Review Article

Strategic Planning for Human Resource and Service Delivery for Eye Care Services Meeting the Challenge of Providing Equitable Eye Care in Pakistan

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Abstract

Introduction: At the time of independence, eye care services were provided by a few Christian missionary hospitals, Government hospitals and a few family owned Cottage hospitals. In 1950s and 60s, new eye departments were established in Karachi, Multan & Peshawar and also at Armed Forces' hospitals. In spite of this, no organized eye care services were available to 80% of the population. Prof Hugh Taylor, a WHO Consultant, conducted a survey in 1980 only to find out that there was a gross human resource mismatch in Pakistan. Another survey and situational analysis carried out in 1998 showed a lack of trained manpower at all levels with poorly organized services and infrastructure at district level and a total lack of eye care services at THQ hospitals, Rural Health Centres and Basic Health Units. There was no referral pathway from primary level onwards.

Methodology: The results of the situational analysis led to development of a new National Plan. The guiding document in this regard was Vision 2020 – "The Right to Sight" initiative. The main objectives were provision of latest technology for eye care, development of infrastructure, training and deployment of Human Resource (HR) at different levels of health careto provide eye care services to poor, at their door step. Provision of equipment and up gradation of infrastructure was planned for 7 centers of excellence, 20 tertiary teaching eye departments, 63 DHQ Hospitals and 147 THQ Hospitals across the country with creation of posts of ophthalmologists, subspecialists and allied vision sciences personnel at different levels of health care.

Results: The results of these interventions show that 37 medical institutions for eye care have produced more than 2300 ophthalmologists with 46 vitreo-retina (VR) specialists, 30 paediatric ophthalmologists and 92 community ophthalmologists. There are also 20 institutions training allied vision personnel that have trained 1568 optometrists, 50 orthoptists, 84 investigative oculists, 56 refractionists, 150 ophthalmic nurses & 1568 ophthalmic technicians. Eye units at 33 out of 47 tertiary hospitals and 94 out of 131 DHQ Hospitals have been upgraded while 96 out of 147 THQ Hospitals have new eye departments. Posts of ophthalmologists, and allied vision personnel have been created at different tiers of eye care. The impact has been 97% increase in OPD attendance, 94% more access by females, 82 % increase in surgeries and 78% increase in intraocular lens implants. At the present time, cataract surgeries are being done with no or minimal cost to the patients, trachoma is near eradication, blindness due to glaucoma and diabetes is being prevented due to early screening and low vision devices are being provided to people with vision impairment. Similarly, people with complicated vitreo-retinal disorders and children with eye disorders are being treated at sub specialty centres. In the next 5 years, it is planned to establish eye screening and service delivery centres at rural health centres (RHCs) with creation of posts and provision of equipment, training of nutrition supervisors and school teachers in vision screening & provision of portable eye examination kit (PEEK) to LHWs with referral to RHCs/THQs.

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Introduction

Pakistan gained Independence on 14th August, 1947. The occasion marked a mixture of joys and sorrows as the partition caused death, disease, destruction and displacement of some 20 million people[1]. Pakistan coped with these problems at that time but later faced other problems such as rising population, aging population, poverty, illiteracy, extremism, political instability and regional conflicts. These problems, particularly the triad of population explosion[2] (from 41 million in 1951 to more than 200 million in 2017), poverty[3] (24.3% of population is below poverty line) and illiteracy[4] (about 35% of total population), have affected the healthcare adversely. Eye care services have also not fared differently from overall picture.

At the time of independence, eye care services were provided by a few Christian missionary hospitals such as those established by Sir H. Holland & sons (Quetta and Shikarpur) and Dr. Novel Christy at Taxila; Government hospitals such as Mayo Hospital, Lahore and Civil Hospital Karachi, and a few family owned cottage hospitals. Later on, with establishment of new hospitals in 1950s and 60s, new eye departments were established in Karachi, Multan and Peshawar and also at Armed Forces' hospitals. In spite of this, no organized eye care services were available to 80% of the population.

1960s saw the establishment of new regulatory bodies, Institutions and organizations for healthcare such as Pakistan Medical & Dental Council (PM & DC), College of Physicians and Surgeons Pakistan (CPSP), Pakistan Medical Research Council (PMRC) and Jinnah Postgraduate Medical Center (JPMC), by the efforts of Lt. Gen (Retd.) W.A. Burki. Gen. Burki, along with Prof. Raja Mumtaz Quli Khan laid the foundation of Ophthalmological Society of Pakistan (OSP).[5]

The first wakeup call in this regard was given in 1980 by Prof Hugh Taylor, a WHO Consultant, who conducted a survey only to find out that there was a gross human resource mismatch in Pakistan. Only 80 ophthalmologists were available for a population of 100 million, Cataract was the major cause of blindness and 45 out of 64 districts had no services of an ophthalmologist.[6]

Another survey and situational analysis carried out in 1998 by the author AAK in the province of Punjab, found the conditions no better than those in rest of the country. According to that study, ophthalmic technology at public sector institutions in the province was found to be 10-15 years old with most of the equipment lying out of order. The human resource situation of Punjab at that time (in comparison with WHO standard requirements) is given in table 1.

There was no existence of sub-specialties like vitreo-retina, paediatric ophthalmology, cornea or Glauco-

Table 1: *Human Resource situation in 1998 Compared to Requirement according to who Standards*

Sr. NO.	CATEGORY	Situation In 1998-1999	WHO REQUIREMENT for following 5 years	FOR 80.0 M POP. (2005)	FOR 90.0 M POP. (2010)	FOR 108.0 M POP. (2020)	Per year requirement for following 5 yrs	Per year requirement for following 15 yrs
1.	Ophthalmologist	<1200	1/150,000	533	600	720	120	48
2	Paediatric ophthalmologist	None	1/10,000,000	8	9	11	2	1
3	Vitreo-retinal Specialist	2	1/10,000,000	8	9	11	2	1
4	Optometrists	None	1/175,000	457	514	617	103	41
5	Investigative Oculist	None	1/2,500,000	32	36	43	7	3
6	Orthoptist	None	1/2,500,000	32	36	43	7	3
7	Ophthalmic technician	None	1/150,000	533	600	720	120	48
8	PHC worker Trained in Primary Eye Care	None	1/5,000	16000	18000	21600	3600	1440

ma even at teaching hospitals. Many posts of district ophthalmologists were lying vacant. There was no post of optometrist / refractionist, orthoptist, ophthalmic technologist or ophthalmic nurse. Cataract surgical rate per district ophthalmologist was 300 per year, at the most. Camps for cataract surgery were held in districts but most of them were poorly organized and unsupervised. Eye department, post of ophthalmologists, refractionists / optometrists did not exist at tehsil headquarter (THQ) hospital level. No concept existed of eye care services at Rural Health Centres and Basic Health Units. Above all, there was no referral pathway from primary level onwards.

The 2nd National survey of Blindness & Visual Impairment was done in 2002. It revealed that the prevalence of blindness in the country was 0.9%[7]. The results of situational analysis of 1998 and Second National survey of Blindness and Vision Impairment as well as recognition of challenge to meet Millennium Development Goals (MDGs), in particularly poverty alleviation, paved the way for a new National Plan. The guiding document in this regard was Vision 2020 – "The Right to Sight" initiative. This initiative came into being in May 2003 when World Health Assembly (WHA) passed a resolution for the adoption of this initiative and Pakistan Government, along with other countries, became signatory to it, thus adopting Vision 2020 as the strategy for control of blindness.

Methodology

The objectives, targets and strategies for a National Plan for Eye Care were determined in a major planning meeting of National Committee for Eye Health (NCEH)[8]. The main objectives of National Programme for Prevention and Control of Blindness (NPPCB) and subsequent Devolved NPPCB and Provincial programmes for the prevention and control of blindness were provision of latest technology for eye care, development of infrastructure, training and deployment of human resource (HR) at different levels to ensure provision of facility of eye care at the door step of poor. The institutions; College of Ophthalmology and Allied Vision Sciences (COAVS) King Edward Medical University Lahore, Pakistan Institute of Community Ophthalmology (PICO) Peshawar, Prevention and Control of Blindness (PCB) Cell Karachi and Helpers Eye Hospital, Quetta; were given targets of training of different cadres, District Eye Care Programme and different disease control projects. International NGOs, mainly CBM, Germany, Fred Hollows Foundation, Australia, Sightsavers, UK and Brien Holden Vision Institute, Australia, were requested to collaborate and support in all areas on Public Private Partnership mode. Australia Aid, (AUS AID), Department for International Development, (DFID) and Standard Chartered Bank were approached by International NGOs (INGOs). World Health Organization (WHO) and International Agency for Prevention of Blindness (IAPB) were also requested for technical assistance.

Results

Because of strategic interventions across the country

Table 2: *Trained Ophthalmologists in Pakistan*

S #	Region	Ophthalmologists	Doctors Practicing Eye Surgery other than Degree holders)	VR Specialists (More than /Equal to 1 yr Degree Holders)	Paeds Specialists (More than /Equal to 1 yr Degree Holders)	Community Ophthalmologist	Training Institutions for Ophthalmologists-Public Sector
1	Punjab	1350	250	22	13	14	18
2	Sindh	600	130	10	8	33	14
3	KPK	271	60	10	6	36	2
4	Baluchistan	45	5	2	2	4	1
5	AJK	20	0	0	0	1	0
6	G-B	6	3	0	0	2	0
7	Islamabad	30	0	2	1	0	2
8	FATA	4	2	0	0	2	0
	Total	**2326**	**450**	**46**	**30**	**92**	**37**

Table 2: *Optometrists & Allied Vision Personnel till Dec 2016*

S #	Region	Optometrists (4 yr Hon Course)	Investigative Oculist /Ophth Technologists	Orthoptists	Refractionists (with 3 yr course)	Ophth Nurses	Ophth Tech.	Training Institutions for AVP
1	Punjab	442	40	40	30	73	364	6
2	Sindh	58	40	4	3	0	700	10
3	KPK	670	0	0	0	63	395	1
4	Baluchistan	34	0	0	6	14	90	1
5	AJK	25	0	1	3	0	8	1
6	G-B	20	1	1	0	0	7	0
7	Islamabad	18	3	4	6	0	2	1
8	FATA	13	0	0	8	0	2	0
	Total	**1680**	**84**	**50**	**56**	**150**	**1568**	**20**

through the institutions established, as mentioned above for the promotion of eye health and prevention of blindness activities, over 2 decades 46 Vitreo-retinal specialist, 30 Paediatric Ophthalmologists, 92 Community Ophthalmologists, 1680 Optometrists, 84 Ophthalmic Technologists, 50 Orthoptist, 150 Ophthalmic nurses, 1568 ophthalmic technicians have been produced in the country (Table 2 & 3). In addition more than 80,000 Lady Health workers (LHWs) were trained in primary eye care and module on primary eye care module was made part of LHWs curriculum (Table 7).

New posts of ophthalmologists, optometrist, orthoptist, ophthalmic technologists, ophthalmic technician, vitreo-retinal specialist, pediatric ophthalmologist and community ophthalmologists were created at different levels of health care.

District Comprehensive Eye Care Programme

In collaboration with INGOs eye departments of 33 tertiary and 94 District Head Quarter hospitals were upgraded with latest equipment and new eye depart-ments were established in 96 Tehsil Head Quarter hospitals. Infrastructural development was done for separate OPD and Operation theater rooms, District Ophthalmologists were given refresher courses and after up gradation eye week was celebrated at each DHQ hospital to build the confidence of people on the eye units of district and Tehsil hospitals. Regular monitoring of the up graded unit remained an essential component of the programme (Table 4,5,6)

Table 4: *Status of Eye Units at Tertiary Level, Government of Pakistan*

Teaching & Training Hospitals (TTH)	Total as per PC1	Upgraded (Equipment Supplied)
Punjab	18	18
Sindh	11	4
KPK	9	6
Baluchistan	4	2
AJK	3	1
G-B	0	0
Islamabad	2	2
Total	**47**	**33**

Table 5: *Status of Eye Units at District Level Government of Pakistan 2001 - 2016*

DHQs Level Hospitals	Total as per PC1	Upgraded (Equipment Supplied)	With Ophthalmologist posted
Punjab	27	27	27 (+13) = 40
Sindh	38	26	28 (+6) = 34
KPK	22	18	20
Baluchistan	32	16	13
AJK	5	3	3
G-B	7	4	3
Islamabad	-	-	-
Total	**131**	**94**	**113**

Table 6 *Status of Eye Units at Sub-District Level, Govt. of Pakistan till Dec 2016*

THQs Hospitals	Total as per PC1	Upgraded (Equipment Supplied)	With Ophthalmologist posted
Punjab	103	79	47
Sindh	23	8	12
KPK	17	8	6
Baluchistan	0	0	0
AJK	0	0	0
G-B	4	1	1
Islamabad	-	-	-
Total	**147**	**96**	**66**

Table 7: *PEC Training Done (Integration of PEC into PHC)*

S #	Region	Doctors trained in PEC including Master trainers	LHSs + LHWs trained in PEC (2-Day Standard training with PEC Kits)		Refreshers given to LHSs + LHWs (1-Day training with PEC/ IEC)	
			LHS	LHW	LHS	LHW
1	Punjab	130	4997	33688	1108	14683
2	Sindh	103	2665	10058		
3	KPK	72	773	4972	PEC Conducted through other partners	
4	Baluchistan	113	238	2541		
5	AJK	PEC Conducted through other partners				
6	G-B					
7	Islamabad					
8	FATA					
	Total	418	8673	51259	1108	14683

Impact of interventions in Punjab

Impact of all strategies, Human resource development, District Comprehensive Eye Care Programme (DCECP) and Disease control projects were analysed in Punjab where all the activities/interventions were done by College of Ophthalmology and Allied Vision Sciences (COAVS), KEMU/Mayo hospital Lahore.

Impact of Human Resource Development in Punjab

Analysis has revealed that due to planned human resource development, COAVS in 2 decades has produced 14 vitreo-retinal specialist, 10 paediatric ophthalmologists, 08 community ophthalmologists, 520 optometrists, 44 ophthalmic technologists, 44 orthoptist, 102 ophthalmic nurses, 358 ophthalmic technicians. in response to advocacy the government of punjab has created posts of optometrist, orthoptist, ophthalmic technologists, ophthalmic technicians, ophthalmogists, vitreo-retinal specialists, pediatric ophthalmologists & community ophthalmologists at different levels of health care. The analysis further revealed that 60 % of newly created posts have been filled by the human resource, trained by COAVS. Interesting fact found is that almost all the human resource trained is employed either in public or private sector (Tables 8 & 9).

Table 8: *Situation of HR in Punjab 1998 vs 2016*

Sr. NO	Category	Situation In 1998	Situation in 2016
1.	Ophthalmologist	<300	1350
2	Paediatric ophthalmologist	None	10
3	Vitreo-retina specialist	None	14
4	Optometrist	None	520
5	Investigative Oculist	None	44
6	Orthoptist	None	44
7	PHC worker Trained in Primary Eye Care	None	> 70,000 LHWs have been trained in PEC
8	Ophthalmic technician	None	358
9	Ophthalmic Nurses	None	102h

Table 9: *Posts Created Eye Health in Punjab Since 1998*

Name of Post	Sanctioned Post	Created At			Occupancy	
		TTH	DHQ	THQ	Occupied	Vacant
Ophthalmologist at THQ Level	71	-	-	71	22	49
Optometrist	12	12	-	-	10	2
Orthoptist	12	12	-	-	9	3
Investigative Oculist	12	12	-	-	9	3
Refractionist	147	40	36	71	124	23
Ophthalmic Technician	326	40	144	142	182	144
Community Ophthalmologist	13	13	-	-	1	12
Vitreo- Retina Specialist	2	2	-	-	2	-
Paediatric Ophthalmologist	2	2	-	-	2	-
Galucoma Specialist	2	2	-	-	-	2
Corneal Specialist	2	2	-	-	-	2
Total	601	137	180	284	360	240

Impact of district comprehensive eye care programme (DCECP) in Punjab

Analysis has revealed that provision of eye care services at District and sub district (Tehsil) level has resulted in 97.05 % increase in OPD attendance, 94.08 % increased attendance by females, 111.4 % increased attendance by children, 81.79 % increase in number of surgeries & 78.6 % increase in Intraocular Lens implantation (Fig 1, 2, 3, 4, 5) and increase of cataract surgical rate from 300 in 1998 to 5600 per ophthalmologist per year (Fig 6).

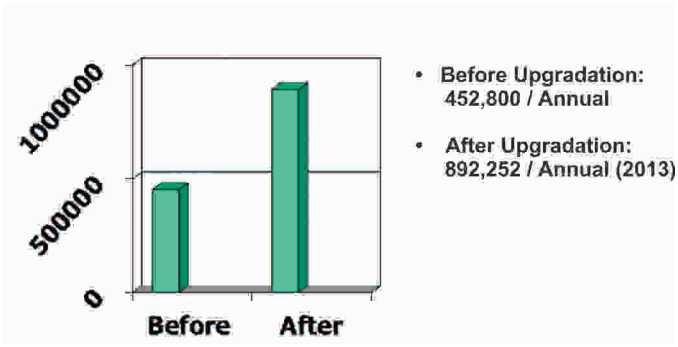

Fig:1 *Overall improvement in OPD attendance: 97.05%*

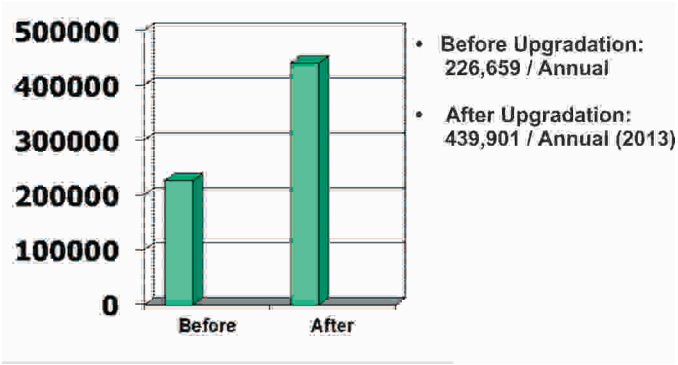

Fig:2 *Increased access by the females : 94.08%*

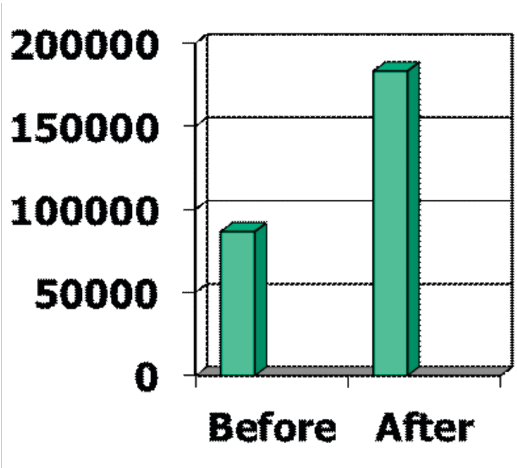

Fig:3 *Increased Access by the Children : 111.4 %*

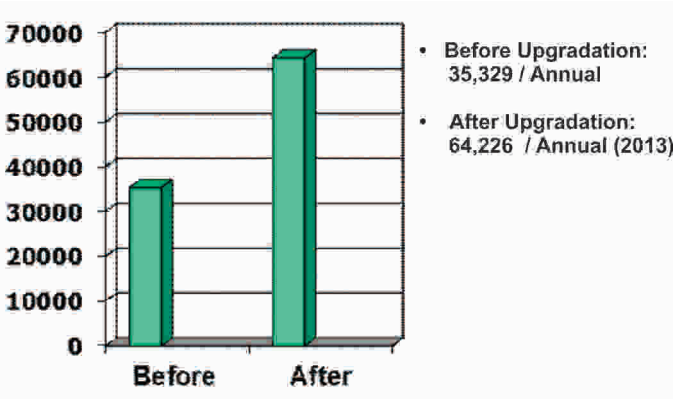

Fig: 4 *Increase in number of surgeries : 81.79%*

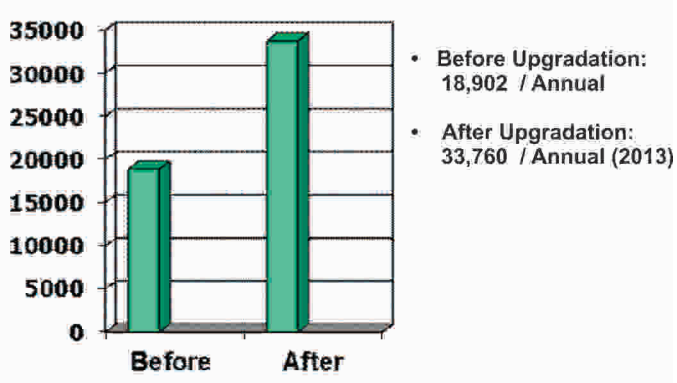

Fig: 5 *More Intraocular Lens Implantation : 78.6%*

Impact of Disease Control in Punjab

- Cataract surgeries are being done either free of cost or at a very affordable cost at District and THQ level
- Trachoma is near eradication
- Children are being screened by the teachers for eye ailment
- Diabetes related blindness is prevented because

Table 10: *Disease Pattern*

S/ No	Disease	Patients Before up-gradation	Patients In 2013	% increase
1	Refractive Error	138106	306862	122
2	Cataract	66247	152584	130
3	Conjunctivitis	82582	143638	74
4	Glaucoma	22968	33891	47
5	Corneal Opacity	16850	28944	72
6	Diabetic Retinopathy	16082	27819	73
7	Injuries	10016	23548	135
8	Trachoma	9277	17831	92
9	Squint	9551	15338	61
10	Low Vision	6241	14129	126
11	VR Cases	3838	8915	132
12	Miscellaneous	74349	137316	85

of early screening

- Blindness due to Glaucoma is being prevented due to early detection/screening
- Patients with Low Vision are being provided with low vision devices at district level

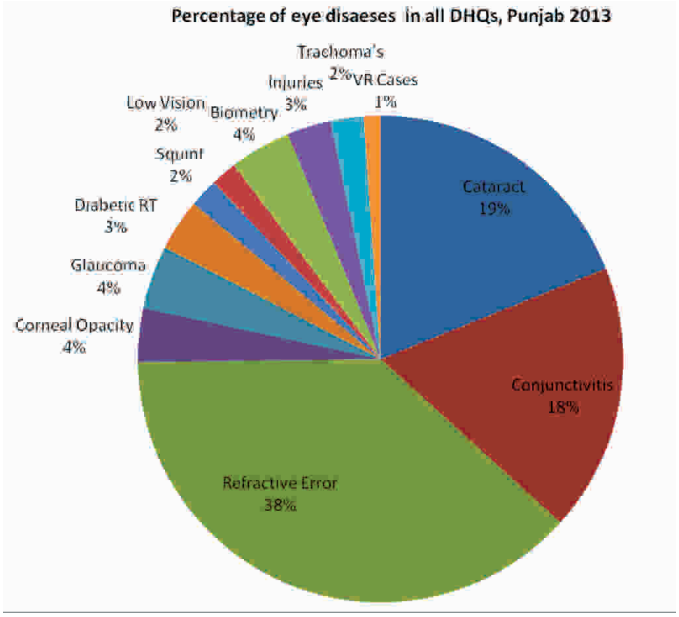

Fig:6 *Disease Break-up*

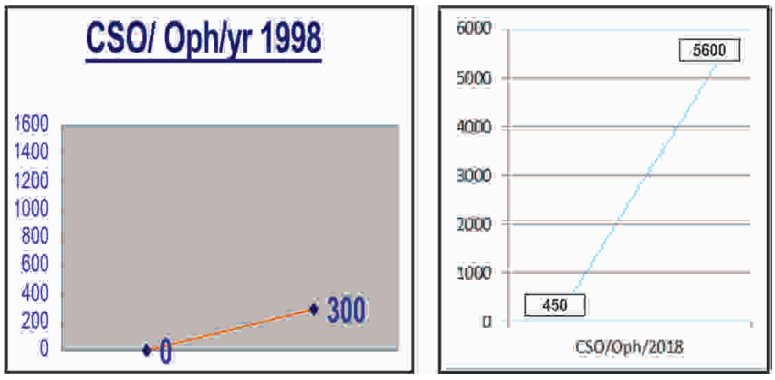

Fig:7 *Cataract Surgical Output / Ophthalmologist/ Year*

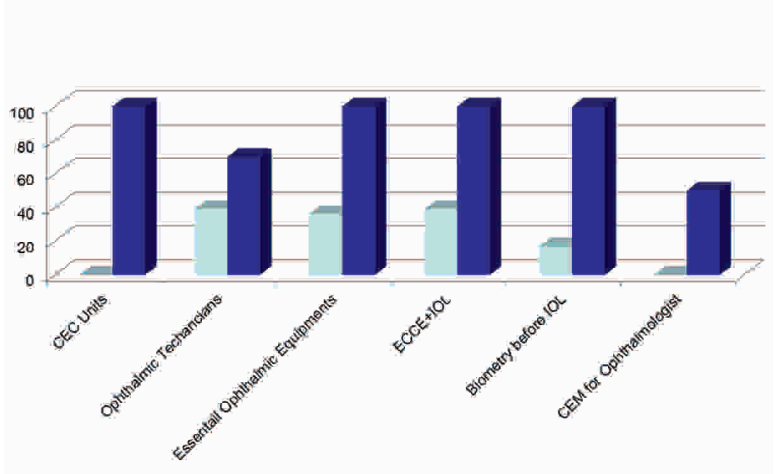

Fig: 8 *Ophthalmic Resources 1998 vs 2018*

Impact of Sub-Specialty Development

Patients with diseases of vitreo-retina and paediatric ophthalmology are being handled at 16 centers across the country.

Table 11: *Number of Sub-Specialty Units in Pakistan*

Province	Sub-specialty centres
Punjab	**6**
KPK	**5**
Sindh	**4**
Baluchistan	**1**

Discussion

The concept of combating blindness with launch of district and sub-district level eye care services has proven to be an effective strategy in Pakistan. Promotion of improved district-level eye-care services with adequate numbers of trained eye care professionals, infrastructure development, sufficient supply of equipment, technology, established referral networks in equitable and sustainable manner has enhanced community coverage in terms of clinical and surgical output in upgraded and newly established eye care units of Pakistan. Disease control measured through district eye care services at district and sub-district level hospitals is found to be an effective approach to combat avoidable blindness contributing to better educational and economicopportunities and achieving Vision 2020 goals of reducing marginalization and poverty.[9]

Introduction of VISION 2020 has resulted in improved treatment statistics in India and Ecuador.[10,11]Similarly, in Pakistan the clinical output with overall increase in OPD attendance, increased access by women, increased access by children, increase in total surgeries and increased intraocular lens implantation rate are due to the successful intervention of up-gradation of eye care units of existing secondary health care hospitals at district and tehsil level hospitals. In fact, establishment of eye care units at THQ hospitals has provided an extra coverage and support, thereby, alleviating the ever-increasing burden on DHQ hospitals due to the trickledown effect of services. THQ hospitals took over up to 40 % burden of overall OPD attendance, 30 % of

total surgeries performed as well as cataract surgeries done at up-graded eye units of secondary level hospitals of Punjab. It has also been observed that refractive error, conjunctivitis, cataract, diabetic retinopathy/ vitreo-retina diseases were the most reported eye diseases at secondary level hospitals.

It is evidenced through this study that up gradation of services at district and establishment of eye care services at sub-district eye care units is vital to provide continuous quality eye care services at door-steps, easing access especially for the marginalized section of our society, women & children, coping increasing number of patients due to population growth, alleviating burden on tertiary care hospital and finally combating the avoidable blindness that ultimately complements improved socio-economic status. Collectively, this is contributing to achievement of Millennium Development Goals (now Sustainable Development Goals). All this has been achieved due to a partnership where International NGOs have contributed a lot and governments have recognized their duty of providing equitable eye care to all sections of society in a strategically planned way.

Way Forward for next 5 years to trickle down services to primary level

- Establishment of eye screening and service delivery centers at rural health centers by creation of posts of optometrists and provision of equipment
- Training of nutrition supervisors and school teachers in vision screening
- Provision of PEEK (Portable Eye Examination Kit) to Lady Health Workers with referral to Rural Health Centres /Tehsil Head Quarter hospitals.

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1. Government of Pakistan, Ministry of NHSR & C, Islamabad
2. Specialized Health Care and Medical Education Dept, Government of Punjab, Pakistan
3. World Health Organization
4. International Agency for Prevention of Blindness
5. CBM Germany
6. Fred Hollows Foundation
7. Brien Holden Vision Institute
8. Standard Chartered Bank

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