The antenatal prevention of congenital syphilis in a peri-urban settlement

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Abstract **The obstetric records of patients from Khayelitsha were examined to assess the efficiency of a system for the antenatal prevention of congenital syphilis, and to identify points of breakdown in the process. Seventy-seven (12,7%) of 607 mothers had serological evidence of syphilis, including 10 (32,3%) of 31 mothers who had received no antenatal care. Of 70 patients who required routine management, only 36 (51,4%) received 3 or more of the recommended 4 penicillin injections. Two main weaknesses in the system were identified. One was the centralisation of serological testing. This delayed results reaching the relevant unit, and was responsible for a high cumulative attrition of patients during the many stages necessitated by the centralised testing. The other was a 24,5% attrition of patients referred from the antenatal clinic to a separate sexually transmitted diseases clinic.**

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Congenital syphilis should be preventable. Penicillin has been available for almost 50 years and maternal screening programmes for syphilis may be cost-effective at an incidence as low as 5 per 100 000.[1] Yet congenital syphilis remains a significant cause of illness and death in both the developed and the developing world.[2-4] In Khayelitsha, a rapidly growing settlement on the outskirts of Cape Town, congenital syphilis is the second biggest known cause of perinatal death. It accounts for 24% of deaths from 'known' causes (S.V. Delport, R. C. Howland — personal communication), despite almost 90% of pregnant women receiving antenatal care from the Peninsula Maternal and Neonatal Service[5] (PMNS), including screening for maternal syphilis.

A retrospective analysis of the records of Khayelitsha patients presenting to the PMNS was undertaken to assess the efficiency of the prevention programme, and to identify points of breakdown in the process.

Patients and methods

Khayelitsha is served by a midwife obstetric unit[6] (MOU), which refers patients to any of 4 hospitals in the PMNS. At the time of the study 96% of mothers from Khayelitsha delivering within this service delivered at either the MOU, Groote Schuur Hospital (GHS) or Peninsula Maternity Hospital (PMH). Routine procedure included the taking of a blood specimen at the first antenatal visit (the booking visit). This was sent to a central laboratory at GSH for a venereal disease research laboratory (VDRL) test. Positive results were confirmed with *Treponema pallidum* haemagglutination (TPHA). At the MOU the patients were asked to return for the results after 2 weeks and at GSH and PMH, after 1 month. Mothers with a positive VDRL (any titre) and positive TPHA were then referred to their local sexually transmitted diseases (STD) clinics for further treatment. At the MOU the first dose of benzathine penicillin was given at the time of referral. Treatment was regarded as complete after 4 weekly injections.

The names of mothers with Khayelitsha addresses, who delivered at Khayelitsha MOU, GSH or PMH from 1 January 1990 to 28 February 1990 and who had positive VDRL and TPHA results, were obtained from the delivery registers of the respective labour wards. Where the serology result was not recorded in the delivery register, the mother's serological status as recorded *pro forma* antenatally in her records or at delivery on the infant record chart was accepted as her status at delivery, unless there was evidence to the contrary in the records. Patients thus regarded as having known positive results at delivery were analysed with the other patients known to be seropositive. In cases where results were unknown at delivery, the central laboratory's records were examined. Where no record was found, it was assumed that no specimen had been received by the laboratory.

Referral between the MOU and the hospitals was frequent, both before and during labour, making it difficult to distinguish between MOU and hospital patients. All seropositive patients with Khayelitsha addresses were thus analysed together. Because of difficulty in establishing the home addresses of seronegative mothers delivering at PMH and GSH, prevalence rates were determined for MOU deliveries only.

Seropositive patients' records were examined to determine whether the stages in the prevention process listed in Table I had been successfully negotiated. When patients had been referred to an STD clinic, the records of each of the three clinics in Khayelitsha were examined for details of attendance and treatment. If there was no record of attendance it was assumed that the patient had not attended.

Results

The prevalence of serological evidence of syphilis in MOU deliveries only is shown in Table II. Seventy-seven (12,7%) of 607 patients were seropositive, including 10 (32,3%) of 31 unbooked patients.

Taking MOU, GSH and PMH deliveries all into account, the records of 84 of 86 patients known to be serologically positive at delivery were traced. Fourteen of these were excluded from further analysis; 5 because a repeat VDRL at the STD clinic was negative, 3 because erythromycin was used in place of penicillin, 5 because unsubstantiated comments in the PMNS records suggested STD clinic attendance in the absence of a STD record, and 1 because of inadequate documentation of treatment at one of the hospitals. The attrition of the remaining 70 patients while negotiating successive hurdles in the detection and treatment process is shown in Table I. Thirty-six (51,4%) received 3 or more of the recommended 4 penicillin injections. The greatest attrition (24,5%) took place at the time of referral from the antenatal clinic to the STD clinic.

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TABLE I.
Attrition rate at each treatment stage (all hospitals)

	No.	Patients lost	Attrition (%)
Seropositive	70		
Test result available before delivery	62	8	11,4
Patient returned for result	56	6	9,7
Result acted upon	53	3	5,4
Attended STD clinic (1st visit)	40	13	24,5
Completed treatment*	36	4†	10,0

* 3 or more injections.
† 2 patients delivered before treatment was complete and 2 patients defaulted on treatment.
Eight (66,7%) of 12 patients who failed to attend the STD clinic attended the antenatal clinic at least 4 times. Records of antenatal attendance in the 13th patient were incomplete.

TABLE II.
Prevalence of serological evidence of maternal syphilis* in MOU deliveries

	Deliveries	Sero-positive	% positive
Booked, test done	576	67	11,6
Unbooked, test done	31	10	32,3
Total tests done	607	77	12,7
Test not done	21	—	—
Total	628	77	

*Positive VDRL and TPHA.

Thirty-five (97,2%) of the 36 fully treated patients started treatment more than 30 days before delivery (data not shown). Fifty (71,4%) of the 70 patients studied received at least 1 injection, either in the PMNS or at the STD clinic (data not shown).

Thirteen mothers booked and/or required treatment between 16 December 1989 and 7 January 1990. The treatment completion rate during that time was not significantly different from that at other times.

Two of the 72 babies born to 70 seropositive mothers had evidence of congenital syphilis at delivery. One had clinical signs of syphilis and the other a raised total IgM level. Their mothers had booked 14 and 11 days before delivery and had received no treatment.

Discussion

At 12,7%, Khayelitsha has a high prevalence of mothers with serological evidence of syphilis and the prevalence rate of 32,4% in the small sample of unbooked mothers is particularly high. It is well recognised that control of early infectious syphilis in a community is essential for the control of congenital syphilis[7] and also that mothers who have no antenatal care present the major problem in the antenatal prevention of congenital syphilis.[1,8] It is thus not surprising that congenital syphilis is a problem in Khayelitsha.

However, this study identified other problem areas in the prevention system. Despite a success rate approaching or exceeding 90% at all but one of the steps in the detection and prevention process, only 51,4% of seropositive patients received 3 or more injections, the recommended treatment for latent syphilis in pregnancy.[9] This was because of the cumulative attrition at each of the many stages in the process, which are largely unavoidable if a centralised system of serological testing is used.

The stage with the greatest attrition rate (24,5%) was referral to the STD clinics, although the main STD clinic is housed in the same building complex as the antenatal clinic. This attrition rate may be an overestimate because of uncertainty about the attendance of 5 patients (who were excluded from the analysis). But even if all 5 of these patients had reached the STD clinic the default rate for this stage would still be 22,4%. The 'defaulters' were not habitual non-attenders, 66,7% of them having attended the antenatal clinic at least 4 times. Possible reasons for non-attendance include poor co-ordination between different clinics administered by different health authorities, the painful injections, and the stigma attached to STD clinic attendance. The reasons for this attrition clearly need investigation to allow for appropriate intervention.

Nevertheless, 1 injection is regarded as adequate treatment for current or recent secondary syphilis,[9] the stage when the risk of transmission to the fetus is greatest.[10] The policy of giving the first injection at the MOU before referral to the STD clinic resulted in 71,4% of patients receiving at least 1 injection.

The mothers of the 2 babies with evidence of congenital syphilis had booked too late for any antenatal treatment. This is consistent with the findings of a retrospective survey of 27 infants from Khayelitsha with congenital syphilis, 78% of whose mothers had booked late (a median of 14 days before delivery). Because of the delays in receiving results from the centralised laboratory, 50% of the booked mothers had received no treatment by the time of delivery. Subsequent attempts to expedite the communication of positive results to the antenatal clinics met with little success. Despite a special effort, only 18% of affected patients in Khayelitsha were traced and treated with less delay than before. Even so the median delay was 7 days.

In these circumstances on-site serological testing has obvious attraction as an alternative to centralised testing. It would eliminate the delay in receiving results and lead to significantly earlier treatment of mothers who book late. It would reduce the number of steps in the prevention process. It would also immediately identify seropositive unbooked mothers, obviating the difficult, expensive and unreliable process of trying to trace them later. The main difficulty with on-site testing relates to the decentralised nature of the MOUs and the problems of staffing and maintaining quality control in 9 peripheral laboratories operating simultaneously. Whether this difficulty negates the many potential advantages of on-site testing requires careful consideration.

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