Sultan Qaboos University Medical Journal
March 2008, Volume 8, Issue 1, p. 5-9
Sultan Qaboos University©
Submitted - 22nd May 2007
Accepted - 3rd December 2007

EDITORIAL

Care of Diabetic Retinopathy Patients in Oman

*Rajiv Khandekar,[1] Ali Jaffer Mohammed,[2] Jawad A Al-Lawati[3]

رعاية عيون المصابين باعتلال الشبكية بسبب داء السكر في عمان

راجيف خانديكار، علي جعفر محمد، جواد اللواتي

Diabetes mellitus is a public health problem in both developing and developed countries with one of its complications being diabetic retinopathy (DR). As the life expectancy of people with diabetes has increased owing to improved health care, the prevalence of DR is rising. DR is therefore now included in the list of priority diseases of the WHO's *VISION 2020* strategy to eliminate all preventable cases of blindness by the year 2020.

In Oman, a comprehensive programme approach to DR was adopted in 1998. Oman's system of screening for and treating DR is considered to be a good model in the region. The programme approach for eye care of people with diabetes in Oman has strengths and weaknesses. This editorial describes these, along with future challenges and solutions to handle them, including the use in Oman of modern technology to manage the eye complications of diabetes. However, strategies for educating people about their role in primary prevention of DR and the development of rehabilitation services for visually impaired diabetics still need urgent implementation.

DIABETES MELLITUS AND DIABETIC RETINOPATHY

Diabetes mellitus (DM) is a clinical syndrome characterized by hyperglycaemia. Long standing damage to the system causes serious complications mainly affecting the nervous system, the kidneys and the eyes.[1] DM causes visual impairment due to eye complications such as diabetic retinopathy (DR), glaucoma, cataract, neuropathies and frequent eye infections. DR is the most serious of the possible eye complications. The long duration of DM, and poor glycaemic and lipid control are the major risk factors for the occurrence and progression of DR.[2] Nearly 75% of persons with ≥15 year duration of diabetes show changes in the eye due to DR. The risk of DR is very high among persons with insulin dependent diabetes mellitus (IDDM). Persons with non-insulin dependent diabetes mellitus (NIDDM) are, however, often detected late and hence their eyes can have DR changes when the DM is first detected.[3] Timely detection and management of DR not only causes regression, but also delays irreversible visual impairment.

WORLD SITUATION FOR DIABETIC RETINOPATHY AND ROLE OF THE WORLD HEALTH ORGANISATION

The World Health Organisation urged its member countries and all partners to prioritize the prevention of blindness and in the World Health Assembly in 1999 endorsed a resolution called *VISION 2020 - The Right to Sight*. This initiative aims to eliminate avoidable blindness by the year 2020. Initially cataract, trachoma, onchocerciasis and childhood blindness were defined as the priority eye diseases,[4] but subsequently DR and glaucoma were also added.[5]

DR is the leading cause of visual impairment in industrialized countries. In many developing countries, rapid socioeconomic development, changes in life style and improved health services have resulted in the rise of non-communicable and chronic diseases. Thus DR is a global public health problem and hence experts have

[1]Eye & Ear Health Care, Non-Communicable Diseases Control Department, Directorate General of Health Affairs, Ministry of Health, Oman; [2]Directorate General of Health Affairs, Ministry of Health, Oman; [3]Department of Non-Communicable Disease Control, Ministry of Health, Oman

*To whom correspondence should be addressed. Email: rajshpp@omantel.net.om

prepared guidelines for managing DR.[6] The Eastern Mediterranean Region (EMR) of WHO also recommended its member countries to adopt an organised approach to controlling visual disabilities due to DR.[7] Interestingly in 1998, Oman had already included DR as one of its priority health issues, while standard operating procedures for eye screening and management were laid down in 2000.[8]

In view of the epidemic of diabetes in all Gulf Cooperation Council countries, a planning meeting was jointly organized by the International Agency for the Prevention of Blindness – Eastern Mediterranean Region in June 2006. Oman participated in preparing recommendations for the programme approach for the region.

THE SITUATION IN OMAN FOR DIABETES MELLITUS AND DIABETIC RETINOPATHY

The Sultanate of Oman has a population of 2.5 million people, of which 1.88 million are indigenous Omanis.[9] Surveys in 1991 and in 2000 revealed that the prevalence of DM was 10% among the ≥20 year old Omani population. A further 10% of people in this age group had impaired glucose tolerance.[10, 11] The Ministry of Health therefore established a National Diabetes Control Programme within its public health approach to non-communicable and chronic diseases. It was adequately represented in the 5th Five Year Health Plan prepared in 1995.[12] In 1999, a national diabetes registry was initiated and regional teams for management of the programme were formed. A Health Information and Management System for diabetes was also established in that year. By the end of 2005, the Ministry of Health had registered around 48,972 diabetics and nearly 5,000 new cases are added each year[13] As renal dialysis centres and cardiology units are established in regional hospitals, the patients with diabetes are likely to live longer; hence the risk of developing visual impairment due to advanced DR will also increase. Thus, a large number of people with diabetes in Oman will seek eye care and the trend will increase in coming years.[14]

A study in 2002 in Oman, showed that nearly 15% of registered diabetics had DR.[15] In 2003, it was reported that 20% of persons newly diagnosed with NIDDM suffer from DR.[16] The annual regional reports of the eye health care programme from all regions provide information on DR. In 2005, ophthalmologists in Oman reported 1,357 new cases of DR.[13] This suggests an annual incidence rate of 2.7%. If we assume that a person lives for 7 years after diagnosis of DR, the prevalence of DR could therefore be as high as 20%. Indeed, ophthalmologists at Rustaq Hospital in the South Batinah region found that 20% of people with diabetes suffered from DR.[17] On the other hand, Osama et al have reported the prevalence of DR to be as high as 40% in the Buraimi region of Oman.[18] Thus DR among Omani diabetics is a major public health issue. In addition, evidence based information suggests that people with diabetes have 20 times more risk of developing visual impairment compared to the general Omani population,[19] while nine percent of the registered people with diabetes were suffering from glaucoma.[20] Periodic eye examination is therefore crucial for the early detection and management of the eye complications of diabetes.

MANAGEMENT OF DIABETIC RETINOPATHY IN OMAN

CURRENT SYSTEM

The Eye Health Care programme piloted the eye screening of diabetics in two regions of Oman in 1998-99; this was expanded in all regions in 2000. Family physicians and diabetologists refer registered diabetics to ophthalmologists at the nearest eye unit for annual eye examination. Nearly 65 qualified ophthalmologists note the ocular manifestations of diabetes at institutions with secondary level eye care facilities in Oman. Ophthalmologists in these units use a panretinal indirect ophthalmoscope and a Volk lens. Senior ophthalmologists at regional hospitals confirm DR changes. They use bio-microscopes to evaluate the anterior segment of eyes and with the help of +90 D lens and examine the retina for DR changes. If the diagnosis is not conclusive or a more advanced type of eye management is needed, patients are referred to the specialists of the vitriol-retina unit at Al-Nahdha Hospital, Muscat. This is the tertiary eye care unit of the Ministry of Health. The regional and national supervisory teams monitor the progress of this referral system.

Within the country, the National Eye Health care Program has established linkages with the Diabetes Control Program, Primary Health Care Program, Department of Health Education and Health Promotion, ophthalmic services in sister organisations, eye clinics of the private sector and local non-governmental

organisations.

The national and regional eye and diabetes control programme teams jointly supervise the DR control programme. The regional teams visit all health institutions at least once in six months and review activities related to eye care of people with diabetes. They prepare supervisory reports, provide feedback to parent institutions to improve the eye care and propose additional measures to the regional administrators. Every year, regional teams evaluate the progress and achievements of the previous year, exchange their experiences and plan the eye care of people with diabetes for the next year. The 'Wilayat Health' is now involved in defaulter retrieval and eye health education of people with diabetes.

REFERRAL PROBLEMS FOR DIABETIC EYE CARE AND SOME TECHNICAL SOLUTIONS

Due to the risk of precipitating an acute attack of glaucoma, physicians cannot dilate the pupil for fundus examination at Primary Health Centres; hence it is necessary to refer them to specialised units. Retina specialists laid down the protocol for diagnosis, management and reference of cases with DR to the tertiary level in 2001. This referral problem, together with the need for ophthalmologists to perform eye check ups and screening on an *annual* basis and the large number of people with diabetes, results in a heavy workload for the secondary and tertiary eye care services. This could compromise the care of other priority eye diseases; therefore, alternate strategies should be planned.

In addition, the literature suggests that the agreement rate of DR screening by physicians compared to ophthalmologists was only 64%;[21] therefore, to improve both the screening and management of DR, technological advances should be adopted in Oman. Trained ophthalmic technicians could carry out digital documentation so that ophthalmologists would then just examine a limited number of problem cases. Equipment for laser treatment, mainly for pan retinal photocoagulation is in fact already available in most of the regional hospitals with ophthalmologists conducting 908 sessions of laser therapy in different regions in 2005.[13] The facilities for fluorescein angiography and treating diabetic maculopathy are, however, not available in all regions. Hence, in 2005, 81% of DR patients were still treated at the tertiary unit of Al Nahdha Hospital, Muscat. [6]

However, technologies for transferring the fundus images are beginning to be used to link institutions with experts and units photographing the images of retina. This client friendly approach will surely reduce the cost of screening and number of defaulters.

In the *VISION 2020 – OMAN* document, DR is one of the priority eye diseases. Accordingly the 6th and 7th Five-Year Health Plans included strategies to address this problem. In the 6th Five-Year Plan of the Ministry of Health (2001-2005), new regional autonomous hospitals (Ibra, Sur, Sohar, Nizwa and Salalah) received laser facilities to manage diabetic retinopathy.[22] In the 7th Five-Year Plan (2006-2010), adequate resource allotment is proposed to manage the eye care of people with diabetes. Each regional hospital would be given digital documentation and modern laser equipment.[23]

The laser destroys part of retina to increase oxygen supply to the vital central part with the outcomes depending on many factors. It would be interesting to study the impact of laser treatment of DR in Oman. The results will help us in promoting this intervention to prospective clients.

Diabetes Centres were also commissioned in 2007 in Muscat, Sur, Ibri and Nizwa. Comprehensive care of persons with diabetes will therefore soon be easily accessible in many regions.

HEALTH EDUCATION

An examination of the retina helps physicians to determine the progress of the DM and the status of micro-vascular changes in other organs. Hence the need for periodic eye examinations should be emphasized to patients, their relatives and family physicians. It is also crucial for the public health units of a country to integrate screening and management of diabetic retinopathy into their diabetes control programmes.[6] In Oman, health education materials for the eye care of diabetics are distributed to people with diabetes and their relatives. At the time of 'World Diabetes Day' and 'World Sight Day', campaigns are organized to increase awareness about visual disabilities among people with diabetes. Use of mass media and group discussions within diabetes societies could further increase awareness of these issues in the community. The knowledge, attitudes and practices of persons with diabetes, if studied, will help us to identify strong and weak areas and improve the awareness campaigns in Oman.

NATIONAL REGISTER FOR SIGHT THREATENING DIABETIC RETINOPATHY

In 2005, in order to strengthen eye care of people with diabetes, the national eye care programme introduced a Sight Threatening Diabetic Retinopathy Register (STDR). Defaulters for eye examination and management are noted among those diabetics registered with the STDR. Staff of medical record sections and ophthalmology departments then contact the defaulters to find the cause of defaulting and arrange another appointment on a priority basis. The defaulter retrieval system for STDR in different regions using different categories of health staff needs to be closely studied as the outcomes will guide other countries aiming to adopt it.

DIABETES AND BLINDNESS

Diabetes was not a significant contributor to blindness in the 1996 Oman Eye Study,[24] but DR contributed significantly in posterior segment pathologies. This group was responsible for 16% of 'Low Vision' disability in ≥ 40 years old Omani population in 2005. [25] This confirms that, in spite of all efforts, many persons with diabetes eventually lose their eyesight. They will need vocational or rehabilitative facilities. Unfortunately, limited facilities are at present available in Oman. People who have become blind due to diabetes are provided with a monthly sustenance allowance by the Ministry of Social Affairs.

CONCLUSION

Improved health services will increase the life expectancy of people with diabetes, who are likely to suffer from DR. The focus from primary prevention of DR should not be shifted, but eye care units should be periodically strengthened through the adoption of technological advances. The programme approach to eye care for diabetes is now established in Oman, but awareness of health issues among persons with diabetes should be further raised so that stringent control of diabetes and compliance to ophthalmologists' advice are achieved.

ACKNOWLEDGMENTS

We thank the Ministry of Health staff of the Eye Department and Diabetes Control Programme who undertake different activities related to eye care of people with diabetes. We appreciate the permission given by the Ministry of Health administrators to permit us to use their health information.

REFERENCES

1. Edwards CRW, Baird JD, Frier BM, Shepherd J, Toft AD. Endocrine and metabolic diseases including Diabetes Mellitus. In: Davidson's Principles and Practice of Medicine 17thEdition. New York: Churchill Livingstone, 1995. p. 724 – 762.
2. Stanga PE, Boyd SR, Hamilton AM. Ocular manifestations of diabetes mellitus. Curr Opin Ophthalmol 1999; 10:483-489.
3. Klein R, Klein BE, Moss SE, Davis MD, DeMets DL. The Wisconsin epidemiologic study of diabetic retinopathy III. Prevalence and risk of diabetic retinopathy when age at diagnosis is 30 or more years. Arch Ophthalmol 1984; 102:527-532.
4. Pararajasegaram R. VISION 2020 - the Right to Sight: from strategies to action. Am J Ophthalmol 1999; 128:359-360.
5. Foster A, Resnikoff S. The impact of Vision 2020 on global blindness. Eye 2005; 19:1133-1135.
6. World Health Organization. Prevention of Blindness from Diabetes Mellitus. Report of a WHO Consultation in Geneva, Switzerland 9-11 Nov 2005. Geneva: WHO in 2006. p.1-3.
7. Report on the conference on 'VISION 2020 Planning for Eastern Mediterranean Region' Dec. 2003, Cairo, Egypt. WHO/EMR/PBL/03.1. From http://whilibdoc.who.EMR/2003/WHO PBL/03.1 pdf. Accessed July 2006.
8. Ministry of Health, Diabetic eye in Eye Health Care Manual. 2nd Edition. Muscat: Al Nahdha Printing Press, 2000. p. 25-27.
9. Ministry of National Economy, Oman. Census 2003. Monthly bulletin issued by the Administration of the 2003 Census, 13th Edition. Muscat: Ministry of National Economy, 2004. p. 20.
10. Asfour MG, Lambourne A, Soliman A, Al-Behlani S, Al-Asfoor D, Bold A, et al. High prevalence of diabetes mellitus and impaired glucose tolerance in the Sultanate of Oman: results of the 1991 national survey. Diabet Med 1995; 12:1122-1125.
11. Al-Lawati JA, Mohammed AJ, Al-Hinai HQ, Jousilahti P. Prevalence of the metabolic syndrome among Omani adults. Diabetes Care 2003; 26:1781-1785.
12. Ministry of Health, Oman. 5th Five Year Health Plan 1995-2000. Program for control of Non-Communicable Diseases. Muscat: International Printing Press, 1996. p. 12-15.
13. Ministry of Health. Sultanate of Oman Annual Health Report Year 2005, Muscat: Ministry of Health. p. 9-55.

14. Al-Lawati JA, Al Riyami AM, Mohammed AJ, Jousilahti P. Increasing prevalence of diabetes mellitus in Oman. Diabet Med 2002; 19:954-957.

15. Khandekar R, Al Lawatii J, Mohammed AJ, Al Raisi A. Diabetic retinopathy in Oman: a hospital based study. Br J Ophthalmol 2003; 87:1061-1064.

16. Ministry of Health, Oman. Diabetes Mellitus Management Guidelines for Primary Health Care. 2nd edition. Muscat: Ministry of Health, 2003. p.35-43.

17. Evaluation of eye health care program in South Batinah region. Newsletter of Department of Surveillance and Disease Control. Muscat: Ministry of Health 1993, Vol. 2:1.

18. El Haddad OA, Saad MK. Prevalence and risk factors for diabetic retinopathy among Omani people with diabetes. Br J Ophthalmol 1998; 82:901-906.

19. Khandekar R, Mohammed AJ. Visual disabilities among people with diabetes in Oman. Saudi Med J 2005; 26:836-841.

20. Khandekar R, Zutshi R. Glaucoma among Omani diabetic patients: a cross-sectional descriptive study: Oman diabetic eye study 2002. Eur J Ophthalmol 2004; 14:19-25.

21. Okoli U, Mackay K. An evaluation of diabetic retinopathy screening models. J Public Health Med 2002; 24:190-195.

22. Ministry of Health, Sultanate of Oman 6th Five-Year Health Plan, Non-Communicable Disease Control Program. Muscat: International Printing Press, Jan 2001. p. 49-60.

23. Ministry of Health, Sultanate of Oman. Domain -13: Non-Communicable Diseases. In: 7th Five-Year Health Plan for Health Development 2006-2010. Muscat: International Printing Press, 2006. p. 155-158.

24. Khandekar R, Mohammed AJ, Negrel AD, Riyami AA. The prevalence and causes of blindness in the Sultanate of Oman: the Oman Eye Study (OES). Br J Ophthalmol 2002; 86:957-962.

25. Khandekar R, Mohammed AJ, Raisi AA. Prevalence