Clinical Review

Clinical Review identifies issues in the medical literature of interest to clinicians in Africa. Essential references are given at the end of each section

Ophthalmology Review

While it is true that the great majority of blindness in Africa is caused by cataract, glaucoma and corneal scar, this is changing. Those of you who work as general physicians will not need to be told that the prevalence of diabetes in Africa is rising rapidly. The International Diabetes Federation estimates that the number of people with diabetes in Africa will double between 2010 and 2030, which is a greater increase than any other region in the world.

Where diabetes is common, diabetic retinopathy (DR) will follow. DR is the most common cause of blindness in people of working age in rich countries, and the World Health Organization estimates that around 5% of global blindness is caused by DR. However, there is a paucity of reliable information about the prevalence of DR in Africa. A recently published study from Kenya investigated the prevalence of DR in Nakuru district, in Rift Valley Province.[1] Nakuru is fairly typical of Kenya, with a mix of urban and rural communities.

The authors examined 4400 adults aged 50 or more in randomly sampled clusters. Every subject had visual acuity measurement and examination at a slit lamp by an ophthalmologist. Where possible, they also had retinal photography. All the retinal images were sent to the UK for examination at the Retinal Grading Centre in Moorfields Eye Hospital, London.

Participants were asked about their tribal origin, education and asset ownership, as well as their medical history. Blood pressure, blood sugar and body mass index were measured in all subjects.

Two hundred and forty four people reported that they were known to have diabetes. Another 43 were found to have a random blood sugar >11mmol/l, giving a prevalence of diabetes in this cohort of 6.5%. It is encouraging to note that 80% of people with diabetes were aware of the diagnosis. This is very similar to the results of similar studies in Mexico and Saudi Arabia, and appears to confirm that even in countries with limited healthcare budgets, the great majority of diabetes has already been recognised and diagnosed.

Diabetes was more common in subjects from urban clusters, with at least primary school education, and higher socio-economic status. Thirty six per cent of the study population had a BMI >25kg/m2. Among participants with diabetes, 55% were overweight or obese. This is more evidence that the global obesity epidemic is not confined to wealthier countries, and public health policy in Africa must pay as much attention to calorie excess in adults as it has done so successfully to calorie deficiency in children.

In total, 35% of people with diabetes had DR on slit lamp examination or photography. 8.7% had proliferative DR, and clinically significant macular oedema was present in 4.1%. These prevalence figures are not vastly different to what would be expected in a Caucasian population.

Fifty six eyes had sight-threatening retinopathy that required immediate laser treatment. Only eight eyes showed evidence of previous laser, giving a laser coverage of 14%. Laser coverage is not an absolute guide to the need for laser treatment as some eyes will require multiple laser treatments – it is possible for a community to have 100% laser coverage, but still require additional laser treatment. However, it is useful for plotting progress, and for setting priorities – a community with 20% laser coverage is likely to be in greater need than a community with 50% laser coverage.

As expected the study found that the retinal photographs were the most reliable method of detecting DR. In comparison, slit lamp grading had a sensitivity of 60% and specificity of 100%. This has implications for DR screening in Africa. Although examination by a trained eye worker at a slit lamp is relatively inexpensive, it is also less effective. Fundus cameras will be required for accurate detection and referral of DR, and at present these are very costly. However, this should not be misinterpreted as suggesting that slit lamp examination is of no value, as all but one of the cases of sight-threatening retinopathy were detected by slit lamp biomicroscopy.

Risk factors for the presence of DR included duration of diabetes, and blood glucose control, assessed by random blood glucose measurement on the day of examination. There was no association with hypertension, BMI, or socio-economic factors.

The Nakuru study was a cross-sectional community-based study. In Malawi another research group has been using a clinic-based approach.[2] They have defined a cohort of 357 people with diabetes attending the diabetes clinics in Blantyre and Zomba. The baseline data is reported in this paper, and 24 month follow-up results will be reported in two years' time. For epidemiological purity, community-based surveys give a more accurate prevalence, as they are less prone to bias. Patients attending a teaching hospital diabetes clinic are more likely to have severe diabetes than those being managed in a district health centre. However, the advantage of a clinic-based study is that it allows for a much more thorough investigation of each participant, and that has provided some interesting findings.

The study included 357 patients. Of these patients, 90% had type 2 diabetes, 60% were female, and the average age was 54 years. Sixty per cent of the patients with Type 2 diabetes had a BMI>25kg/m2, 50% had DR, 7% had proliferative retinopathy, and 26% had advanced maculopathy (exudates close to the fovea). Altogether 63 (29%) of the subjects had sight-threatening retinopathy requiring immediate laser treatment. Only one patient had previously had any laser, giving a laser coverage of 1.6%.

Because the study was clinic based, the authors were able to complete a much more extensive examination than could be accomplished in Nakuru. All participants had multiple blood tests and a more detailed physical examination. This found that 13% were HIV positive, of whom 71% were taking antiretrovirals. Because HIV infection is associated with a vasculopathy, it is possible that it might increase the risk of diabetic microvascular complications. However, HIV positive patients did not have a higher prevalence of DR. Fifteen per cent of subjects were anaemic (haemoglobin <130g/dl in men and <120g/dl in women). Multivariate analysis showed that the risk factors for sight-threatening retinopathy included: duration of diabetes, poor glycaemic control, raised systolic blood pressure, elevated LDL cholesterol, and anaemia.

The association of anaemia with sight-threatening DR is a new finding. The authors are careful to point out that they have found an association, which does not necessarily mean that that anaemia increases the risk of retinopathy. Anaemia may simply be a marker for patients who have less access to healthcare, but it remained an independent risk factor for sight-threatening DR in a model that included poor glycaemic control and hypertension. A low haemoglobin could reduce oxygen saturation in the retina, leading to increased production of vascular endothelial growth factor, and accelerated development of retinopathy, so the association is biologically plausible. Treatment of anaemia in patients with diabetes may help to delay the onset of sight-threatening retinopathy in Africa, and could be a simple and cost-effective intervention to reduce the need for laser treatment.

I confess that I very rarely read *The International Journal of Health Policy and Management*. However, the journal recently published a fascinating qualitative study of screening programmes for DR in Africa.[3] The research was conducted by the VISION 2020 LINKS Programme, which links eye clinics in the UK with eye clinics in Africa, for an exchange of expertise and experience. Thanks to this programme, the researchers were able to get in-depth access to five DR screening programmes in Ghana, Zambia, Tanzania (Moshi and Dar es Salaam), and Botswana. The lessons drawn from this should be very helpful to anyone thinking about managing DR in their community.

The different programmes ranged from a nationwide national screening programme (Botswana) to simple fundus check in the eye clinic (Dar es Salaam). Some programmes used a fundus camera, and others relied on examination by an ophthalmologist. Fundus cameras are more likely to detect DR, and, in the long-term, are likely to be cheaper, as an ophthalmologist or trained grader can examine many photos in a fraction of the time it takes to examine the same number of patients. However, fundus cameras are expensive, and any programme to detect DR at an early and treatable stage may have to begin with ophthalmoscopy, if only to demonstrate the need.

Some of the programmes were static and hospital-based, and others were mobile, using outreach clinics. The static programmes had the advantage that any patient found to have sight-threatening DR could have laser treatment at the same visit. Although outreach screening programmes were able to reach a higher proportion of the diabetic population, patients with sight-threatening DR did not always attend the hospital.

Successful static programmes depended on close integration between the diabetes clinic and the eye clinic. Patients were more likely to attend eye screening if there was good communication between the diabetes and eye clinics, and if they did not have to queue for two appointments on the same day. One centre used a liaison nurse from the eye clinic, but based in the diabetes clinic, to improve communication.

No centre had a formal call/recall system to ensure that all diabetic patients had an annual examination, however, high rates of coverage could be achieved through community involvement, and with the collaboration of organisations such as the Tanzania Diabetic Association.

The paper also discusses the advantages and disadvantages of a vertical programme versus screening programmes integrated into existing diabetes and eye services, and the various tasks that can be undertaken by different levels of personnel. Unfortunately there is not space to cover all of these insights in this article, but I strongly recommend the paper to anyone considering the establishment of a DR screening programme in Africa.

The study showed that it is helpful to consider DR screening as a progression to:

- Diagnose and treat cases in the eye clinic;
- Screen all diabetes patients in a hospital diabetes clinic;
- Create a diabetes register and call patients for annual eye examination;
- Establish a national DR programme.

It is better to start something, and then progress, than to wait until it is possible to establish and manage a perfect National Screening Programme. The authors suggest that an initial screening programme can evolve by increasing the geographic area, moving from an opportunistic to a systematic screening service, and integration of the screening programme into the healthcare system. Whatever stage a screening programme has reached, it will be most effective if it involves all the interested parties. This includes endocrinologists, regulatory authorities (who may have to certify screening technicians and graders), national and local diabetic associations, ministries of health, and non-government funding agencies.

If any readers would like more information about DR, there is a review article, published in 2010, that is still relevant,[4] and *Community Eye Health* devoted an issue to DR in 2011.

Dr David Yorston
Ophthalmic Consultant,
Christophel Blinden Mission, UK

References

1. Mathenge W, Bastawrous A, Peto T, et al. Prevalence and correlates of diabetic retinopathy in a population-based survey of older people in Nakuru, Kenya. *Ophthalmic Epidemiol* 2014; 21: 169–77.
2. Burgess PI, Allain TJ, García-Fiñana M, et al. High prevalence in Malawi of sight-threatening retinopathy and visual impairment caused by diabetes: identification of population-specific targets for intervention. *Diabet Med* 2014; 31: 1643–50.
3. Poore S, Foster A, Zondervan M, et al. Planning and developing services for diabetic retinopathy in Sub-Saharan Africa. *Int J Heal policy Manag* 2015; 4: 19–28.
4. Ockrim Z, Yorston D. Managing diabetic retinopathy. *BMJ* 2010; 341: c5400.

STI Review

Male circumcision

It is well-established that male circumcision (MC) reduces heterosexual acquisition of HIV. Three significant randomised controlled trials enrolling more than 10 000 men in South Africa, Kenya and Uganda between 2002 and 2006 found that MC reduced heterosexual HIV acquisition by 53-60%.[1-4] Follow-up studies demonstrated this protective effect is long-lasting and even increases, and is evident in non-trial settings as well.

Data from these trials also demonstrated the protective effects of MC on other sexually transmitted infections (STIs). In the South African and Ugandan trials, MC reduced the incidence of herpes simplex virus type 2 (HSV-2), human papillomavirus (HPV) infections and genital ulcerations in men. A systematic review of 21 studies confirms the clear inverse relationship between MC and the prevalence of genital HPV in men.[5]

The data on MC and bacterial STIs is less clear. In the South African trial, MC decreased both Trichomonas vaginalis and Chlamydia trachomatis, but not Neisseria gonorrhoeae. The Kenyan trial found no reduction in any of these infections, but did find that MC cut in half the risk for Mycoplasma genitalium infection.[6]

The effect of MC on female partners in these trials shows that MC reduces Trichomonas vaginalis, bacterial vaginosis, HPV and genital ulcer disease. Another study using the Uganda trial data found that MC had no effect on Mycoplasma genitalium infection in female partners.[7]

The Ugandan and Kenyan trials did not show any reduction in acquisition of syphilis in men. However, another large prospective study of syphilis incidence in Kenyan and Ugandan men and women, and the effect of male circumcision found that MC significantly decreased incident syphilis.[8] This study of 4716 serodiscordant couples, in which half of the men were circumcised, found that circumcision decreased incident syphilis by 42% compared with uncircumcised men. MC was even more protective for HIV positive men, with syphilis reduction of 62%. The study also showed that MC reduced the incidence of syphilis in women by 59%, with a 75% reduction in women without HIV, and a 48% reduction in HIV positive women. Compared with the earlier randomised MC trials, which excluded HIV- or Treponema pallidum-infected men and reported low detection of syphilis infection, the participants in this study may have had greater exposure to syphilis. With higher incidence of syphilis, it is hypothesised that this study was able to observe the effect of MC on syphilis not possible in the earlier trials.[9]

Scale-up

The clear protective effect of MC led the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) to issue a formal policy statement in 2007 supporting and promoting MC as an HIV-prevention intervention. This policy, along with the research results, propelled MC to the forefront of strategies aimed at reducing HIV infection, especially in Africa. While MC programmes have been established in many African countries with high HIV risk and low rates of MC, scale-up has been slow. WHO and UNAIDS established a goal of 80% MC coverage among men aged 15-49 in 13 eastern and southern African countries by 2015.[10] Unfortunately, most countries are lagging far behind the rate of MC needed to meet this goal. Only Kenya appears on track to meet the 80% coverage goal.

A recent *Annual Review of Medicine* article summarizes why MC, as the authors state, is 'a globally relevant, but under-utilised method for the prevention of HIV and other sexually transmitted infections'.[4] One of the major barriers to MC scale-up in Africa is the lack of human resources – physicians, surgical specialists, nurses, counsellors, and support staff – necessary to achieve the MC targets. Conventional MC programmes often use a team of one physician and one assistant to surgically perform each MC procedure, and can complete 8-10 MCs per day. Other staffing models, mobile clinics, and use of prepackaged or disposable MC kits could increase the volume of procedures. A study in Kenya found that trained nurses and clinical officers can provide safe voluntary medical male circumcision (VMMC) services.[11] The 15 nurses and 11 clinical officers trained to perform MCs reported a low 2% adverse event rate (mostly swelling) and overall patient satisfaction 60 days post-circumcision.

New MC devices, such as the Shang Ring or PrePex, could also increase the number of MCs performed. A review of clinical trials in Kenya, Uganda and Zambia using the Shang Ring indicates the device can simplify MC and facilitate scaling-up of MC services.[12] The studies completed to date show the Shang Ring is very safe, easily used by trained non-physicians, and is preferred by both providers and men in the studies. MC using the Shang Ring is minimally invasive, takes less time (7 minutes versus 21 minutes for conventional procedure), and decreases risk of serious surgical errors. The Shang Ring costs about US$15, while conventional surgery costs about US$45-65. Disadvantages of the ring include the necessity to leave the ring in place for 7 days, need to return to a provider to have it removed, and longer healing time compared with conventional MC surgery. The Shang Ring offers an appealing technique for MC in Africa.

Lack of demand

Scale-up is also limited in some areas by lack of demand. While surveys in sub-Saharan Africa indicate that around 65% of men say they would be willing to accept MC, uptake of the procedure has been very low.[13] Qualitative studies suggest reasons men do not accept MC are fear of pain, concerns about sexual potency and dysfunction, and time lost from work. There is need to address these concerns, as well as increase access and availability of MC services. This could include expanded clinic hours, male-only clinics, services aimed at specific age groups to avoid mixing of younger and older men, and mobile services near places of work. Among some groups 'demedicalising' the procedure, and making it socially desirable instead of something that is good for one's health could increase demand.

However, opinions differ by geography and culture. Focus group discussions with men (circumcised and uncircumcised), along with their female partners aged 25-49, and with men aged 50 and older in Turkana County, Kenya found most are supportive of VMMC, but many

older men perceived VMMC as a procedure for young, urban men.[14] The older, rural men do not see themselves at risk of HIV. However, it was also suggested by some of the women that older men should be circumcised as role models for young men. Some older men also object to circumcision as they regard it as something related to initiation to manhood as practiced by their enemies. Another study of perceptions of VMMC among Malawian men also found they had difficulty distinguishing between traditional circumcision and modern medical circumcision performed for public health reasons.[15] Among these groups, messaging about circumcision should emphasise the procedure as a biomedical intervention to protect against HIV.

It is important to address the opinions and attitudes of female partners as well. Their perceptions can influence uptake of MC. Interviews with 30 sexually active women in Kisumu, Kenya found that these women care about their partner's circumcision status and that is a factor in partner selection and condom use.[16] Most of the women understood that MC provides partial protection for men acquiring HIV, and women perceive circumcised men as cleaner, carrying fewer diseases, and taking more time to reach ejaculation. A quantitative and qualitative study of women's knowledge and understanding of MC in Zambia found a large proportion did not understand the limits of MC protection against HIV and other STIs for both men and their partners.[17] There is clear need to educate women and emphasise the continued need for condom use, no matter the circumcision status of their partners.

Barbara C. Shane, MPH
International Health Consultant in Reproductive Health
Bainbridge Island, WA USA

References

1. Bailey RC, Moses S, Parker CB, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. *The Lancet* 2007; 369(9562): 643–656.
2. Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. *The Lancet* 2007; 369(9562): 657–666.
3. Auvert B, Taljaard D, Lagarde E, et al. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial. *PLoS Medicine* 2005; 2(11): e298.
4. Tobian A, Kacker S, Quinn T. Male circumcision: a globally relevant but under-utilized method for the prevention of HIV and other sexually transmitted infections. *Annu Rev Med* 2014; 65: 293–306.
5. Albero G, Castellsagué X, Giuliano A, et al. Male circumcision and genital human papillomavirus: a systematic review and meta-analysis. *Sex Transm Dis* 2012; 39(2): 104–113.
6. Mehta S, Gaydos CX, Maclean I, et al. The effect of medical male circumcision on urogenital mycoplasma genitalium among men in Kisumu, Kenya. *Sex Transm Dis* 2012; 39(4): 276–280.
7. Tobian A, Gaydos C, Gray R, et al. Male circumcision and mycoplasma genitalium infection in female partners: a randomized trial in Rakai, Uganda. *Sex Transm Infect* 2014; 90(2): 15–154.
8. Pintye J, Baeten J, Manhart L, et al. Association between male circumcision and incidence of syphilis in men and women: a prospective study in HIV-1 serodiscordant heterosexual African couples. *Lancet Global Health* 2014; 2(11): e664–e671.
9. Tobian A, Quinn T. Prevention of syphilis: another positive benefit of male circumcision. *Lancet Global Health* 2014; 2(11): e623–e624.
10. UNAIDS. Joint strategic action framework to accelerate the scale-up of voluntary medical male circumcision for HIV prevention in Eastern and Southern Africa: 2012-2016. Geneva, 2011.
11. Frajzyngier V, Odingo G, Barone M, et al. Safety of adult medical male circumcision performed by non-physician clinicians in Kenya: a prospective cohort study. *Global Health: Science and Practice* 2014; 2(1): 93–102.
12. Barone M, Li P, Awori Q, Lee R, et al. Clinical trials using the Shang Ring device for male circumcision in Africa: a review. *Transl Androl Urol* 2014; 3(1): 113–124.
13. Gray R, Wawer M, Kigozi G. Programme science research on medical male circumcision scale-up in sub-Saharan Africa. *Sex Transm Infect* 2013; 89: 345–349.
14. Macintyre K, Andrinopoulos K, Moses N, et al. Attitudes, perceptions and potential uptake of male circumcision among older men in Turkana County, Kenya using qualitative methods. *PLoS One* 2014; 9(5): e83998.
15. Rennie S, Perry B, Corneli A, et al. Perceptions of voluntary medical male circumcision among circumcising and non-circumcising communities in Malawi. *Global Public Health* 2015; 10.1080/17441692.2015.1004737.
16. Riess T, Achieng M, Bailey R. Women's beliefs about male circumcision, HIV prevention, and sexual behaviors in Kisumu, Kenya. *PLoS One* 2014; 9(5): e97748.
17. Haberland N, Kelly C, Mulenga D, et al. Women's (mis) understanding of male circumcision: a mixed methods study in Zambia. *AIDS Research and Human Retroviruses* 2014; 30(S1): A198–A199.

Africa HEALTH

CPD Challenge

See page 46 for questions about this article

The African Journal of Respiratory Medicine

www.africanjournalofrespiratorymedicine.com

Our peer-reviewed journal *The African Journal of Respiratory Medicine* includes review articles, original articles, short reports, and up-to-date respiratory medicine research and items.

The March 2015 issue available online includes:

Comparison of forced expiratory volume (FEV_1) and BODE index in the assessment of health-related quality of life in patients with chronic pulmonary disorder
W Ketata, T Abid, W Feki, S Msaad, N Bahloul, and A Ayoub

A descriptive study of patients admitted with acute exacerbation of chronic obstructive pulmonary disease in three hospitals in Cape Town, South Africa
L Pienaar, M Unger, and S Hanekom

A preliminary assessment of nurses' asthma education needs and the effect of a training programme in an urban tertiary healthcare facility
O O Adeyeye, Y A Kuyinu, R T Bamisile, and C I Oghama

Allergic sensitisation to common antigens among Ethiopian asthmatic patients
K Gidey, A Adem, M Guizaw, K-H Franz , and A Potthoff

Splenopulmonary fistula complicating hydatid disease
Y Ouadnouni, J Ghalimi, R Sani, M Lakranbi, and M Smahi

Catamenial right haemothorax due to endometriosis: two case reports
A Ahmed, I Garba, B A Denue, M B Alkali, B Bakki, and H Rawizza

Authors wishing to publish in the AJRM should write to editor@fsg.co.uk for more information or visit the website at www.africanjournalofrespiratorymedicine.com.

The journal is available online on an open-access basis, or you can subscribe to the paper version for £30/US$50. See the website for details or email michelle@fsg.co.uk.