COMMUNICATION

Teleophthalmology and Vision 2020 in South Africa

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We aimed to determine whether teleophthalmology has a place in the South African health care delivery system and its role in Vision 2020 in South Africa. We used a consensus process to determine its impact on the diagnosis and management of patients seen in a hospital eye clinic. Edendale Hospital, Pietermaritzburg, and Moorfields Eye Hospital, London, collaborated in this study involving 90 patients seen between May 2000 and April 2001.

Teleophthalmology had an impact on diagnosis in 46% of cases, on management in 78%, on outcome in 63% and on medical education in 11% of cases.

The South African government has identified telemedicine as a strategic tool to facilitate delivery of equitable health care services to all South Africans, irrespective of distance and availability of specialised expertise, particularly in rural areas. Teleophthalmology has been identified as one of the key applications of this initiative.[1]

The International Agency for the Prevention of Blindness, in partnership with the World Health Organisation Prevention of Blindness Programme, launched the Vision 2020 initiative in 1999, with the aim of eliminating avoidable blindness in the world by the year 2020. Cataract and refractive error have been identified as priority diseases to be tackled in the first phase of this programme, and glaucoma and diabetic retinopathy as priorities in the second phase.[2]

What was done

Teleophthalmology connections were established between Edendale Hospital in Pietermaritzburg and Moorfields Eye Hospital in London using a Sony 5100 video conference unit. Images were captured at Edendale using a video slit lamp and a hand-held digital recorder. Video conferencing sessions lasting approximately 1 hour were scheduled every week, and were used for clinical and educational purposes. A senior ophthalmologist-in-training at Moorfields Eye Hospital provided advice.

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A consensus process was used, viz. a nominal group technique. Participants each recorded their views privately and then discussed them with the rest of the group. Ninety patients were seen over a 12-month period from May 2000 to April 2001, to determine the impact of teleophthalmology used in this way. The consensus group discussion allowed participants to reconsider their initial ratings in the light of other participants' views. Discussions continued until consensus was reached.

Three ophthalmologists participated and each member of the panel inspected the notes and the data collection forms completed following the teleconsultations. Medical officers had completed these forms at the time of the teleconsultation and recorded the initial diagnosis, a proposed management plan, and a revised diagnosis and management plan following the teleconsultation. Members of the consensus panel recorded their assessments on a new form, under separate headings for diagnosis, management, patient's visual and general health, and use of novel procedures. The questions referred to three stages, viz. before, during, and after the teleconsultation. Participants in the consensus process were asked to evaluate the resource use and outcomes of the teleconsultation. Three evaluation categories were permitted, namely: definitely related, possibly related or unrelated to telemedicine. The form also asked whether the teleophthalmology had increased or reduced the number of tests, investigations or admissions.

What was found

There were 113 consultations over a 12-month period. Of these, 90 patients were examined in the consensus process to determine the impact of using teleophthalmology.

Impact on diagnosis

An impact was considered definite in 22 cases (24%) and possible in 20 (22%), while there was no impact in 48 cases (53%). Of the 90 patients seen using teleopthalmology, a higher proportion of posterior segment and neuro-ophthalmology cases, and a lower proportion of anterior segment cases were discussed compared with the annual distribution of cases seen.

Impact on management

Examinations, tests, and investigations recommended through the use of teleophthalmology are shown in Table I. In 65 of the

90 cases, further examinations, tests and investigations were recommended through the use of teleophthalmology. Further clinical examinations were recommended in 44 cases and further scientific investigations such as scans or blood tests in 31 cases, and in 9 cases referral was recommended. In total, 109 investigations were recommended. In 5 cases further examinations were avoided through discussion using teleophthalmology.

Table I. Examinations, tests and investigations recommended through use of teleophthalmology

Type of investigation	Definitely added	Possibly added	Definitely avoided	Possibly avoided
Clinical examinations	31	3	1	1
Chemical tests	9	–	–	–
Haematology tests	7	–	–	–
Immunology tests	15	1	–	–
CT scans	9	–	–	2
X-rays	7	–	–	1
Biopsy	8	1	–	–
Other	18	–	–	–
Total	104	5	1	4

CT = computerised tomography.

Impact on outcome

Table II shows the impact of teleophthalmology on outcome. In 57 cases there was possibly improvement in visual health as a result of teleophthalmology advice. It was judged that in 24 cases teleophthalmology may have prevented blindness in one eye, and in an additional 13 cases it may have prevented blindness in both eyes. Of the 35 cases where there was possibly improvement in general health due to teleophthalmology, it was agreed that death may have been prevented in 11 cases, in 12 cases there was possibly a major improvement in quality of life, and in 12 cases there was possibly minor improvement in quality of life.

Table II. Impact of teleophthalmology on outcome

Impact	Definite		Possible		None		Total	
	N	%	*N*	%	*N*	%	*N*	%
Visual health	9	10	48	53	33	37	90	100
General health	0	0	35	39	55	61	90	100

Impact on medical education

Ten novel procedures were introduced through the use of teleophthalmology. The procedures were considered novel in that the activities advised would not have been normal practice among doctors working at Edendale Hospital.

Discussion

Use of teleophthalmology for video conferencing and case presentations between ophthalmology departments has been found to be useful and beneficial, both for the service providers and for the patients. However, the expertise and capacity to use such a facility does not exist in most rural districts in South Africa, and cannot be used there at present.

Priorities for the first phase of Vision 2020 are cataract and refractive error. There are few diagnostic dilemmas that need to be resolved with teleophthalmology. There is a need for ophthalmic nurses and optometrists with the training and capacity to provide refractive services, and for ophthalmic medical officers with the training and capacity to provide cataract surgical services. Teleophthalmology has no direct application in this first phase of Vision 2020 in South Africa.

Priorities for the second phase of Vision 2020 are glaucoma and diabetic retinopathy. Here too there is a need for ophthalmic nurses and optometrists with the training and capacity to recognise and refer patients with these blinding conditions, and ophthalmic medical officers with the training and capacity to provide the appropriate laser and surgical services. A potential use of teleophthalmology in this second phase of Vision 2020 would be the transfer of still images of the retina via e-mail in cases where there is indecision about referring patients with diabetic retinopathy.

Conclusions

The use of teleophthalmology for video conferencing and case presentations was found to be useful and beneficial and has a place between ophthalmology departments. In the South African health care delivery system, the expertise and capacity to use such a facility does not exist in most rural districts and cannot be used in those situations. Teleophthalmology has no role to play in Vision 2020 in South Africa at this time, but may do so in the future.

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1. Gulube SM, Wynchank S. The national telemedicine system in South Africa - an overview and progress report. *S Afr Med J* 2002; **92:** 513-515.
2. World Health Organisation. Global Initiative for the Elimination of Avoidable Blindness. Geneva: WHO, 1997. WHO/PBL/97.61.