rates, along with deficient CSR, CSC, and eCSC, point to the urgent need for better infrastructure, improved HReH, reduced cost of care, and public-private partnerships. Practical and feasible innovative approaches in DR care, including prevention and treatment, are summarised in this communication. Using the WHO's IPEC model, every south Asian country should design intra-country regional policy for eye care for people with diabetes. An optimal legal and regulatory framework can enhance universal eye health coverage by establishing suitable standards and resolving concerns or grievances effectively.

Contributors

Taraprasad Das: Data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, writing - original draft, writing - review and editing; Khaleda Islam, Phuntsho Dorji, Raja Narayanan, Padmaja K Rani, Brijesh Takkar, Raba Thapa, Muhammad Moin, Prabhat N Piyasena: Data curation, writing - review and editing; Sobha Sivaprasad: Data curation, writing - original draft, writing - review and editing.

Data sharing statement

The corresponding author would consider sharing of the data with others on request. All the authors involved in the study have access to the data collected as part of this manuscript.

Declaration of interests

TD received funding from Hyderabad Eye Research Foundation, Hyderabad, India (2024) for this paper. SS reported receiving financial support not related to this manuscript from AbbVie, Amgen, Apellis, Bayer, Biogen, Boehringer Ingelheim, Novartis, Eyebiotech, Eyepoint Pharmaceuticals, Janssen Pharmaceuticals, Nova Nordisk, Optos, Ocular Therapeutix, Kriya Therapeutics, OcuTerra, Roche, Stealth Biotherapeutics and Sanofi. All authors declare no other conflicts of interest.

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