

Operational issues in preventing mother-to-child transmission of HIV-1 in Abidjan, Côte d'Ivoire, 1998–99

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Objective To demonstrate the feasibility, from the public health standpoint, of preventing mother-to-child transmission of human immunodeficiency virus type 1 (HIV-1) in Africa.

Methods Voluntary counselling and HIV serotesting were routinely provided in four health centres in Abidjan, Côte d'Ivoire, for six months in 1998–99. Peripartum treatment with zidovudine and alternatives to breastfeeding were provided free to HIV-infected women.

Findings Of the 4309 pregnant women in the study who attended their first antenatal care visit, 3756 benefited from individual counselling and pretesting (87.2%), and 3452 (80.1%) agreed to undergo HIV serotesting. Overall HIV prevalence was (12.89%) and 5% for women aged under 18 years. Among the 2998 HIV-negative women, 71% returned for their test result, whereas only 60% of the 445 HIV-positive women did so. A total of 124 HIV-positive women were informed of their serostatus and the possibility of preventing mother-to-child transmission of HIV; 100 started treatment and 80 completed zidovudine prophylaxis. At 6 weeks of age, 36 of the 78 liveborn children were being breastfed (46%), two were being mixed-fed and 41 (52%) were being artificially fed.

Conclusions In Abidjan, voluntary counselling and HIV testing with a view to preventing mother-to-child transmission was feasible in antenatal care units and was well accepted by pregnant women. An insufficient proportion of women returned to obtain their test results. This was especially so among HIV-positive women, the target group for preventing mother-to-child transmission of HIV. Additional staff were required in order to offer voluntary counselling and HIV testing to the study women. Close supervision and strong commitment of health workers were essential. Alternatives to breastfeeding were effectively proposed to HIV-positive women, with active follow-up of children and clinical, nutritional and social support.

Keywords HIV infections/therapy/diagnosis; HIV-1/immunology; HIV seropositivity; Disease transmission, Vertical/prevention and control; Breast feeding/adverse effects; Pregnancy; AIDS serodiagnosis; Counseling; Truth disclosure; Zidovudine/therapeutic use; Program evaluation; Côte d'Ivoire (*source: MeSH*).

Mots clés HIV, Infection//thérapeutique/diagnostic; HIV-1/immunologie; Séroposivité HIV; Transmission verticale maladie/prévention et contrôle; Allaitement au sein/effets indésirables; Grossesse; Sérologie HIV; Conseil; Zidovudine/usage thérapeutique; Evaluation programme; Côte d'Ivoire (*source: INSERM*).

Palabras clave Infecciones por VIH/terapia/diagnóstico; VIH-1/inmunología; Seropositividad para VIH; Transmisión vertical de enfermedad/prevenición y control; Lactancia materna/efectos adversos; Embarazo; Serodiagnóstico del SIDA; Consejo; Revelación de la verdad; Zidovudina/uso terapéutico; Evaluación de programas; Côte d'Ivoire (*fuente: BIREME*).

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Introduction

Clinical trials have demonstrated that reductions of 37–50% in mother-to-child transmission of human immunodeficiency type 1 virus (HIV-1) can be achieved through a short course of zidovudine

(AZT) (1–3) or nevirapine (4). Subsequently such interventions have been implemented as public health programmes in developing countries (5) and in several African countries pilot programmes began in 1999 (6).

In Abidjan, Côte d'Ivoire, the DITRAME ANRS 049a trial achieved 37% and 30% reductions

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in mother-to-child transmission of HIV-1 at the ages of 6 and 15 months, respectively, following a short maternal regimen of AZT, compared with a placebo, in a breastfed population (1, 7). Building on this result, investigators of the project, UNICEF and the National AIDS Control Programme in Côte d'Ivoire jointly developed and implemented a six-month public health project beginning on 1 October 1998 to provide, on a routine basis, the following services free of charge: universal proposal of HIV screening to pregnant women; HIV serotesting of all pregnant women who agreed; provision of pretest and post-test information and counselling; and a short course of zidovudine and alternatives to breastfeeding for pregnant women infected with HIV-1.

Methods

In October 1998 the UNICEF Interim Project initiated the organization of the above services in the four facilities where the DITRAME research programme had been taking place: the Yopougon Teaching Hospital, a public sector health centre, and two community-based health centres. The field team comprised five experienced counsellors, two midwives, and two physicians who complemented the regular personnel of these clinics during the research phase.

The HIV serotest was proposed to each pregnant woman during an individual pretest interview lasting 10–15 min at the first antenatal consultation, after clinical examination in a private room. A blood sample was taken by the person who conducted this interview and an identification number was assigned to each patient so that the entire process would remain anonymous. No restrictions were placed on the age or gestational age of the participants. Two enzyme-linked immunosorbent assays (ELISA) (Murex ICE™, Murex Biotech Ltd, Dartford, England; and Vironostika™, Organon–Teknika Inc, Scarborough, Ontario, Canada) were used to test to all the sera in the Centre de Diagnostic et de Recherches sur le SIDA (CeDReS) laboratory in Abidjan. In accordance with the recommendations of the National AIDS Control Programme, tests distinguishing between HIV-1 and HIV-2 were not employed. Positive results were disclosed to the women who returned to the clinic two weeks later, when a new sample was taken for repeat testing in order to avoid labelling and laboratory errors.

The result of her HIV test was explained to each participating mother at individual post-test counselling sessions by the person who had proposed and performed it. On average, each post-test session lasted 10 min for uninfected women and 30 min for HIV-positive women. Uninfected women were given further counselling on prevention of HIV infection and were encouraged to bring their partners for free testing. They were then provided with routine antenatal services. Each HIV-positive woman also received general preventive counselling and

was advised to inform her partner, who, if he consented, was tested under similar conditions. Furthermore, specific counselling was given to each HIV-positive woman on the means available for reducing the risk of infecting her child, on support groups for people living with HIV, and on locations where she could obtain care, assistance, and counselling. An appointment was made for her to meet the project team within a week to discuss the prescription of AZT and the choice of feeding methods. The only criterion for excluding the prescription of AZT was a haemoglobin level below 7g/dl. HIV-positive pregnant women were invited to return at any time if they wished to ask questions about counselling and care.

The treatment involved taking one 300-mg tablet of AZT twice a day from the first day of week 36 of pregnancy until delivery, this being the regimen adopted by the National AIDS Control Programme in the light of trial results (1, 2). Two additional 300-mg AZT tablets supplied to each woman at the beginning of treatment were required to be taken at the onset of labour, preferably before going to the maternity unit in order to avoid possible stigmatization in the delivery room. There was also free provision of daily anaemia prophylaxis with generic iron folate.

A first follow-up clinic appointment was scheduled after one week of treatment. If compliance seemed satisfactory, a three-week AZT course was given and an appointment was made for the day after delivery. Women who had not delivered within a month after the start of treatment were advised to return to the project site for an additional two-week supply of AZT.

Immediately after the disclosure of their test results, HIV-positive women received information on the advantages and problems related to the various types of infant feeding. Emphasis was placed on the expected reactions of family members, relatives and friends if alternatives to breastfeeding were chosen. If a mother decided to use powdered milk for her baby, the initial assessment focused on her capacity to carry out this feeding method successfully. Each woman was informed that artificial milk would be provided free of charge but in controlled quantities (a maximum of two tins at each appointment), and that each time she collected it she would have to be accompanied by her child, who would be weighed and examined. Women choosing artificial feeding were given a tin of milk and feeding material at the last visit before delivery. This ensured a sufficient quantity of milk for feeding new babies at the maternity unit before the first postnatal appointment. Recommendations on early cessation of breastfeeding were given to women who had chosen to breastfeed, in line with the experiences of the DITRAME Project in Abidjan (8) and international guidelines (9). If mothers chose mixed feeding, the programme did not provide artificial milk, since recent findings in South Africa indicate that mixed feeding combines the risks related to both types of feeding (10).

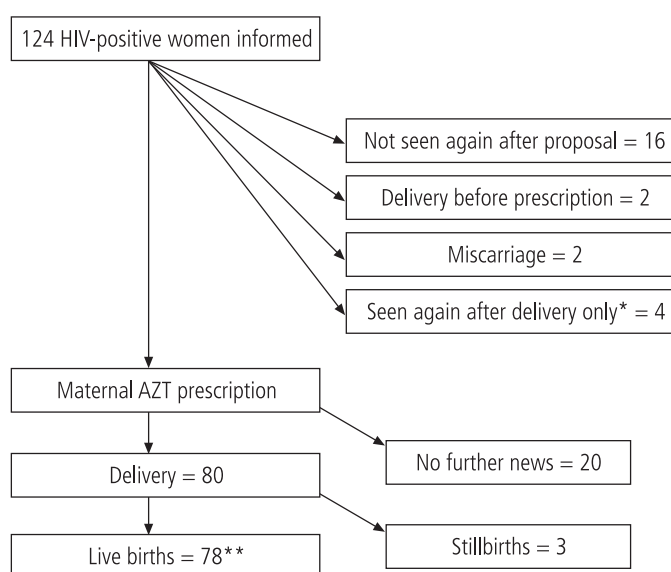
Results

Of the 4309 pregnant women attending their first antenatal care visit between 1 October 1998 and 15 April 1999, 198 left the health centre before the counselling session; 355 pregnant women could not be given either proper counselling or the HIV test because of a language barrier; and 3756 received individual counselling and attended a pretest session (87.2%). The median age of the study women was 23 years (interquartile range: 19–28 years) and the median gestational age was 25 weeks (interquartile range: 20–28 weeks).

Of the 3756 women who received counselling, 3452 agreed to undergo the HIV test (91.9%). The overall HIV prevalence was 12.89% (445 HIV-positive women); among the 475 women under the age of 18 years the HIV prevalence was 5.0%. There were nine discordant HIV results that required further laboratory investigation. Of the women who were tested, 2384 (69.1%) returned for their results; this was organized independently of the routine antenatal care services. Of the 2998 HIV-negative women, 2116 (71%) returned, as did 268 of the 445 HIV-positive women (60%) ($P < 10^{-5}$). Thus, of the women to whom the HIV test was proposed, 63.5% agreed to undergo it and returned for the results, this being a measure of the overall acceptability performance of the counselling and testing procedure of the programme.

Of the 445 pregnant women diagnosed as HIV-positive, 177 did not return for their test results. Furthermore, a total of 144 HIV-positive women received their results, post-test counselling and information on the mother-to-child transmission prevention programme but did not return at the following stages. Altogether, 124 HIV-positive women who were informed of their serostatus made at least one subsequent contact with the team (Fig. 1). This corresponded to 27.8% of the HIV-positive women screened and 46.3% of the HIV-positive women who attended in order to obtain their test results. For unknown reasons, 16 of these 124 HIV-positive women did not return to receive AZT, 2 had a miscarriage, 2 delivered live neonates before receiving AZT, and 4 were seen again only after delivery. For the

Fig. 1. Flowchart for pregnant women who were prescribed AZT (zidovudine), UNICEF Interim Project, 1998–99, Abidjan, Côte d'Ivoire



* 4 women were seen again after delivery and did not receive AZT.

** one twin pregnancy.

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100 women who began AZT prophylaxis as scheduled, the treatment started, on average, at 36 weeks of pregnancy (range: 33–40 weeks), but 20 of these women were not seen again before delivery. The remaining 80 women received AZT up to delivery, resulting in 78 live births and 3 stillbirths. The median duration of antenatal AZT treatment was 22 days (range: 1–68 days). Intrapartum treatment was taken by 61 of the 80 women followed up in the antenatal period (79%), 2 of them taking four tablets instead of the two prescribed.

The target population for infant feeding was considered to be the 124 HIV-positive pregnant women who were informed about their serostatus and who subsequently presented at least once for consultation. The sample comprised the 77 women under AZT treatment who delivered 78 live births, the 2 women who delivered before receiving AZT, and the 4 who returned for their test result after

Table 1. Screening activities for pregnant women in four health centres, Abidjan, UNICEF Interim Project, October 1998 to April 1999

Total number of women in antenatal clinics	No. of women making first visit to antenatal clinics	No. of women received by project	No. of tests proposed to women (TP)	No. of tests accepted by women (TA)	TA/TP ^a (%)	No. of women who returned for result (RR)	RR/TA ^b (%)	RR/TP ^c (%)
16 621	4309	4111	3756	3452	91.9	2384	69.1	63.5

^a Test acceptance rate.

^b Rate of return for result.

^c Global acceptability rate.

delivery, accounting for a total of 84 live births. At the age of 6 weeks, 79 children were still alive: 36 were being breastfed (45.6%), 2 were receiving mixed feeding (2.5%), and 41 were receiving artificial feeding (51.8%).

As shown in Fig. 2, a total of 56 children were breastfed from birth, 7 were mixed fed, and 21 were artificially fed. On average, the 21 children on artificial feeding between birth and the sixth week of life started this type of feeding during the third week (range: 2–35 days). Five babies died before the sixth week: three of them, who were being breastfed, died on the first, third and fourth days of life, and two on artificial feeding died at the ages of 4 weeks and 6 weeks. A total of 16 mothers switched from breastfeeding to artificial feeding during the first 6 weeks of their babies' lives without a period of mixed feeding; this increased the total number of children artificially fed to 41 out of 79 (52%) by the age of 6 weeks. Most of these mothers had originally chosen breastfeeding because of a fear of being identified as HIV-positive or because of social pressure from their families or from midwives in the maternity unit.

Discussion

The programme yielded useful insights for the planning and implementation of future public health programmes for mother-to-child transmission of HIV in Africa.

HIV testing

HIV testing was readily accepted by the mothers and did not involve major difficulties of consent or confidentiality. It was feasible under appropriate conditions in the antenatal care units and was well accepted by pregnant women in a previous trial performed in the same population (7, 11). Acceptance of the testing was somewhat better than in other research settings (12). The studies conducted earlier in our location probably helped greatly to win good acceptance of the UNICEF Interim Programme — a situation that would possibly not be the case in settings without a similar history.

Proposing the HIV test to women aged under 18 years of age did not entail any special problems. A significant proportion of these women were found to be HIV-positive. A specific approach to the prevention of HIV and family planning is necessary for this target group.

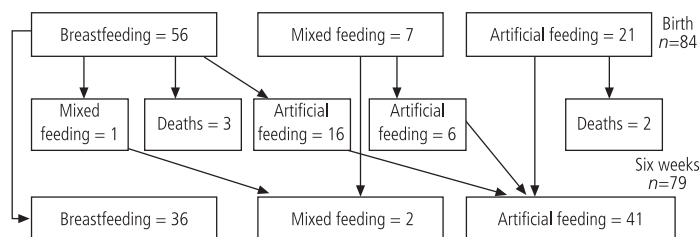
On at least one occasion over a period of 6 months, the 3756 pregnant women from two Abidjan districts in the study received individual counselling on HIV, its mode of transmission, and the means of protection. This accounted for 10% of the total number of women delivering in Abidjan over the same period, since it was estimated that there were 78 000 deliveries per year in the city. Furthermore, two-thirds of the study women received information on HIV on two occasions: when the test proposal was made and after disclosure of the results. It is not yet possible to measure the effect of this wide dissemination of information on the subsequent prevention behaviours of women made aware of their HIV status. However, positive effects of HIV testing have recently been demonstrated (13). Furthermore, in a complex situation where the number of HIV-positive women receiving AZT remained low, the total number of pregnant women reached by the project was high. This may ultimately lead to an improvement in the general organization and quality of antenatal services, a potential target of programmes to reduce mother-to-child transmission of HIV (14).

Mothers' serostatus

As already observed in Rwanda (15), fewer infected than uninfected women returned to obtain their test results. In the Abidjan population studied, failure to return for results was significantly related to women's fear of being infected and their inability to deal with such a situation (11, 16). This aspect may, however, have been overestimated, since a significant proportion of uninfected women also failed to return and the women may have simply chosen to express their right not to know their HIV infectivity status (17). Another important fear often expressed by the study women was that their serostatus could be discovered by relatives or neighbours through a breach in confidentiality. This fear could induce reluctance to return and meet the health care workers who knew that they were HIV-positive. These observations indicate the current perception by HIV-positive women of their risk of stigmatization associated with the use of services for the prevention of mother-to-child transmission of HIV in Abidjan. Site-specific operational research is required to provide a better understanding of this behaviour and improve the global acceptability of the HIV test.

It appeared that it would be extremely difficult to perform adequate testing and counselling of pregnant women in Abidjan without increasing the number of people employed in the antenatal services. An a priori decision was therefore made to increase the human resources. Counselling, perhaps more

Fig. 2. Feeding practices among children of HIV positive mothers, UNICEF Interim Project, 1998–99, Abidjan, Côte d'Ivoire (n = 84*)



*78 were born to HIV positive mothers having received AZT treatment at the end of pregnancy and the six others were born to untreated mothers.

than other antenatal services, requires regular supervision and the full commitment of staff, those in charge of their supervision, and decision-makers (18).

Infant feeding

In the urban context of Abidjan, it is feasible to develop alternatives to breastfeeding for HIV-positive women if well-organized support is available. This is particularly important in the light of the benefits and limited adverse consequences of artificial feeding among HIV-positive women recently reported from Nairobi (19). The UNICEF Interim Project was designed to be integrated subsequently into the routine antenatal and postnatal care services in Abidjan. In view of the need for precautionary measures associated with the distribution of artificial milk, the usually irregular postnatal attendance of mothers and the limited information on the subject given by health workers, we decided to set up an active follow-up of women covered by the project. In most programmes dealing with the prevention of mother-to-child transmission, active follow-up of artificially fed children is likely to be required in order to provide appropriate clinical, nutritional and social support for both mothers and children. Alternative infant feeding methods (20) and the prevention of infectious complications of paediatric HIV infection are also needed (21, 22). Overall, the integration of the prevention of mother-to-child transmission of HIV into maternal and child health programmes, together with the provision of additional services for HIV-positive women and their children, will be required on a systematic basis (23, 24). Our project was not intended to document the reduction in the transmission rate obtained through this combination of interventions. Results will be given individually to each woman wishing to know the infection status of her child by the age of 15 months, on the basis of standard serological antibody tests.

This type of intervention is sustainable to the extent that zidovudine or other antiretrovirals are

affordable and artificial milk is subsidized. The counselling and follow-up of HIV-infected persons is time-consuming but the resources required can and should be provided by health ministries. Strong support and solidarity from the international community is also vital.

Conclusions

In Abidjan the gradual establishment of the International Therapeutic Solidarity Fund (25) ensured that there was no interruption in counselling and testing when the UNICEF Interim Project ended. Late in 2000, UNICEF pilot programmes on the prevention of mother-to-child transmission of HIV started in Abidjan. Their findings will be vital for the gradual introduction of national and international policies and the acquisition of increased resources for the prevention of mother-to-child transmission of HIV in Africa. ■

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Conflicts of interest: none declared.

Résumé

Aspects opérationnels de la prévention de la transmission mère-enfant du VIH-1 à Abidjan (Côte d'Ivoire)

Objectif Démontrer la faisabilité, du point de vue de la santé publique, de la prévention de la transmission mère-enfant du virus de l'immunodéficience humaine type 1 (VIH-1) en Afrique.

Méthodes Un conseil volontaire et un dépistage sérologique du VIH ont été proposés en routine pendant six mois dans quatre centres de santé d'Abidjan (Côte d'Ivoire) en 1998-1999. Un traitement péripartum par la zidovudine et des alternatives à l'allaitement maternel ont été offerts gratuitement aux femmes infectées par le VIH.

Résultats Sur les 4309 femmes enceintes recrutées dans l'étude et qui se présentaient pour leur première visite anténatale, 3756 ont bénéficié d'un conseil individuel et d'un pré-test (87,2 %) et 3452 (80,1 %) ont accepté de subir un test de dépistage sérologique du

VIH. La prévalence globale du VIH était de 12,95 %, et chez les femmes de moins de 18 ans elle était de 5 %. Parmi les 2998 femmes VIH-négatives, 71 % sont revenues pour le résultat de leur test, contre 60 % seulement des 445 femmes VIH-positives. Au total, 124 femmes VIH-positives ont été informées de leur statut sérologique et de la possibilité d'éviter de transmettre le VIH à leur enfant ; 100 ont commencé une prophylaxie par la zidovudine et 80 l'ont suivie jusqu'au bout. A l'âge de six semaines, 36 des 78 nourrissons nés vivants étaient nourris au sein (46 %), 2 recevaient un allaitement mixte et 41 (52 %) un allaitement artificiel.

Conclusion A Abidjan, le conseil volontaire et le dépistage du VIH dans le but d'éviter la transmission

mère-enfant du virus se sont révélés réalisables dans des services de soins anténatals et ont été bien acceptés par les femmes enceintes. Une proportion insuffisante de femmes sont toutefois revenues pour le résultat de leur test, en particulier parmi les femmes VIH-positives, qui constituent le groupe cible de la prévention de la transmission. Un personnel supplémentaire a été

nécessaire pour assurer le conseil volontaire et les tests VIH chez les participantes. Une supervision étroite des agents de santé et un fort engagement de leur part étaient indispensables. Des alternatives à l'allaitement au sein ont été proposées avec succès aux femmes VIH-positives, avec un suivi actif des nourrissons et un soutien clinique, nutritionnel et social.

Resumen

Aspectos operativos de la prevención de la transmisión materno-infantil del VIH-1 en Abidján (Côte d'Ivoire)

Objetivo Demostrar la viabilidad, desde una perspectiva de salud pública, de la prevención de la transmisión materno-infantil del virus de la inmunodeficiencia humana tipo 1 (VIH-1) en África.

Métodos A lo largo de seis meses de 1998-1999 se ofrecieron sistemáticamente en cuatro centros de salud de Abidján (Côte d'Ivoire) asesoramiento y pruebas serológicas del VIH voluntarias. A las mujeres infectadas por el virus se les suministraron gratuitamente tratamiento perinatal con zidovudina y alternativas a la lactancia natural.

Resultados De las 4309 mujeres embarazadas del estudio que realizaron una primera visita de atención prenatal, 3756 se beneficiaron de asesoramiento individual y preanálisis (87,2%), y 3452 (80,1%) consintieron en someterse a la prueba serológica del VIH. La prevalencia global del VIH fue del 12,95%, y el 5% de las mujeres tenían menos de 18 años. De las 2998 mujeres VIH-negativas, el 71% volvieron por los resultados de la prueba, mientras que sólo un 60% de las 445 mujeres VIH-positivas hicieron lo propio. Se informó en total a 124 mujeres seropositivas de su situación y de la posibilidad de prevenir la transmisión

materno-infantil del VIH; 100 comenzaron el tratamiento, y 80 terminaron la profilaxis con zidovudina. A las seis semanas de edad, 36 de los 78 nacidos vivos estaban siendo amantados (46%), dos recibían alimentación mixta, y 41 (52%) recibían alimentos artificiales.

Conclusión En Abidján el asesoramiento y las pruebas del VIH voluntarias con miras a prevenir la transmisión materno-infantil resultaron ser una opción viable en las unidades de atención prenatal, y fueron bien aceptados por las mujeres embarazadas. El porcentaje de mujeres que volvieron por los resultados de sus pruebas fue insuficiente. Así ocurrió sobre todo con las mujeres VIH-positivas, precisamente el grupo destinatario de la prevención de la transmisión materno-infantil del virus. Se necesitó personal adicional para ofrecer a las mujeres del estudio asesoramiento y pruebas del VIH voluntarias. El mantenimiento de una estrecha supervisión y la firme dedicación de los agentes de salud fueron factores fundamentales. A las mujeres VIH-positivas se les propusieron alternativas a la lactancia materna, con seguimiento activo de los niños y apoyo clínico, nutricional y social.

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