

Impact of the introduction of a colposcopy service in a rural South African sub-district on uptake of colposcopy

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Objective. To describe the establishment of a colposcopy service at a district hospital in a rural sub-district of the Western Cape, South Africa, and assess its impact on colposcopy uptake.

Design. A retrospective double-group cohort study using a laboratory database of cervical cytology results, clinical records and colposcopy clinic registers.

Setting. The Overstrand sub-district, where 80 000 people are served by seven clinics and a district hospital in Hermanus, 120 km from its referral hospitals in Cape Town and Worcester. A colposcopy service was established at Hermanus Hospital in 2008.

Subjects. All women in the sub-district who required colposcopy on the basis of cervical smears done in 2007 and 2009.

Outcome measures. Numbers of women booked for colposcopy at distant referral hospitals in 2007 and at the district hospital in 2009, the proportions who attended colposcopy, the time from cervical smear to colposcopy, and comparison between the two years.

Results. Uptake of colposcopy booked at distant referral hospitals was 67% in 2007. Uptake improved by 18% to 79% for the district hospital colposcopy service in 2009 ($p=0.06$). When patients from an area with no public transport to the district hospital were excluded from analysis, the improvement was more marked at 22% ($p=0.02$). The delay from cervical smear to colposcopy improved significantly from 170 to 141 days ($p=0.02$).

Conclusion. Establishment of a colposcopy service in a rural sub-district increased uptake of colposcopy and decreased the delay from cervical smear to colposcopy. The service removed 202 booked patients in one year from the colposcopy load of the referral hospitals.

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Cervical cancer is a major cause of morbidity and mortality worldwide and is the most common cancer affecting women in South Africa.^[1] It accounted for 2% of premature deaths among women aged >15 years in 2005 in the region where this study was conducted.^[2] The

South African national cervical cancer screening policy, based on cervical cytology, recommends cervical smears for all women every 10 years from the ages of 30 to 60 years.^[3] An HIV-positive woman has a 4.9 times higher risk of developing cervical cancer than an HIV-negative woman, so the Western Cape Province recommends that HIV-positive women have cervical smears every 3 years from the age of 20 years.^[3,4]

Screening alone is insufficient – there must be a mechanism for treating those with dysplastic smears. Because of weaknesses in the prevention and screening process, there remains a high rate of cervical cancer despite the technological means to prevent it.^[5-7] One of the problems in the South African context is poor uptake of colposcopy services because of long distances to be travelled to these services; this is complicated further by long waiting periods from the screening investigations to the colposcopy appointment.

Participation of women in the full cervical screening process has been assessed in several studies, mostly in developed settings.^[5-8] They

too have shown problems in accessing colposcopy services. No studies were found examining attendance rates at South African colposcopy clinics and the follow-up of women with abnormal smears. A 2010 Cape Town study predicted that the increase in cervical screening and the number of lesions requiring follow-up was likely to outpace the growth of colposcopy services in South Africa.^[1]

The Overstrand sub-district is centred on Hermanus in the Western Cape Province, South Africa. The population of approximately 80 000 people is served by seven clinics and a district hospital (unpublished data). The primary healthcare (PHC) head count for the Overstrand healthcare facilities was 214 941 patients in 2007 and 300 216 in 2009, an increase in patient numbers of 40%.

The regional referral and tertiary referral hospitals are both 120 km from Hermanus. In August 2008, a local gynaecologist was recruited to set up a colposcopy service at Hermanus Hospital to lessen the problems of transport for referred patients.

This study was done to determine whether the establishment of a district hospital colposcopy service in the Overstrand sub-district has improved uptake of colposcopy among women who require it, compared with referring them for colposcopy at a distant secondary or tertiary hospital.

Methods

Study design and subjects

Colposcopies at Hermanus Hospital were initially booked fortnightly from August 2008. After a year, the service was taken over by another gynaecologist, who was appointed on a sessional basis to do weekly colposcopies. An elderly, 'retired' colposcope from Tygerberg Hospital was used; it was later replaced by a new basic colposcope costing approximately R60 000. Colposcopies were performed using the existing diathermy machine with disposable large loop excision of the transformation zone (LLETZ) loops and customised smoke-extraction specula. The cost of histological examination of the LLETZ specimens was approximately R1 000 per patient. Each patient was given a follow-up appointment to see the gynaecologist in the outpatient department a month later for histological results. Forms were designed to send to referring clinics with colposcopy findings and follow-up instructions.

A retrospective double-group cohort study was conducted. The cohort comprised women utilising government health services in the Overstrand and booked for colposcopy. The first group comprised women booked for colposcopy at distant referral sites in 2007 (Tygerberg and Worcester hospitals), before the introduction of a local colposcopy service. The second group comprised all women booked for colposcopy in 2009, after a colposcopy service had been established in Hermanus. Data were not collected from 2008, as for a time all three sites were used.

Data collection

All cervical cytology results from the Overstrand for 2007 and 2009 were obtained electronically from the National Health Laboratory Service at Tygerberg Hospital, Parow, Cape Town. Details of all patients with atypical squamous cells of undetermined significance (ASCUS), human papillomavirus (HPV), low-grade squamous intraepithelial lesions (LSILs), high-grade squamous intraepithelial lesions (HSILs), atypical glandular cells of undetermined significance (AGUS) and suspected cervical carcinoma (Ca) were extracted. The medical records of all patients who had HSILs, AGUS or Ca, and of those with LSILs/ASCUS/HPV where colposcopy was recommended on the cytology report, were reviewed.

The medical records were checked to find the HIV status of each patient, whether she had returned and had received the cytology result, and whether colposcopy had been booked. The colposcopy site and appointment date were recorded. Evidence of the patient having received colposcopy was sought in the records and whether or not she had remained in care.

Colposcopy registers and patient records at Worcester, Tygerberg and Hermanus hospitals were reviewed to determine whether patients had attended their colposcopy appointments. Patients were assessed as having attended colposcopy if they attended at some point even after several missed appointments. The number of patients requiring rebooking before attendance was not recorded.

Statistical analysis

Microsoft Excel 2000 was used to capture the data, and names were removed before analysis. Statistical analysis was done using Statistica version 9 (StatSoft Inc.). The Mann-Whitney *U*-test was used to compare non-parametric variables, and categorical variables were compared using the chi-square test. A *p*-value <0.05 was taken to represent statistical significance in hypothesis testing.

Ethical considerations

Ethical approval was obtained from the Health Research Ethics Committee of Stellenbosch University (reference N09/11/334).

Results

A total of 886 and 1 628 cervical smears were done in the Overstrand in 2007 and 2009, respectively, an 84% increase over 2 years (c.f. clinic visits, which increased by 40% in the same period). There were 174 abnormal smears in 2007 (19.6%) and 418 in 2009 (25.7%). Table 1 shows the breakdown of results.

The median age at the time the cervical smear was done was 34 years in 2007 and 33 years in 2009. Of all the cervical smears, 32% were done on women under the age of 30 years and 3.6% on women over the age of 60 years.

Table 1. Total cervical smears done in 2007 and 2009, with a breakdown of results

Cervical cytology results	2007 n (%)	2009 n (%)
Unsuitable	10 (1.1)	29 (1.8)
Normal	654 (73.8)	1 096 (67.3)
Benign changes	48 (5.4)	85 (5.2)
Atypia	7 (0.8)	32 (2.0)
ASCUS	30 (3.4)	30 (1.8)
ASC-H	1 (0.1)	5 (0.3)
AGUS	1 (0.1)	3 (0.2)
LSILs	93 (10.5)	221 (13.6)
HSILs	36 (4.1)	125 (7.7)
Malignant	6 (0.7)	2 (0.1)
Total	886 (100.0)	1 628 (100.0)

ASCUS = atypical squamous cells of undetermined significance; ASC-H = atypical squamous cells – cannot exclude HSIL; AGUS = atypical glandular cells of undetermined significance; LSILs = low-grade squamous intraepithelial lesions; HSILs = high-grade squamous intraepithelial lesions.

Table 2. Feedback of colposcopy results to patients

	2007 n (%)	2009 n (%)
Cytology report recommended colposcopy	109 (100.0)	310 (100.0)
Result communicated to patient	77 (70.5)	254 (82.0)
Result not communicated to patient	18 (16.5)	43 (14.0)
Not known whether result communicated to patient or not	14 (13.0)	13 (4.0)

Table 3. Cervical cytology of patients booked for colposcopy

Total booked for colposcopy	2007 n (%)	2009 n (%)
ASCUS	0 (0.0)	2 (1.0)
ASC-H	0 (0.0)	2 (1.0)
AGUS	0 (0.0)	1 (0.5)
LSILs	33 (55.0)	94 (47.0)
HSILs	22 (37.0)	102 (50.0)
Ca	5 (8.0)	1 (0.5)
Total	60 (100.0)	202 (100.0)

ASCUS = atypical squamous cells of undetermined significance; ASC-H = atypical squamous cells – cannot exclude HSIL; AGUS = atypical glandular cells of undetermined significance; LSILs = low-grade squamous intraepithelial lesions; HSILs = high-grade squamous intraepithelial lesions; Ca = carcinoma.

The files of patients with cytology reports recommending colposcopy were requested: there were 109 from 2007 and 310 from 2009. The proportion of these patients who received communication of their cytology results is shown in Table 2. The prevalence of HIV infection among those booked for colposcopy was 88.3% in 2007 (1.6% unknown) and 86.1% in 2009 (4.0% unknown).

In 2007, 60 patients were booked for colposcopy at Tygerberg and Worcester hospitals. This represents 6.8% of the women who had cervical smears in that year. In 2009, 202 patients were booked for colposcopy, all at Hermanus Hospital and representing 12.4% of the women who had cervical smears in that year. The breakdown of cervical lesions on cytology of patients booked for colposcopy is shown in Table 3.

In 2007, 40 of the 60 patients booked (66.7%) attended for colposcopy at Tygerberg and Worcester hospitals. In 2009, 159 (78.7%) of the 202 patients booked attended for colposcopy at Hermanus Hospital (Fig. 1). This is an improvement in colposcopy uptake of 18% from 2007 to 2009, a positive trend ($p=0.06$). If one compares the proportions of colposcopies required that were actually done (36.7% for 2007 v. 51.3% for 2009), there was a 40% increase in 2009.

Colposcopy uptake for each clinic, with distances from the district hospital and availability of public transport for each area, is set out in Table 4. If uptake is analysed excluding the patients from Kleinmond,

from which there was no transport to Hermanus Hospital, there was a significant 22% increase in uptake from 2007 to 2009 ($p=0.02$) (Fig. 2).

The mean time from the date of taking the cervical smear to the date of attending the colposcopy clinic was 170 days in 2007 and 141 days in 2009, i.e. there was a significant reduction of 29 days (17%) ($p=0.02$).

The median age of women booked for colposcopy was 30 years in 2007 and 31 years in 2009.

In both years, two-thirds of women who had not gone for colposcopy remained in care at the clinic without being rebooked for colposcopy. The outcomes of patients with HSILs or cancer who were not booked for colposcopy are set out in Table 5.

Discussion

The current approach to the prevention of cervical carcinoma in South Africa is widespread screening of women with Pap smears, and referral of those with dysplastic smears for colposcopy and LLETZ if confirmed. This system frequently breaks down as a result of difficulty in accessing the colposcopy services, which are usually provided at referral hospitals that may be far from where patients live. This has been examined elsewhere in several studies, mostly in developed settings.^[5-8] In an Italian study, 81% of women accessed colposcopy services after referral, while women from low socio-

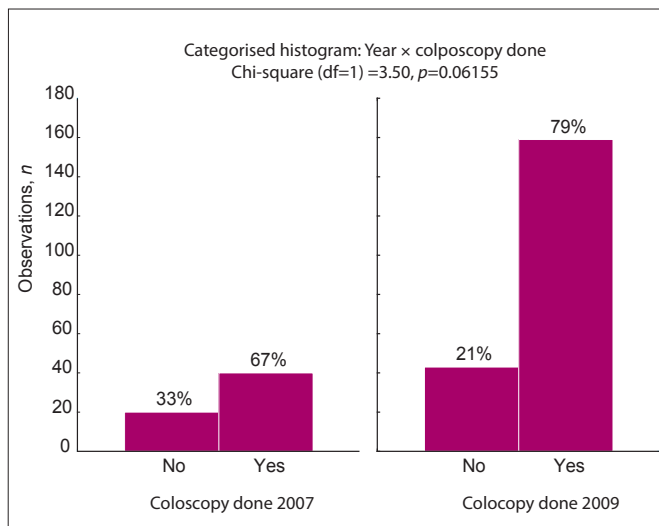


Fig. 1. Uptake of colposcopy (2007 and 2009).

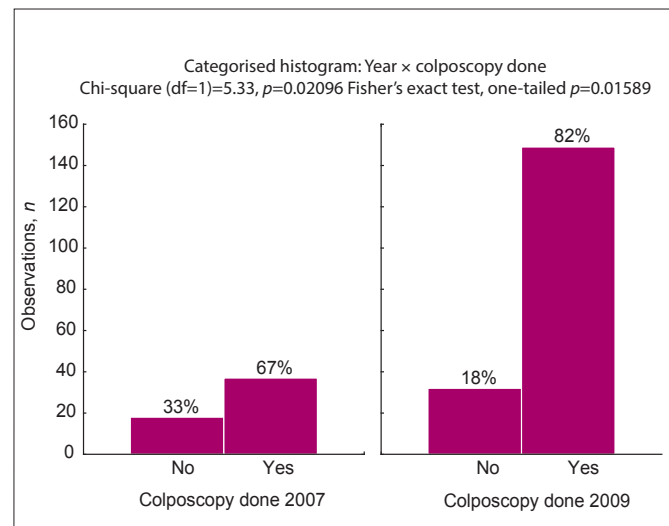


Fig. 2. Colposcopy uptake (2007 and 2009), Kleinmond patients excluded.

Table 4. Colposcopy uptake per clinic, with distances from the district hospital and availability of public transport for each area

Clinic	Distance from Hermanus Hospital (km)	Public transport available	2007			2009		
			Colposcopies done, n	Colposcopies not done, n	Colposcopy uptake, %	Colposcopies done, n	Colposcopies not done, n	Colposcopy uptake, %
Hospital OPD	0	Yes	16	8	66.6	67	9	88.1
Hermanus	1.3	Yes	0	0	0	5	1	83.3
Zwelihle	2.4	Yes	13	4	76.5	50	11	82.0
Mount Pleasant	2.4	Yes	0	0	0	7	2	77.8
Hawston	11	Yes	3	1	75.0	6	2	75.0
Stanford	28	Yes	3	2	60.0	4	0	100.0
Kleinmond	36	No	3	2	60.0	10	11	47.6
Gansbaai	50	Yes	2	3	40.0	10	7	58.8

OPD = outpatient department.

Table 5. Reasons for HSIL and cancer patients not being booked for colposcopy

	2007 n (%)	2009 n (%)
HSILs not booked for colposcopy	14 (100.0)	22 (95.7)
Ca not booked for colposcopy	0 (0)	1 (4.3)
Lost to follow-up	4 (28.6)	15 (65.2)
Known to have died	1 (7.1)	3 (13.0)
File lost	4 (28.6)	1 (14.3)
Result not noted by clinic	5 (35.7)	4 (17.4)

HSIL = high-grade squamous intraepithelial lesions; Ca = carcinoma.

economic groups in the UK and USA attended at a rate of 50 - 75%^[5,7] A study in rural Australia showed a 69% colposcopy uptake rate, with rural and indigenous women, those living transiently in an area and those in very remote areas being less likely to attend for follow-up.^[9] Various alternative strategies have been tried to address this problem, including telecolposcopy, portable colposcopy, nurse practitioner or generalist colposcopists, and the establishment of colposcopy services in local PHC facilities or district hospitals^[7,8,10,11] (and Western Cape Department of Health Population Estimate, Circular H13/2010:16 – unpublished). Local colposcopy services outside referral centres were found to be cost-effective and more acceptable to patients, and to result in higher rates of attendance for colposcopy.^[7,8,11]

The PHC patient load in the hospital and clinics increased considerably (by 40%) from 2007 to 2009. Despite this, 84% more cervical smears were done in 2009. This increase could be attributed to the provincialisation of the clinics that occurred in July 2007, when municipal clinics were taken over by the Department of Health and incorporated into a unified district health system together with the district hospital, strengthening PHC.

National cervical smear performance targets take into consideration only cervical smears done every 10 years on patients between the ages of 30 and 60 years. Using this measure, at least 32% of the cervical smear workload in the Overstrand sub-district, which was done on HIV-positive women under the age of 30, would not have been recognised when measuring the performance of the PHC services.

The overwhelming majority of women booked for colposcopy were HIV-positive. Cervical cytology performance targets do not take the HIV guidelines and the nature of the cervical smear workload into account. Conversely, the overwhelming preponderance of HIV-positive women booked for colposcopy suggests that the 10-yearly screening of asymptomatic women is being neglected in favour of screening of the HIV-infected population.

Fourteen per cent of women who had cervical smears were not told their results; this was most commonly because they were not seen again. However, some were seen again but the results were not noted by the healthcare workers, the results being either not in the file, or in the file and overlooked. There is clearly no place at all for the often-encountered practice of only notifying those patients who have abnormal results. Every woman who has a smear taken must be asked to come back for the result, irrespective of whether it is abnormal or not. Improvement in follow-up is likely to occur if cervical cytology targets are changed to measure the number of cytology results given to women rather than the number of cervical smears taken.

The 236% increase in colposcopy bookings far exceeded the 84% increase in cervical smears done. This is not explained by an increase in the proportion of abnormal smears (Table 1). Increased awareness of colposcopy because of the local service and the simplified booking procedure (which no longer included the need to book transport), might have encouraged staff to book colposcopy more readily. There is no evidence of an increase in unnecessary colposcopies, as the proportion of LSIL colposcopies (which can include some unnecessary bookings) did not increase in 2009 (Table 3). The high HIV prevalence in the area may help to explain the increase: cervical screening of HIV-positive women is part of the package of care, and women are screened both earlier and more frequently. A higher proportion will need colposcopy, as they are more likely to have dysplastic lesions, and these lesions are more likely to progress more rapidly. It would be interesting to compare the change in size of the HIV clinics over the study period.

The colposcopies booked in 2009 for Hermanus Hospital removed 202 women from the waiting lists of the referral hospital colposcopy clinics, where resource constraints limited the capacity for further increase. It would not have been possible to establish this service at this time without the skills and time of the private specialists contracted in to provide services to state patients. Depending on the circumstances, expertise for such a service could be provided by referral hospital specialists on an outreach basis or by training an interested family physician, career medical officer or specialist nurse.

The establishment of a district hospital colposcopy service did improve uptake of colposcopy in a rural sub-district. The improvement in uptake was most marked in the clinics closest to the hospital. For the only area without public transport, Kleinmond (36 km from the district hospital), there was a worsening of colposcopy uptake in 2009. This is because government-provided planned patient transport to Tygerberg, which is often fully booked, is the only transport available to those in Kleinmond who do not have access to a private vehicle. If a patient was fortunate enough to get a place on the 'ambulance bus', it was therefore easier for her to travel 120 km to Tygerberg Hospital than to hitch-hike the 36 km to Hermanus Hospital. When the Kleinmond clinic was excluded from the analysis, the statistical significance of the increase in colposcopy uptake improved, with the *p*-value decreasing to 0.02. This highlights the importance of transport in accessibility of medical services.

The time from cervical smear to colposcopy seems inordinately long, but the 17% decrease from 170 days (5.5 months) to 141 days (4.5 months) was nonetheless a statistically significant improvement afforded by the local service. Reasons for delay included a delay in the patient returning for results, a delay in the result being noted and acted on by the healthcare worker, and patients missing their colposcopy appointments and being rebooked for a later date. The improvement could be explained in part by the local service removing the need to co-ordinate the booking of scarce vacant seats on the planned patient transport service with available colposcopy appointments at the distant sites. As the local colposcopy service gained momentum, the backlog of women needing colposcopy decreased and the waiting list was greatly reduced by 2010. At the time of writing this article (August 2010), the waiting list for colposcopy was 34 days at Hermanus Hospital, 83 days at Worcester Hospital and 146 days at Tygerberg Hospital, with the possibility of accommodating urgent patients earlier. This improved access to colposcopy is reason enough to consider starting up more colposcopy sites at district hospitals where circumstances allow.

Not all women who failed to attend colposcopy were lost to follow-up. In 2007 and 2009, 35% and 33% of women, respectively, who missed their colposcopy appointments continued in care at their clinics. If colposcopy clinics record the name of the clinic making the booking alongside the details of the patient booked, they can notify each clinic when their patients do not attend.

Of concern were women with HSILs or suspected cancer on cytology who were not booked for colposcopy. Most of these patients were either lost to follow-up or known to have died. However, 9 of them were still in care with cytology results that had either never been actively sought by the staff or were in the file but not acted upon. Better systems need to be put into place to prevent such errors, and their huge medicolegal implications. Good communication and patient education will remain an important key to the cervical screening process, as a well-informed patient can help to remind her carer of the follow-up that is required.

The study highlighted the areas needed to strengthen the cervical cancer prevention programme at many levels: getting the results to patients, taking the correct action on results, and facilitating attendance for colposcopy and further follow-up. Simple administrative improvements can be expected to impact positively on the screening process.

Study limitations

The two years compared had differences besides the change in the referral pathway for colposcopy, e.g. workload and management structure. The retrospective design of the study prevented assessment of convenience and acceptability for both patients and staff. An analysis of the cost to the state and the patient of the local v. the distant colposcopy service would further inform decision-making about the establishment of colposcopy services in district hospitals.

Conclusion

This study demonstrates that the establishment of a colposcopy service at a district hospital in a rural sub-district in South Africa is possible, and that it increased the uptake of colposcopy and decreased the delay from cervical smear to colposcopy. This district hospital colposcopy service for one rural sub-district removed 202 patients booked in one year from the colposcopy load of its referral hospitals. The colposcopy service was relatively easy to set up, and except for the cost of the colposcope, did not demand significant capital outlay. As the demand for colposcopy increases, the establishment of other district hospital colposcopy services could help to improve access for many rural women requiring this essential service.

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