

Review

Creating synergies for health systems strengthening through partnerships in Pakistan – a case study of the national eye health programme

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إنشاء التآزر لتعزيز النظم الصحية من خلال الشراكات في باكستان: دراسة حالة لبرنامج وطني لصحة العين
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الخلاصة: يُعدُّ العمى وضعف الإبصار من الأسباب الرئيسية للأمراض غير السارية في باكستان. وقد أوضح مسحان وطنيان مرتكزان على السكان أجريا في عام 1988، وفي عامي 2002 – 2004، وجود نقص في معدل انتشار العمى من 1.7% إلى 0.9%، مع انخفاض يُعتمد به إحصائياً في العمى الناجم عن الساد (الكاتراكت)، وذلك نتيجة للتدخلات المتسارعة على كامل البلاد، وإدماج الرعاية العينية ضمن الرعاية الصحية الأولية. وبالإضافة إلى ذلك، فإن 88 مرفقاً قد حظيت بالارتقاء في الأعوام 2006 و2008، وذلك نتيجة للبرنامج الوطني لصحة العيون. وقد أدت هذه الإجراءات إلى ازدياد مقداره 279% في عدد المراجعين للعيادات الخارجية، وازدياد مقداره 375% في عدد الجراحات العينية المجرة. وقد ساهم الاستثمار في تنمية الموارد البشرية وتغيير السياسات مساهمة يُعتمد بها إحصائياً في ضمان استمرار البرنامج. أما التحديات الرئيسية التي تواجه البرنامج فتشتمل على الموازنة بين الاستراتيجيات الوطنية لصحة العيون، مع تعزيز النظم الصحية المرتكز على إطلاع ومعرفة ببحوث النظم الصحية. وتحاول هذه الورقة توثيق هذا النجاح الباهر.

ABSTRACT Blindness and visual impairment are major causes of noncommunicable diseases in Pakistan. Two national population-based blindness surveys conducted in 1988 and 2002–04 demonstrated a reduction in prevalence of blindness from 1.78% to 0.9% with a significant drop in cataract blindness as a result of accelerated nationwide interventions and eye care integration in primary health care. In addition, between 2006 and 2008, 88 facilities were upgraded as a result of the national eye health programme. These measures resulted in a 279% increase in eye outpatient attendances and a 375% increase in eye surgeries performed. Investment in human resources development and policy change contributed significantly to the sustainability of the programme. Key challenges facing the programme include aligning national eye health strategies with health system strengthening informed through health systems research. This paper attempts to document this extraordinary success.

Création de synergies en vue du renforcement du système de santé par le biais de partenariats au Pakistan : étude du cas du programme national de santé oculaire

RÉSUMÉ La cécité et les déficiences visuelles sont des causes majeures de maladies non transmissibles au Pakistan. Deux enquêtes nationales en population sur la cécité, réalisées en 1988 et entre 2002 et 2004, ont montré une baisse de la prévalence de la cécité de 1,78 % à 0,9 %, ainsi qu'une diminution sensible de la cécité due à la cataracte, grâce à des interventions plus rapides au niveau national et à l'intégration des soins oculaires dans les soins de santé primaires. Par ailleurs, entre 2006 et 2008, 88 établissements ont été modernisés dans le cadre du programme national de santé oculaire. Ces mesures ont entraîné une hausse de 279 % des consultations ophtalmologiques externes et une augmentation de 375 % des actes de chirurgie oculaire réalisés. L'investissement dans le développement des ressources humaines et le changement de politique ont largement contribué à la viabilité du programme. Le principal enjeu auquel ce programme est confronté est l'harmonisation des stratégies nationales de santé oculaire et du renforcement du système de santé, au moyen des recherches sur les systèmes de santé. L'objectif de cet article est de décrire cette exceptionnelle réussite.

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Introduction

The importance of blindness and visual impairment as a global public health issue is illustrated by the World Health Assembly [1]. *The State of the World's Sight VISION 2020* report stated that, based on available global data, 75% of blindness and visual impairment was avoidable [2]. According to World Health Organization (WHO) estimates, 314 million people worldwide live with low vision and blindness [3]. Of these, 45 million people are blind, 269 million have low vision and over 50% of these are due to uncorrected refractive errors (near-sightedness, far-sightedness or astigmatism). In most cases, normal vision could be restored with eyeglasses. A total of 90% of blind people live in low-income countries.

Restoration of sight and blindness prevention strategies are among the most cost-effective interventions in health care [2]. Infectious causes of blindness are decreasing as a result of public health interventions and socioeconomic development. Blinding trachoma now affects fewer than 80 million people, compared with 360 million in 1985 [2]. Ageing populations and lifestyle changes mean that chronic blinding conditions such as diabetic retinopathy are projected to rise exponentially. Women face a significantly greater risk of vision loss than men.

Blindness also has profound socioeconomic implications [4]. It was noted that without extra interventions, the global number of blind individuals would increase from 44 million in 2000 to 76 million in 2020 [4]. A successful VISION 2020 initiative would decrease blindness to only 24 million by 2020 and lead to 429 million blind person-years avoided. A conservative estimate of the economic gain is US\$ 102 billion [4]. Similar studies in Australia have also demonstrated that vision disorders cost Australia AUD 9.85 billion in 2004 [5].

In 1980, at the request of the Ministry of Health, WHO conducted a

situation analysis of eye health in the country. It found that over two-thirds of the district (secondary-level) hospitals had no eye care services. The report further added that there were an insufficient number of ophthalmologists and that there was no paramedic cadre to assist the ophthalmologists. It observed that the cataract surgical output was very low and insufficient to address the backlog of cataract in the country. Based on these recommendations, the Ministry of Health constituted a national team in 1982 to address this issue [6]. This team was called the National Cataract Committee, which later in 1988 was changed to the National Eye Camp Planning Committee, as the general approach to reducing the burden of cataract blindness in south Asia at the time was through eye camps.

In 1987–90, the first national blindness survey was conducted with support from WHO [7]. The results of the survey were so staggering that the Ministry of Health took a very serious note of the prevailing situation of blindness in the country, with the effect that the National Eye Camp Planning Committee rapidly evolved into the National Committee for Prevention of Blindness in 1991. In 2008, this committee was reconstituted as the National Eye Health Committee. This new committee formulated the first national plan for prevention of blindness 1994–98 [6]. Subsequently, two further national plans were developed – the second national plan 1999–2003 [8] and third national plan 2005–10 [9].

The second national survey on blindness and low vision was undertaken in 2002–2004 [10,11]. After almost 15 years of joint intervention, this survey revealed that the prevalence of blindness had been halved to 0.9%.

The purpose of this paper is to discuss how this exceptional progress of reducing the prevalence of blindness by 50% in less than 15 years was achieved and scaled-up further, supported by a national strategy development, consen-

sus building, multistakeholder efforts and enhanced synergies.

Methods

Desk reviews of key published peer reviewed articles and reports spanning the last 30 years were undertaken. These were obtained from the archives of the National Eye Health Committee, WHO Country Office, MEDLINE[®] search and situation analyses reports from donors. Health information data were obtained from the national health management information system and the national programme for family planning and primary health care.

Two major population-based national blindness surveys were analysed and compared. However, there were limitations in analysing the results from the surveys as there were differences in methodology. The first survey [7] employed a cluster random sampling, including all ages, in which several small surveys were carried out in 17 locations in the country. In the second survey [10,11] a multistage, stratified (rural–urban), cluster random sampling, with probability proportional to size procedures, was used to select a cross-sectional, nationally representative sample of adults aged 30 years and above. Thus, it needed a smaller sample size than the first survey.

Specific data relating to national programmes for lady health workers (LHWs) and prevention and control of blindness were obtained from their respective programme implementation units. Additional data on human resources were obtained from various training institutions, Pakistan Medical and Dental Council and relevant national nongovernmental organizations.

Information on cofinancing was obtained from WHO, institutional donors and international nongovernmental organizations.

The data were organized into epidemiological, disease specific, facilities,

health information, health finance and health workforce categories. The facilities and health workforce data were further disaggregated by province. All analysed data were reviewed by the coordinator of the National Eye Health Programme and relevant officials from the respective training centres to check for any inconsistencies.

Results

Table 1 illustrates the key results of two national blindness surveys undertaken about 15 years apart. The surveys revealed that while cataract (clouding of the lens of the eye) still remained the commonest cause of blindness, its proportion as a blinding cause had reduced from two-thirds to about half of all causes. This corroborated with the eye health workforce development and simultaneous strengthening of static facilities for eye care at the secondary level which took place during this period. Furthermore, the second survey identified diabetic retinopathy and macular degeneration as emerging causes of blindness. The first survey may

have identified these conditions but these were not reported separately.

Table 2 demonstrates a rising trend in eye care interventions every five years. The period between 1988 and 1993 serves as a baseline before any formal national programme for prevention of blindness was launched. As static facilities were upgraded and new eye hospitals established in the nongovernment sector, a corresponding decrease in eye camps is noted.

Table 3 indicates the operational outcome of interventions and upgradation of district hospitals in the public sector. There was a threefold increase in outpatient attendance rates and the number of cataract surgeries increased by almost four times. Even in areas of heightened security, there were modest increases. In Balochistan, 10 districts were not upgraded owing to lack of staff. A similar situation was found in two districts each in Punjab and Khyber Pakhtunkhwa, formerly North West Frontier province, and one each in Sindh and Pakistan Administered Kashmir. Data from districts that were not upgraded were not reliable as no systematic reporting was being followed.

Table 4 highlights the key eye health cadres, their respective minimum training criteria and the current status of production and deployment.

Table 5 shows the professional tasks and roles assigned to the different levels of eye care facilities. The national programme identified these specific roles to ensure that the various levels of health care services could comprehensively implement the national eye strategy.

Table 6 illustrates how integration of eye health within primary health care by LHWs expanded access and coverage of eye health services at the primary level. This step has led to promotion of eye health by a 100 000-strong force of LHWs who are resident in their respective communities. As a result of institutionalization of eye health within broader health initiatives, there has been a transition of facility-based care to community-based primary health care.

Discussion

Cataract blindness is a major public health problem in most developing countries, and the availability of and access to cataract surgical services often serves as a proxy indicator for the success of a national eye health programme as far as reduction of avoidable blindness is concerned [12]. The first national plan estimated that in 1988, the total cataract surgery per annum was about 140 000 [6], whereas these efforts were scaled-up during the second five-year plan. A national mapping exercise substantiated the attainment of a significant reduction in the burden of blindness that was reported by the national blindness survey of 2002–2004 [13] and revealed that at least 310 752 cataract surgeries were being performed annually. Of all cataract surgeries, 55% were carried out in the nongovernment sector, 39% in the government sector and 6% by the forces services; 58% of these surgeries were using intraocular lenses.

Table 1 Causes of blindness in Pakistan obtained from two population-based surveys

Main cause of blindness	National blindness survey 1988–89		National blindness survey 2002–04		Odds ratio (95% CI)
	No.	%	No.	%	
Cataract	342	66.7	289	51.5	1.83 (1.42–2.36)
Corneal opacity	66	12.6	66	11.8	1.10 (0.75–1.60)
Uncorrected refractive errors ^a	60	11.4	15	2.7	0.97 (0.70–1.35)
Uncorrected aphakia	NSR	NSR	48	8.6	
Glaucoma	21	3.9	40	7.1	0.55 (0.31–0.98)
Macular degeneration	NSR	NSR	12	2.1	–
Diabetic retinopathy	NSR	NSR	1	0.2	–
Others	29	5.4	90	16.0	–
Blindness sample total	518 ^b	100.0	561 ^c	100.0	–
Survey sample total	29 157		16 507		

^aIncludes uncorrected aphakia.

^bThis gives a prevalence of blindness of 1.78%.

^cThis gives a prevalence of blindness of 3.4%. However, when adjusted for all ages, the prevalence is 0.9%.

CI = confidence interval; NSR = not separately reported.

Table 2 Eye care interventions carried out in Pakistan during 1988–2003

Year	Type of service	Estimated annual number of interventions carried out		Total
		Institutionalized	Non-institutionalized ^a	
1988–93 (pre-national programme)	Eye outpatients	1 600 000	500 000	2 100 000
	Refractive error examinations	160 000	100 000	260 000
	Cataract surgeries	88 000	52 000	140 000
1994–98 (1st five-year plan)	Eye outpatients	3 768 120	753 624	4 521 744
	Refractive error examinations	565 218	113 044	678 262
	Cataract surgeries	120 000	70 000	190 000
1999–2003 (2nd five-year plan)	Eye outpatients	6 782 616	1 356 523	8 139 139
	Refractive error examinations	1 017 392	271 304	1 288 697
	Cataract surgeries	208 204	102 548	310 752

^aThis includes eye camps, outreach and private practices.

In the second national blindness survey, persons of less than 30 years of age were excluded from the study. In a review of global data on blindness [14] and a population-based study done in the Gambia [15] it was observed that the prevalence of blindness in persons 0–15 years or 18–29 years did not have any significant effect on the overall prevalence determined by examining those 30 years or older. This methodology saved time and cost and provided comparable results to all age surveys.

Despite the reduction of the prevalence of blindness by 50%, it still remains a public health prerogative. This has important implications when one considers

the link between poverty and blindness. Gilbert et al. studied the association between visual impairment and poverty assessed by a cluster-level deprivation index and household-level poverty indicator [16]. They found that the prevalence of total blindness was more than three times higher in poor clusters than affluent clusters. They concluded that blindness is associated with poverty in Pakistan and lower access to eye care services was one contributory factor.

A countrywide situation analysis of refractive error services conducted in 2006 gathered data from over 2000 optical outlets from all the districts in the country [17]. They found that at

least 6.2 million refractions were being done annually (2.2 million by ophthalmologists, 1.6 million at hospitals and 2.4 million by opticians). As part of a community-based study, the prevalence of visually disabling refractive errors was found to be about 3.5%–4.5% in children and 4% in all ages [18].

Refractive errors are the commonest cause of visual impairment worldwide [3]. A national study found that overall spectacle coverage (6/12 visual acuity cut-off) was 15.1%, indicating that refractive error services were not covering the majority of the population in need [19]. Trachoma endemic foci were also recognized, providing the evidence for

Table 3 Three-year operational outcome of upgrading district eye services

Province	Number of facilities upgraded	Eye outpatients seen in upgraded district eye units			Eye surgeries performed in upgraded district eye units		
		2006	2007	2008	2006	2007	2008
Federal	2	19 702	40 971	18 576	719	1 934	1 610
Punjab	34	45 461	132 917	259 385	1 584	9 757	13 898
Sindh	14	91 095	133 890	263 971	1 072	4 349	16 024
Khyber Pakhtunkhwa ^{a,b}	22	68 192	87 043	146 440	3 448	8 839	8 706
Balochistan ^a	11	31 600	37 309	44 585	6 079	5 617	7 145
Northern Areas	2	2 055	2 122	4 440	179	187	351
Azad Jammu and Kashmir	3	21 081	22 495	41 151	498	1 047	3 148
Total	88	279 186	456 747	778 548	13 579	31 730	50 882

^aThe outcome of interventions was greatly affected by the ongoing security situation in these provinces.

^bFormerly North West Frontier province.

Table 4 Human resources development for eye health in Pakistan

Eye health workforce trained at formally accredited training centres	Criteria	Number of centres running an accredited training programme	Total number of specific cadre produced annually	Total number of specific cadre available in country	Total number actively deployed in service
Paediatric ophthalmologist	Minimum one year of accredited training after qualifying as general ophthalmologist	5	5	8	6
Vitreo-retina specialist	Minimum one year of accredited training after qualifying as general ophthalmologist	5	8	20	18
Medical retina specialist	Minimum one year of accredited training after qualifying as general ophthalmologist	1	2	-	-
Cornea specialist	Minimum one year of accredited training after qualifying as general ophthalmologist	-	-	3	3
Oculoplastic and orbit specialist	Minimum one year of accredited training after qualifying as general ophthalmologist	-	-	2	2
General ophthalmologist – FCPS, MS or equivalent	Minimum four years of accredited training	30	30	500	400
General ophthalmologist – MCPS, DOMS or equivalent	Minimum two years of accredited training	30	30	1500	1500
Community ophthalmologist	Minimum one year of accredited training	2	15	89	-
Optometrist	Minimum four years of accredited training	5	30	67	10
Refractionist	Minimum two years of accredited training	5	80	319	40
Orthoptist	Minimum four years of accredited training	4	15	40	10
Ophthalmic technologist	Minimum four years of accredited training	4	15	27	12
Ophthalmic nurse	Minimum one year of accredited training after general nursing	2	20	48	21
Ophthalmic technician	Minimum one year of accredited training	6	100	1100	65
Lady health worker (LHW)	Minimum two days of training in eye health as part of LHW training programme	4	20 000	90 000	90 000

FCPS = Fellow of the College of Physicians and Surgeons of Pakistan; MS = Master of Science; MCPS = Member of the College of Physicians and Surgeons of Pakistan; DOMS = Diploma in Ophthalmic Medicine and Surgery.

undertaking the necessary control interventions [20]. A district-based comprehensive eye care strategy comprising of strengthening of facilities, training of eye care staff, and strengthening detection

and referral pathways was adopted to address the scarcity of eye care services in many regions of the country [21]. It was piloted in one district in 1996 and after a successful evaluation was

expanded to 63 districts between 2000 and 2005 with support from international partners, and then scaled-up to another 63 districts in the country by the Government in the 2005–2010

Table 5 Roles of primary, secondary and tertiary level facilities for eye care

Type	Tasks/role
Centre of excellence	<ul style="list-style-type: none"> • Dedicated specialized eye care services for complicated and referred cases • Training in general ophthalmology for ophthalmologists and medical graduates • Subspecialty training in the areas of vitreo-retina, paediatric ophthalmology, cornea, glaucoma and community eye health • Training for allied health personnel especially in ophthalmic services • Coordination, facilitation and management of developing eye health services in the respective province and zones • Lead on research/situation analysis of eye health, and advocacy for health system strengthening as part of sustainable development • Serve as Master trainers for CME, and eye health component of primary health care, school health programmes and pilot initiatives
Teaching hospital	<ul style="list-style-type: none"> • Dedicated specialized eye care services for complicated and referred cases • Training in general ophthalmology for ophthalmologists and medical graduates • Training of allied health personnel in ophthalmic services • Facilitation to Centre of Excellence in developing eye health services, advocacy and research • Support linkages development with district and subdistrict hospitals for referrals and medical education
DHQ/civil hospital	<ul style="list-style-type: none"> • Dedicated eye care unit with an ophthalmologist and two or three ophthalmic assistants • Diagnosis and treatment of common eye diseases • Receiving referrals from basic health units/rural health centres and THQ hospitals for treatment, and referring the complicated cases to tertiary units • Serve as trainer/technical expert for school eye health programmes in refractive errors and early detection of eye problems
THQ/subdistrict hospital	<ul style="list-style-type: none"> • Dedicate eye care unit to be established where staff is available • Diagnosis and treatment of common eye diseases • Receiving referrals from basic health units/rural health centres for treatment, and referring the complicated cases to DHQ hospitals or tertiary units
Rural health centre	<ul style="list-style-type: none"> • Dedicated vision screening and assessment • Provision of eye health promotion as part of primary health care • Early detection and identification of priority blinding conditions • Referrals of the cases to THQ/DHQ hospitals for prescription and treatment • Support in school eye health programmes especially for refractive errors
Basic health unit	<ul style="list-style-type: none"> • Provision of eye health promotion as part of primary health care • Early detection and identification of priority blinding conditions • Referrals of the cases to rural health centre for vision screening and THQ/DHQ hospitals for prescription and treatments • Support in school eye health programmes especially refractive errors

CME = continuing medical education; DHQ = district headquarter; THQ = tehsil/taluka headquarter.

national plan. The district programme not only demonstrated the feasibility of the approach even in the most difficult districts, but also revealed that

there was a demonstrable increase in the number of women attending the district eye units for treatment and eye surgery [22].

The combination of micro-surgical training of district ophthalmologists, upgradation of district eye care services and the establishment of more than 25

Table 6 Expanding access to eye health services through lady health workers (LHWs)

Province	Number of LHWs employed	People with eye problems examined by LHWs at the primary level		Percentage increase
		At start of programme – baseline in 2005	After five years – 2009	
Balochistan ^a	6 350	201 290	230 640	15
Khyber Pakhtunkhwa ^{a,b}	13 888	1 146 462	989 322	-14
Punjab	49 000	3 008 564	4 286 896	42
Sindh	22 621	1 325 357	1 680 880	27
Total	91 859	5 681 673	7 187 738	27

^aThe data here show a reduction. This is due to the heightened security situation and internal displacement of people. Thus, there was a very low level of training undertaken during this period. ^bFormerly North West Frontier province.

new eye hospitals in the non-government sector contributed to the doubling of cataract surgical output and increased uptake of services. The Layton Rahmatullah Benevolent Trust with its 15 eye hospitals in the country has contributed significantly to social protection.

The uptake of services in the upgraded district eye units corroborated closely with the increase in eye health treatments by LHWs delivering primary health care. The upgraded district eye units demonstrated a 279% increase in eye outpatient attendances and a 375% increase in eye surgeries performed at upgraded facilities.

In 1993 there were 1500 ophthalmologists. Based on data from the Pakistan Medical and Dental Council (personal communication 2010 – NK), there were an estimated 2000 or more ophthalmologists in the country by 2009. The strategy also developed the concept of an eye care team, with allied health professionals supporting ophthalmologists.

One of the key successes of the national plans for eye health has been the development of provincial and national centres for training an eye health workforce. To address the paucity of eye health professionals, the national committee for prevention of blindness prioritized the establishment of at least one training centre in each province. Two of the critical factors in this regard were the identification of eye health workforce development needs and the establishment of training institutions in the public sector in all four provinces. Similar efforts were made by the nongovernment sector in key geographical regions of the country illustrated by Al-Shifa Trust Eye Hospitals, operating as a WHO Collaborating Centre for prevention of blindness with its four eye care hospitals, and by Ibrahim Eye Hospital.

A community-based study was conducted to determine the prevalence of non-vision-impairing conditions

(NVICs) such as conjunctivitis, watering of the eye, presbyopia (difficulty in seeing near objects, e.g. during reading), etc. that add to the burden of disease that LHWs have to attend to as part of their work [23]. This study found a prevalence of 30.6% for NVICs. If presbyopia was excluded, NVICs then accounted for 14.6%. The main NVICs included infections such as conjunctivitis. The average complaint frequency per month/1000 population was found to be 55. This study demonstrated that there was a significant burden of simple eye diseases that could be treated at primary level. The national programme for prevention of blindness has liaised with LHWs' programmes to revise the curriculum of LHWs and strengthen the eye health component of primary health care.

A vital element of any national health plan is an effective health information system. The national health management information system (HMIS) team conducted a survey of eye health information needs and included eye health data in their national integrated report [24]. Eye health and disease indicators also appeared in a Gateway Paper on health indicators [25]. There is a need to develop an eye health information system as an integral part of the HMIS.

The financing of the three national plans has again been a combination of state and non-state partnership and is an example of conditional cofinancing. The first two national plans were almost solely funded by international partners. However, in 2005, after evaluating pilot programmes and demonstration approaches, the Federal Ministry of Health launched a five-year national plan for prevention of blindness worth US\$ 50 million. The Government now provides support to capital investment and deployment of trained human resources, and has committed to creating at least 2700 new posts for eye health workers. In support of this commitment, the international partners continue to provide technical and financial assistance for

training of the much needed eye health workforce.

Some of the key challenges facing the national eye health programme include sustaining cofinancing for the programme, ensuring creation of posts and deployment of eye care staff in all provinces, aligning eye health strategies with health systems and improving eye health information systems for planning interventions at various levels of health care. Furthermore, the referral pathway between the community level, first level health facilities and the sub-district level needs to be strengthened. The role of a rural health centre as a community eye health facility needs to be validated.

In developing countries, success of eye health can be achieved provided there is strong policy support, health interventions and programmes are integrated into the district health system and that they avail the support of the national primary health care community-based workforce. Such accomplishments are seen in Pakistan where a vertical programme combines horizontal health systems strengthening and requires creation of strong public-private partnerships and collaboration with professional bodies to monitor and guide progress. Pakistan's eye health programme has demonstrated that investment in, and alignment with, the six building blocks of health systems (service delivery, health workforce, medical products and technology, health information, health financing and governance) and supporting primary health care reform can be a model for other developing countries. Such hard-earned success in Pakistan needs to be sustained.

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