

# EVALUATION OF EYE HEALTH FACILITIES FOR DIABETIC PATIENTS IN DERA GHAZI KHAN

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## ABSTRACT

**PURPOSE:** To evaluate the eye health facilities for diabetic patients in two tehsils of district Dera Ghazi Khan.

**METHODS:** This was a descriptive cross sectional study involving the use of a questionnaire to assess the availability of eye care resources for diabetic retinopathy in Dera Ghazi Khan. Eye care professionals (n=20) were asked to fill the questionnaire. Participants provided information about the availability of resources for the comprehensive eye examination, management and treatment of diabetic retinopathy.

**RESULTS:** 90% of the facilities were clustered in the main city of district DG Khan. Eighty percent of the diagnostic equipment and clinical services were found in the main THQ and some private centers. Three quarters of the centers had optometrists for the basic screening of DR patients and medical counselors for the counseling of DR patients. Ninety five percent had facility to check the blood sugar level. Seventy percent had indirect ophthalmoscope, fifteen percent had OCT and only 10% have FFA. There were no single HRT through the whole district. Sixty five percent had argon laser. Only 15% of the total centers had endo laser and RD surgery. Sophisticated eye care provision was done by the teaching hospitals of city.

**CONCLUSION:** The eye care facilities for diabetic patients are mainly embedded in the main city DG Khan. The DHQs of Taunsa and Kot Chatta are not adequately facilitated with the necessary diagnostic equipment i.e. FFA and OCT. Several aspects of health system need to be improved. The coordination should be strengthened for an efficient holistic management of diabetes mellitus making diabetes care and DR services more accessible to people.

**KEYWORDS:** Diabetes mellitus, Diabetic retinopathy, Infrastructure, Service delivery.

## INTRODUCTION

Diabetes mellitus (DM) is a metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Persistent hyperglycemia causes dysfunction and failure of various organs especially the eyes, kidneys and heart.<sup>1</sup> The main cause of blindness in the world is diabetic eye disease.<sup>2</sup> Drifting from the stereotypical concept that diabetes is more prevalent in advanced and developed countries, now it is manifested that 80 % of patients with diabetes are living in the developing and low income countries. DM is the most common cause of legal blindness occurred by diabetic retinopathy

in working age group (20-64) years now becoming a greatest health challenge of 21<sup>st</sup> century.<sup>3</sup>

The rapid increase in the prevalence of diabetes has become one of the most alarming public health issues of the 21<sup>st</sup> century. It was estimated that from 2010 to 2030, prevalence of diabetes could increase up to 67% in these countries.<sup>4</sup>

One of the major vascular complications of diabetes is diabetic retinopathy (DR), damaging the vasculature of retina and has been become as the predominant cause of blindness in the working age group population.<sup>5</sup> The prevalence rates of diabetic

microvascular complications due to hyperglycemia such as retinopathy, nephropathy, and neuropathy are 15.8%, 31.0% and 48.7% respectively in Pakistan.<sup>6</sup> Chronic diabetes and hypertension are predisposing factors for the diabetic retinopathy.<sup>7</sup> DR has long been recognized as a microvascular disease. Hyperglycemia plays a vital role in the pathogenesis of retinal vasculature.<sup>8</sup> Pakistan has been ranked as 6<sup>th</sup> among the countries which have highest burden of diabetes.<sup>9</sup> Accurate population based data on the prevalence of diabetic retinopathy and visual loss caused by diabetic retinopathy is not available in Pakistan. It is however reported that prevalence of diabetic retinopathy among type 2 diabetic in Pakistan could be 56.9%.<sup>10</sup>

An estimated 285 million people worldwide were suffering from diabetes in 2010, of which one third was manifesting the signs of DR, and one fourth had vision threatening diabetic retinopathy. 11 Basic equipment and diagnostic procedures used for the evaluation of visual functions are indirect ophthalmoscope, fundus fluorescein angiography, perimetry and slit lamp must be available to screen out the patients with diabetic retinopathy particularly at the district headquarter hospitals. Similarly, the mandatory equipment which are used for laser procedures and optical coherence tomography for imaging of neural retina is also the basic diagnostic equipment.<sup>12</sup>

Laser delivery system for the pan retinal photo coagulation is needed for the tertiary care of diabetic retinopathy. Surgical interventions i.e. pars plana vitrectomy are needed in case of advanced DR which leads to tractional detachment of retina. Screening programs for the diabetic retinopathy are also launched by the international/national level NGOs at the different districts. In the routine general examination, patients with diabetes are referred to ophthalmology department for the evaluation of retinal changes because of diabetes.<sup>13</sup>

Pakistan is categorized as a developing country and has a population of 190 million. The current health care system of Pakistan is developed on the basis of primary health care (PHC) model comprising three tiers: the first-level facilities are Basic Health Units (BHUs), Rural Health Centers (RHCs), and Maternal and Child Health (MCH) Centers; secondary-level facilities are Tehsil Headquarter Hospitals (THQs) and District Headquarter Hospitals (DHQs); and Third-level facilities are tertiary and teaching hospitals.<sup>14</sup>

In 1849, the British Government declared Dera Ghazi Khan a separate district. This district is located in the southwestern part of Pakistan. For administration of health services, District D. G. Khan was divided into two tehsils, i.e. D. G. Khan and Taunsa, and one tribal area. There are 59 union councils with 51 rural and 8 urban. Their selected representatives articulate the Zilla (District) and Tehsil (Town) councils.<sup>15</sup> Occupying an area of 11,298 square kilometers, the district's population over two million are mostly poor and have a traditional norms and tribal culture.<sup>16</sup>

In D. G. Khan, like the rest of the country, community social, cultural structures and belief systems are well-defined and dominated by men, which preserve gender imbalances and lead to poor outcomes in fertile behaviors and reproductive health system. The health care system of the district health department of D.G. Khan is comprised of two DHQ, one THQ and two Civil District Health Profiles. In addition, 9 Rural Health Centers, 53 Basic Health Units, 5 MCH centers and 29 Dispensaries are also present. One DHQ Hospital at Taunsa is functioning in District D. G. Khan, One DHQ hospital at Kot Chatta.

Overseas Pakistan foundation has established two eye hospitals at D.G.Khan (yaro khosa) in 1994. OPF hospitals of D.G.Khan have facilities of 10 beds respectively. Apart from government sectors, many more private sectors are in function at district Dera Ghazi Khan.

The eye care services provided by the private centers of district Dera Ghazi Khan comprise of primary and secondary level services. Although all centers are provided with the nationally accepted list of diagnostic and treatment procedures, they are not facilitated with the tertiary eye care services which comprise of all subspecialty eye care services, including advanced diagnostic, medical and surgical treatment for both children and adults. Such sophisticated eye care service provision is done by THQ DG Khan, DHQ Tounsa sharif, and DHQ Kot Chatta.<sup>17</sup> Dera ghazi khan is the remote district of Pakistan; a huge population is concentrated in the rural areas which have difficulty in accessing services because of cost and/or transportation. Teaching hospital/THQ of D.G.Khan follows the national guidelines for detection, treatment, referral and periodic follow-up of diabetic retinopathy. Patients with diabetic retinopathy addressed at private centers are periodically referred for the comprehensive ocular examination to THQ and DHQs and DG Eye & General Hospital.

**MATERIALS AND METHODS**

This was a descriptive cross sectional study. All the eye care practitioners including ophthalmologists and optometrists of all the hospitals of DG Khan were involved. Information about the eye care services provided by the hospitals of DG Khan, Taunsa, and Kot Chatta was gathered by interviewing the general ophthalmologist, vitreo retina specialists and optometrists. Data was collected through self-designed questionnaire to investigate the availability of diagnostic equipment and clinical services for DR patients. The research protocol was approved by Ethical Board of College of Ophthalmology and Allied Vision Sciences. The data was collected from September to December 2020.

**RESULTS**

The structured questionnaire was filled by the main heads of hospitals including

ophthalmologists and vitreo retina (VR) surgeons. After the analyzing the data, it was cleared that 90% of the facilities are clustered in the main city of district DG Khan. 80% of the diagnostic equipment and clinical services for Diabetic retinopathy are found in the main THQ and some private centers. Sophisticated eye care provision is done by the teaching hospitals of city. 90% of the centers have slit lamp and tonometer. 75% of the centers have fund scope. 70% of the centers have indirect ophthalmoscope, 15 centers have OCT and only 10% of the centers have FFA. There were no single HRT through the whole district (table 1).

**Table - 1: Diagnostic Equipment at the Centers**

Questions	Frequency (%)	
	Yes	No
Slit lamp	18 (90)	2 (10)
Ophthalmoscope	15 (75)	5 (25)
HRT	0	20 (100)
OCT	3 (15)	17 (85)
FFA	2 (10)	18 (90)
Indirect Ophthalmoscope	14 (70)	6 (30)
Tonometer	18 (90)	2 (10)
Fundus Lens		16 (80) (20)

90% of the centers have cyclo-ablation, 65% have argon laser, 15% have IV injection, 35% have anterior vitrectomy, and 30% have posterior vitrectomy. Only 15% of the total centers have endo laser and RD surgery (table 2)

**Table - 2: Clinical Services at the Centers? (N=20)**

Questions	Frequency (%)	
	Yes	No
Argon laser	13 (65)	7 (35)
IV injection	10 (50)	10 (50)
Anterior vitrectomy	7 (35)	13 (65)
Posterior vitrectomy	6 (40)	14 (60)
Endo laser	3 (15)	17 (85)
Cyclo-ablation	18 (90)	2 (10)
RD surgery	3 (15)	17 (85)

75% of the centers have optometrists for the basic screening of DR patients and medical counselors for the counseling of DR patients. 95% of the centers have facility to check the blood sugar level (table 3).

**Table - 3: Facilities (N=20)**

Questions	Frequency (%)	Frequency (%)
	No	Yes
Facility to check the blood sugar level?	19 (95)	1 (5)
Optometrists to screen or examine DR patients?	15 (75)	5 (25)
Medical counselor for the counseling of diabetics?	15 (75)	5 (25)
Formal protocol for the referral DR of patients?	18 (90)	2 (10)

**Table - 4: Waiting Time**

Questions	< 1 hour	< 3 hours	>3 hours
	Frequency (%)	Frequency (%)	Frequency (%)
Standard waiting time for the proper consultation of DR patients?	10 (50)	8 (40)	2 (10)

In 50% of centers, patients have to wait for the < 1 hour, in 40% of the centers for < 3 hour and 10% of the centers; patients have to wait for > 3 hour for the proper consultation (table 4). 50% of the centers refer the patients to respective DHQs while 50% of the centers refer the patients to private tertiary centers for the tertiary management.

**DISCUSSION**

Diabetic retinopathy is a sight threatening complication of diabetes. It has been predicted that the risk of retinal complications becomes higher with the poor hyperglycemic control and persistent increase in the duration of diabetes.<sup>18</sup> The factors which majorly contribute towards the increased prevalence of diabetes are less awareness about the seriousness of disease and biased distribution of adequate care to diabetic individuals in the low and middle income Countries. To ensure that adequate care is offered to all the patients with DR, it is important to

evaluate the perceptions of individuals about the care and the barrier they face in assessing the services for diabetes and diabetic retinopathy. The challenges faced by the person for the diabetes and diabetic retinopathy management will be revealed by the better understanding of these factors.<sup>19</sup>

The previous studies conducted in different countries have used an assessment tool which is Tool Assessment of Diabetes and Diabetic Retinopathy management systems for the diagnosis, management, follow ups and timely referral of patients with DR.<sup>20</sup> It has been estimated that, unfortunately, 75% of diabetics who need eye care management are living in developing countries where the equipment and treatment facilities are limited. So they can't approach to the modern methods of treatment despite innovations in technology and advancement in investigative methods for early diagnosis and treatment.<sup>21</sup> A structured questionnaire comprising of various questions regarding the available diagnostic equipment and clinical services for the comprehensive examination of diabetic retinopathy was distributed among the eye care professionals of all these centers.

Among all the centers which were visited, 95% of the eye care centers both government and private have the facility to check the blood sugar level of the diabetic patients. While a study was conducted in India to assess the eye care infrastructure and human resources for managing the DR. Less than a quarter (23.3%) of the facilities performed routine glycosuria testing on adult patients This was a more common practice in eye units in multispecialty hospitals than in stand-alone eye hospitals (37%) and in public- versus private-funded hospitals (43.5%). A higher proportion (45.3%) routinely measure glycosylated hemoglobin (HbA1C) on all persons with diabetes with 17.4% only testing those with DR. Nonteaching hospitals were more likely to test HbA1C levels compared to teaching hospitals (47.7%) with no other significant

differences by hospital type.<sup>22</sup>

A study was conducted at 25 hospitals to assess the infrastructure services for DR patients in Tanzania. The majority 92% of diabetic clinic staff responded that they measure the blood pressure and also examine the feet of diabetics on each clinic day. Only the staff of two diabetic clinics responded that they measure the blood pressure and tests the random and fasting blood glucose levels of only protocol referrals.<sup>23</sup> It has been indicated that 90% of diagnostic equipment are accumulated in the teaching hospital of DG Khan. Among all the centers (n=20) which have been visited, 90% have slit lamp and tonometer, 85% have fundus lens, 75% have fund scope, 70% have indirect ophthalmoscope, and 15% have OCT and only 2 centers 10% have FFA. Teaching hospitals of Taunsa and Kot Chatta are not facilitated with the OCT and FFA.

While evaluating the clinical services present in the government and public funded hospitals of DGkhan, 18 centers (90%) of DG Khan have cyclo-ablation, 13 centers (65%) have argon laser, and 10 centers (50%) have IV injection, 7 centers (35%) have anterior vitrectomy, 6 centers (30%) have posterior vitrectomy, 3 centers (15%) have endo laser and RD surgery. Teaching hospitals of Taunsa and Kot chatta lack argon laser, anterior and posterior vitrectomy, endo laser and RD surgery. A qualitative study was conducted in Africa to evaluate clinical services for DR patients. Anti-Vascular Endothelial Growth Factor, intra vitreal injections and laser photocoagulation were most commonly used in some centers. 90% of the centers were facilitated with the laser delivery systems and anterior and posterior vitrectomy.<sup>24</sup>

Results from the present study have shown that 75% of the hospitals teaching, non-teaching and private centers have diabetic counselors to counsel the DR patients. These medical counselors establish diabetic dietary plans for DR patients. Diabetic meal planned by medical specialists for people with type 2 diabetes indicates both 1<sup>st</sup> line

therapy and basis for ongoing care. 25% centers are not facilitated with medical counselors.

Patient satisfaction is important and has been recognized as the main indicator of the quality of care. In 10 hospitals (50%), eye care professionals responded that DR patients have to wait for < 1 hour from their arrival to get completely checked up. 40% of the centers have shown that standard waiting time for the DR patients was < 3 hour. Because there are several stations need to be visited by the diabetic patients before entering the doctor's consultation room. 10% of the centers' practitioners have demonstrated that patients have to wait for > 3 hours for the consultation.

An audit was conducted at a primary clinic with the aim to assess the patients waiting time and to formulate strategies for improvement in Kuantan District, Malaysia. The average total waiting time to see a diabetic educator and doctor were the longest duration recorded which were 50 minutes and 60 minutes respectively. The maximum time recorded was up to 124 minutes from the screening area to doctor's consultation room and this contributed to the longest waiting time.<sup>25</sup>

In lower and middle income countries, primary and secondary level centers often lack the basic facilities for the screening of DR patients and do not have proper referral system for the tertiary management which result in the overburdening of tertiary level facilities and hinder to the timely care pf patients particularly for those who are the vision threatening stages.90% of the hospitals have formal protocol for the tertiary care management. Despite the well-developed infrastructure of several centers i.e. Al Qasim Eye Care and Farooqi Eye Care, these centers do not have tertiary care settings to deal with DR at tertiary level. However, all these centers have a structured referral network to teaching hospitals of DG Khan for tertiary level intervention. Dera Ghazi Khan, being the remote district of Punjab, patients experience many socioeconomic, health systems, and cultural barriers to seek long-term continuous care.

## CONCLUSION

In this study, a range of different types of eye care facilities for the diabetic patients were assessed across the whole district Dera Ghazi Khan. The eye care facilities for diabetic patients are mainly embedded in the main city DG Khan. The DHQs of Taunsa and Kot Chatta are not adequately facilitated with the necessary diagnostic equipment i.e. FFA and OCT. Most of the private centers of DG Khan are facilitated with basic and necessary equipment required for the comprehensive eye examination of DR patients. The existence of national policies, programs, and modern technology is promising in the THQ of DG Khan. Nevertheless, other aspects of the health system need to be improved to ensure access to health and eye care for people with DM and DR. Hospitals also lack a health information management system that collects epidemiological information about DM and DR. The coordination should be strengthened for an effective holistic management of DM making diabetes care and DR services more accessible to the people.

## RECOMMENDATIONS

Such surveys should be conducted to assess the gaps between the service delivery to centers and provision of services to the people. Policies and strategies should be made to resume such gaps and quick access of services to people.

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