• Investigation •

Task sharing: situation analysis about capacity and resources for management of diabetic retinopathy in Pakistan

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Abstract

• AIM: To assess the capacity and resources of eye care facilities, using the WHO Health Systems Framework, to manage diabetic retinopathy (DR) through task sharing.

• METHODS: Using purposive sampling, four participants (administrators) from four selected hospitals in two provinces in Pakistan were recruited for this cross-sectional study. A survey, to assess the capacity and resources of the selected eye care facilities for the feasibility to adopt task sharing in management of DR to prevent vision loss, was emailed to participants who were asked to complete. Responses to open-ended questions were entered into a Microsoft Excel spread sheet and inductive approach was applied for analysis.

• RESULTS: All the surveyed eye care facilities offer eye care services for people with diabetes and DR. All surveyed eye care facilities have a shortage in the number of human resources across all cadres. Optometrists and mid-level eye care workers did not have active roles in DR screening and management in all four hospitals. All the hospitals surveyed did not have a computerized record management system for patients who visit ophthalmologists for eye examinations. Equipment for detection and management of DR were short in number and main users were ophthalmologists. There was no policy for population-based screening program for detection of DR in any of the surveyed hospitals.

• CONCLUSION: A system-based approach to manage DR is needed. The capacity of eye care facilities and the potential to improve access of people with diabetes to eye care services can be enhanced through implementation of task sharing.

• KEYWORDS: task sharing; capacity; diabetes; diabetic retinopathy; Pakistan

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INTRODUCTION

The prevalence of diabetes and associated retinopathy is increasing rapidly in low resource countries. A systematic review of diabetic retinopathy (DR) reported the prevalence of any type of DR 30.2% and 31.6% among people with diabetes in Africa[1]. The prevalence of DR among people with type-2 diabetes in Pakistan is reported 56.9%[2]. A situation analysis for management of DR in 11 cities in India reported that 45% of people with diabetes only visit eye clinics to have their first eye examination after loss of vision[3]. These data demonstrate a considerable delay in early detection and timely treatment of DR.

Availability of a trained health workforce is one of the key determinants to the development of a sustainable health care system to provide quality health care delivery[4]. The shortage of ophthalmologists in many low resource countries is a major barrier to regular eye examinations for people with diabetes, particularly in remote areas[5]. The growing number of people with diabetes and vision loss due to DR further increases the burden on health care systems which limit the access of people with diabetes and DR to eye care services, specifically in low resource countries.

Task sharing, as suggested in the literature, could expand the workforce roles to support ophthalmologists in eye care service delivery for people with diabetes[6]. Literature reported that DR screening by non-ophthalmologists eye and health care workers in the community is both feasible and acceptable[7-10].

A situation analysis in Cambodia found that effective collaboration between Caritas Takeo Eye Hospital (CTEH), Kiri Vong District Referral Hospital Vision Centre, Commune Health Centres and non-government organizations (NGOs) (Mo Po Tsyo and Cambodian Development Mission for Disability)

through involvement of mid-level eye care workers in outreach activities helped to extend eye care services to communities even with limited number of ophthalmologists[11]. This study aimed to assess the capacity and resources of eye care facilities, using the World Health Organization (WHO) Health Systems Framework, to manage DR through task sharing in Pakistan.

SUBJECTS AND METHODS

Ethical Approval Appointments for collection of the survey were made with the participants through phone calls. Signed informed consent forms were obtained prior to collection of the survey. On collecting the survey, I reviewed the responses to the questions in the survey and the participants were asked to complete any unanswered questions. Ethics approval was obtained from the Human Research and Ethics Committee of the Royal Victorian Eye and Ear Hospital, Australia.

A cross-sectional survey entitled 'Field survey for assessing the capacity of eye care facilities for task sharing in management of DR in Pakistan' was conducted in the Departments of Ophthalmology in four purposively selected hospitals in two provinces in Pakistan. Head of the Department of Ophthalmology of each of the four selected hospitals, who already had participated in the first part of this research[6], was contacted by email and phone to seek their agreement to participate in this survey. The nature and possible consequences of the study were explained. Eye care facilities included in this survey were: 1) Al-Shifa Trust Eye Hospital, Rawalpindi, designated as a centre of excellence in eye care by the government of Pakistan. Al-Shifa Trust Eye Hospital is an NGO and the largest eye hospital in Pakistan situated in the capital city of the country, Islamabad which serves patients mostly from Punjab province but also from the whole country; 2) Department of Ophthalmology at Mayo Hospital Lahore, designated as a centre of excellence in eye care delivery by the government of Pakistan for Punjab province; 3) Department of Ophthalmology at Hayatabad Medical Complex (HMC), designated as a centre of excellence in eye care delivery by the government of Pakistan for Khyber Pakhtunkhwa province; 4) Department of Ophthalmology at Khyber Teaching Hospital (KTH) Peshawar, a tertiary eye care hospital in Khyber Pakhtunkhwa province.

The purpose of the survey was to assess the capacity of the selected eye care facilities for the feasibility to adopt task sharing in eye care delivery to people with diabetes for early detection and timely management of DR to prevent vision loss. The survey was developed on the basis of the WHO Health Systems Framework. The WHO Health Systems Framework is based on six clearly defined building blocks: service delivery; human resources for health; health information systems; medical products, vaccines and technologies; finances; and leadership and governance[12].

The survey consisted of two sections. The first section obtained demographic data. In the second section of the survey, the response format used both closed and open-ended questions to obtain quantifiable and in-depth results. The survey included topics: eye care service delivery in managing DR. This included a spectrum of eye care service provision for people with diabetes such as diagnosis, treatment, referral, follow-up, outreach services, health education about diabetes and DR, barriers to the delivery of eye care services for people with diabetes. This also included linkages and referral pathways for people with diabetes and DR between eye and health care services providers, public hospitals and NGOs; Health workforce: roles and tasks performed by the eye care workforce, training of the workforce regarding screening and management of DR and continuing medical education; Health information systems and management. This part of the survey included patients' records if diabetes and DR are recorded, mechanism for follow-up for people with diabetes and methods for patient record collection and storage; Health technologies and infrastructure. This part of the survey explored availability of the equipment to perform eye examinations for people with diabetes and task sharing in management of patients with DR; Health financing and sustainability. Financing eye care services provided to the patients with DR such as who pays for eye care services (patient, government, NGO); Governance and leadership. The role and involvement of key stakeholders in overseeing DR management was investigated in this part of the survey.

The survey was sent to the Heads of the Department of Ophthalmology in the selected hospitals *via* email who were asked to complete the survey within two weeks. A reminder was sent one week after the first email.

Quantitative data were entered into a database in SPSS version 19 (IBM Corp, Armonk, NY, USA) to analyse quantitative data. For analysis of responses to open-ended questions text was entered into a Microsoft Excel spread sheet. Data were analysed and summarised. Tables were constructed to display results.

RESULTS

All of the four participants from the selected eye care facilities responded to the survey. Findings from the survey were summarized on the basis of the six pillars of the WHO Health Systems Framework.

Service Delivery Relate to Diabetic Retinopathy All of the four participants reported that all the surveyed eye care facilities offer secondary and tertiary eye care services for people with diabetes and DR. Three participants stated that their respective eye care facilities have DR screening program in targeted areas in a few districts which are sponsored by NGOs. There was no mechanism for reaching people with

Table 1 Comparison of eye care service delivery to people with diabetes in the surveyed hospitals in Pakistan

Activities	Al-Shifa	Mayo Hospital	HMC	KTH
Availability of eye care services for people with DR	Yes	Yes	Yes	Yes
Availability of low vision/rehabilitation services for people with DR	Yes	Yes	Yes	Yes
Awareness program regarding DR in the community	No	No	No	No
Health education to people with diabetes and DR within department of ophthalmology	Yes	Yes	Yes	Yes
Providers of health education to people with diabetes and DR within department of ophthalmology	Ophthalmologist	Diabetes educator	Ophthalmologist	Ophthalmologist
Networking and linkages with other health care facilities for eye care for people with diabetes	No	Only within hospital	Only within hospital	Only within hospital
Community screening for detection of DR	NGO sponsored community screening in targeted areas	NGO sponsored community screening in targeted areas	NGO sponsored community screening in targeted areas	No
Collaboration of INGOs within the facility in the care of people with DR	Yes but limited	Yes but limited	Yes but limited	No

Al-Shifa: Al-Shifa Trust Eye Hospital; HMC: Hayatabad Medical Complex; KTH: Khyber Teaching Hospital; DR: Diabetic retinopathy; NGO: Non-government organization; INGO: International non-government organization.

Table 2 Cadres available for eye care services in each of the four sites

Cadre	Al-Shifa	Mayo Hospital	HMC	KTH	Total
Ophthalmologists	20	13	8	8	49
Optometrists	19	6	5	1	31
Orthoptists	2	4	1	1	8
Refractionists	4	4	0	1	9
Ophthalmic technicians	0	6	2	2	10

Al-Shifa: Al-Shifa Trust Eye Hospital; HMC: Hayatabad Medical Complex; KTH: Khyber Teaching Hospital.

diabetes in the community with the risk of developing DR to ensure early detection and timely management of DR to prevent vision loss. All participants mentioned that people with high risks of developing DR during their check-ups for diabetes in the Departments of Endocrinology or Medicines in various hospitals are referred to the eye care facilities and those not identified in the early stages, often get missed until vision problems are noticed by the patient. A comparison of the eye care service delivery for people with diabetes in the surveyed hospitals is presented in Table 1.

Human Resources for Health Relate to Diabetic Retinopathy All participants indicated inadequacy of human resources across all cadres including ophthalmologists, optometrists and mid-level eye care workers in their respective hospitals. Participant from Al-Shifa Trust Eye Hospital, the largest eye hospital in the country, reported that amongst the 20 ophthalmologists at Al-Shifa for a population of five million, only four ophthalmologists are available to treat people with retinal diseases including eye care delivery to people with diabetes. The roles of optometrists and refractionists were limited to visual acuity assessment, refraction, contact lens fitting and low vision assessment in all four hospitals. The available workforce for eye care delivery in each of the four eye care facilities is shown in Table 2.

All four surveyed hospitals have four year ophthalmology residency programs for doctors, while three hospitals have graduate programs for optometry and other cadres in eye care delivery. Education structure for eye care workforce in Pakistan is shown in Table 3. Participants stated that they do not have in-service continued medical education for the mid-level eye care workers in the surveyed hospitals.

Health Information and Management System Relate to Diabetic Retinopathy Participants from all the surveyed hospitals stated that they did not have an electronic medical records network and electronic referral management system for people with diabetes who visit ophthalmologists for eye examinations. All participants indicated that patient who visits ophthalmologist for an eye examination in the respective hospitals takes a slip of paper, called outpatient department (OPD) slip, with his name printed on it from the receptionist. After eye examination, ophthalmologists note the treatment given and prescribe medicines on that slip and give it back to the patient. Patients, who need follow-up, were either informed verbally by the ophthalmologist along with a note written by the ophthalmologist on the OPD slip. Other than this, no properly designed and technology-oriented follow-up system was found in the surveyed hospitals.

All participants reported that patient records were limited only to patients who were admitted in wards for surgical procedures. These records included demographic details, type of diabetes and related investigations, severity of DR, treatment for DR and required procedures such as vitreoretinal surgery.

Table 3 Educational structure for eye care workforce in Pakistan

Cadre name	Basic entrance requirement	Duration of basic pre-service education	Clinical internship duration	Name of degree/ diploma	What aspects regarding diabetes and DR are included in course curriculum?
Doctor	12 years of schooling	5y	1y	MBBS	Diagnosis and management of diabetes
Ophthalmologist	MBBS	2.5y	2.5y	FCPS	Diagnosis and management of DR
Optometrist	12 years of schooling	4y	1y	Bachelor of Optometry	Screening and diagnosis of DR
Orthoptist	12 years of schooling	4y	1y	Bachelor of Orthoptics	Not included
Refractionist	12 years of schooling	2y	1y	Refractionist	Introduction to diabetes and DR
Ophthalmic nurse	General nursing	1y	6mo	Graduate Ophthalmic Nurse	Introduction to diabetes and DR
Ophthalmic technician	12 years of schooling	1y	6mo	Diploma	Introduction to diabetes and DR

MBBS: Bachelor of medicines, bachelor of surgery; FCPS: Fellowship of college of physicians and surgeons Pakistan; DR: Diabetic retinopathy.

Table 4 Comparison of health financing relate to DR in the four hospitals of Pakistan

Activities	Al-Shifa	Mayo Hospital	HMC	KTH
Cost for medical management for people with DR	Hospital (for poor patients only)	Hospital	Patients	Patients
Cost for surgical management for people with DR	Hospital (for poor patients only)	Hospital	Patients plus hospital	Patients plus hospital
Infrastructure/ equipment maintenance	NGO/donation	Government	Government	Government
Sources of funding	NGO/donation	Government	Government	Government

Al-Shifa: Al-Shifa Trust Eye Hospital; HMC: Hayatabad Medical Complex; KTH: Khyber Teaching Hospital; DR: Diabetic retinopathy; NGO: Non-government organization.

Availability of Technology Relate to Diabetic Retinopathy Basic equipment essential for assessment of visual functions and diagnostic procedures such as visual field, indirect ophthalmoscope, slit-lamp bio-microscope and fluorescein fundus angiography (FFA) were available in all surveyed hospitals. Similarly equipment for laser procedures such as the Argon laser and Nd:YAG Laser was also available in all surveyed hospitals. Three hospitals had optical coherence tomography (OCT) for imaging the retina. One participant stated that they do not have vitrectomy machine in their hospital. All participants stated that considering increase in numbers of people with DR, the numbers of equipment are not adequate in their respective hospitals.

All participants reported that the users of the available technology for DR detection and management were mostly ophthalmologists with a very little involvement other mid-level eye care workers in procedures such as FFA and OCT. In all the surveyed hospitals indirect ophthalmoscopy was carried out by ophthalmologists to detect DR.

Health Financing Relate to Diabetic Retinopathy Except Al-Shifa Trust Eye Hospital, all the surveyed hospitals are in public sector and Government of Pakistan finance the operating cost. Participant from the Mayo Hospital reported that government funds were used for subsidizing the cost of treatment to all patients who visit Department of Ophthalmology for eye care. However, for treatment like anti-VEGF the patients have to pay. In HMC and KTH government funding is available only for treatment of patients admitted in hospitals. A comparison of health financing related to DR in the four surveyed hospitals is given in Table 4. All participants reported that the lack of funding was the primary reason for the lack of community screening for detection of DR in people with diabetes.

Leadership/Governance Relate to Diabetic Retinopathy During the survey period, there was no policy for population-based screening programme for detection of DR in any of the surveyed hospitals. A participant from one hospital reported the involvement and interest of board members and directors in the leadership team of that hospital with respect to screening for DR in the community. That screening program was launched in collaboration with an International NGO in targeted areas in a few districts.

Amongst the four surveyed hospitals, two hospitals have developed a mechanism for routine referral of patients with diabetes to ophthalmology department who attend medicine or endocrinology departments in the same hospital. An optometrist was placed in the endocrinology department in the respective hospital who uses a non-mydriatic retinal camera and makes referrals to ophthalmologists.

One hospital adopted and implemented Early Treatment Diabetic Retinopathy Study (ETDRS) guidelines for quality management. None of the participants mentioned about the International Council of Ophthalmology guidelines for DR in low resource countries which were released in February 2014.

DISCUSSION

Finding from this research showed that eye care services for people with diabetes were available in the surveyed eye care facilities in Pakistan. Eye care services were mainly provided by ophthalmologists and there is a shortage in the number of ophthalmologists. For many eye care facilities in Pakistan,

government funding is the only source to meet operating costs which is insufficient as evident from this research. Results from this study showed that there was no policy for a mass population-based DR screening program for people with diabetes as reported in literature[13].

The service delivery model can influence the access that people with diabetes have to eye care facilities. In Pakistan, it was found that overall linkages with other health and eye care facilities and the referral and follow-up system for people with diabetes is not well organized and systematic. Such linkages are reported as pivotal in ensuring prevention of vision loss due to DR in people with diabetes[6,14].

Although there is a shortage in the health care workforce in Pakistan, the work distribution among eye care workers has not been well managed. The Cambodian health system incorporated task sharing across institutions as well as amongst the workforce within an institution that improved access to eye care services instead of a very limited number of ophthalmologists[11]. Similarly, improvement in access to eye care services has been achieved through task sharing such as development of vision centres and secondary centres in the underserved areas in the LV Prasad Eye Institute (LVPEI) and Aravind Eye Hospital (AEH) models in India[15-16]. These findings suggested that support and facilitation from the government and NGOs is needed in implementation of task sharing to further improve the eye care systems in Pakistan.

Health information management system, record keeping, patient referral system and re-call for follow-up eye examination are key factors in effective service delivery for people with diabetes and DR[17-18] which were not well organized in the surveyed hospitals in Pakistan. Examples from Cambodia showed that a well-structured and networked computerised referral system is in place that maintains records of patients about who are referred to, from which different interlinked facilities they come and what management plan is decided[11]. This allows these facilities to keep track of patients being treated and the ones who need to be recalled for a follow-up examination. Pakistan's DR information management system is another area that needs significant attention and support in order to meet the WHO goals.

Though the innovation in technology, such as non-mydriatic cameras, provided an opportunity to utilize mid-level eye care workers and facilitate task sharing in management of DR[19]. In Pakistan, the roles of optometrists and mid-level eye care workers were found to be limited to visual acuity assessment, refraction, contact lens fitting and low vision assessment in all the four hospitals. Optometrists and mid-level eye care workers can be adopted for screening to improve screening coverage[15-16]. Through improving skills of optometrists, they can perform well in DR screening through fundus examinations where modern technology is not affordable[20-21].

One of the barriers identified in Pakistan for DR was the cost of the screening and treatment for people with DR. Taking the example of LVPEI and AEH, task sharing has allowed the hospitals to utilize services of optometrists and mid-level eye care workers to reduce the demand of ophthalmologists for primary level tasks[22]. By shifting tasks to trained mid-level workers, these organisations generate income, reduce operating costs, increase availability of staff and making these models sustainable. Similarly in the LVPEI model, eye examination at VCs is free of charge and income from spectacle sales are used to sustain the operational cost of the Vision Centres[15].

This research highlights the need and importance of adopting a systems thinking approach in designing, implementing and evaluating health policies that are suited to the better outcomes of patients and eye and health care workers.

In conclusion, in Pakistan, reconfiguration of health care system including adopting guidelines and protocols for population-based DR screening and referral procedures for people with DR is needed in order to provide timely eye care services to people with diabetes everywhere. The capacity of eye care facilities and the potential to improve access of people with diabetes to eye care services can be enhanced through implementation of task sharing.

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