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SEXUALLY TRANSMITTED DISEASES IN AFRICA

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SUMMARY

Sexually transmitted diseases (STD) are defined as a group of communicable diseases which have in common that they are transmitted predominantly by sexual contact. The number of agents now known to be sexually transmitted include some 20 pathogens. Some of these agents (such as Chlamydia trachomatis, herpes simplex virus, human papilloma virus, hepatitis B, virus, human immunodeficiency virus) tend to replace the classical "venereal diseases" both in importance and frequency as these agents are often more difficult to detect, treat, and control.
Sexually transmitted diseases are a major public health problem in most African countries on account of their frequency, their associated morbidity and mortality, their impact on maternal and infant health, as well as their economic costs in terms of health expenditure and lost productivity, and, last but not least, because of their social consequences. Recent epidemiological studies using sophisticated diagnostic technologies greatly extend our knowledge on the true spectrum of complications and sequelae associated with these infections.
Nongonococcal urethritis - caused to 40% by Chlamydia trachomatis - and gonococcal infections are together the most frequent sexually transmitted diseases. The increasing importance of chlamydial infections, in contrast to a gradual decrease of gonococcal infections, is related to the fact that these

infections frequently cause asymptomatic or mild disease and do not motivate patients to seek medical care, resulting in an extended period of infectivity and high risk of developing complications. Untreated gonorrhoea and chlamydial infections are the most common causes of epididymitis in males under the age of 35 years and may lead to decreased fertility. In some parts of sub-saharan Africa where urethritis often goes untreated, epididymitis is the leading course of male infertility. Also urethral strictures still from a large part of urogenital practice in some African countries.
An estimated 8-16% of women with untreated endocervical gonococcal or chlamydial infections will develop acute salpingitis following an ascending spread of these pathogens. After one episode of acute salpingitis approximately 10% of women may become infertile due to complete tubal occlusion. Similarly, the risk for women to develop an ectopic pregnancy after salpingitis is 6-10 times greater than in controls. Ectopic pregnancies in areas with insufficient health services carry a high mortality risk.
Maternal infections with STD may not only have adverse effects on pregnancy outcome but may cause serious morbidity and mortality in the newborn (e.g. congenital syphilis, ophthalmia neonatorum, herpes simplex virus infection of the neonate, chlamydial pneumonia, congenital HIV infection).
AIDS is an example "par excellence" of a sexually transmitted disease of public health importance requiring extensive clinical services and posing enormous financial and social problems for the individual and the society at large.
AIDS and the other viral STD have greatly increased the interest in primary prevention strategies such as health education and behavioral modification, for the control of sexually transmitted diseases.

KEY WORDS: chancroid, chlamydia, gonorrhoea, HIV, infertility, sexually transmitted diseases, surveillance

INTRODUCTION

Awareness is increasing that sexually transmitted diseases (STD) are very common in most of the developing world, particularly in Africa. Evidence for this awareness can be found in the rapidly rising number of publications on STD in scientific journals, and in the many reports on these diseases in

the lay press of many countries. The actual incidence of the STD, however, is not known in most countries.
Two major new developments in the STD field have led to this changed attitude to the STD problem.
The first development was the advent and the spread of penicillinase-producing N. gonorrhoeae (PPNG) which added a new dimension to gonorrhoea treatment. The cheap and widely available penicillin had to be replaced by more expensive antibiotics and this has not been implemented in many areas resulting in increases gonorrhoea morbidity. The second was the appearance of the acquired immunodeficiency syndrome (AIDS), which in a large part of the developing world is mainly a sexually transmitted disease, and now poses the most difficult challenge of all.
The epidemiology of STD in African countries differs greatly from the situation in industrialized nations in at least 4 aspects (Arya & Lawson 1977, Osoba 1981, Piot & Meheus 1983, Antal & Meheus 1988):

(a) It is now clearly established that the frequency rates of STD overall are much higher in both rural and urban areas. For example, STD are among the top five causes of consultation at health services in many African countries. The rate would be even higher if age-specific consultation rates were available for the 15-44 year-old age group. STD have a very high incidence and prevalence in specific population groups like female prostitutes and their clients (D'Costa et al 1985), while male homosexuals are not a significant group. Prostitution is still an important factor in the transmission of STD in Africa, where prostitutes are named by up to 90% of men as the source of infection. They are named more frequently where they operate in a more easily identifiable pattern, such as in Asia (Thirumoorthy et al 1986) than in Africa where the dividing line between the typical prostitute and the casual sexual contact may be difficult to draw since the two groups overlap (Rotowa et al 1986).

(b) Among the STD, genital ulcer disease is relatively much more frequent. The so-called tropical STD, in particular chancroid, and to a lesser degree lymphogranuloma venereum and granuloma inguinale are major causes of genital ulcers.
The proportion of genital ulcers caused by syphilis is also higher than in industrialized countries, while genital herpes accounts for only a small proportion of ulcerative disease.

(c) The incidence of STD complications and sequelae is much higher, due to lack of resources for adequate diagnosis and treatment. The list of complications and late sequelae associated with STD has grown considerably during the last decade due to a better understanding of the natural history of STD.
Major STD complications and sequelae are adverse pregnancy outcome for mother and newborn, neonatal and infant infections, infertitility in both sexes, ectopic pregnancy, urethral stricture in males, blindness in infants due to gonococcal ophtalmia neonatorum and in adults due to gonococcal kerato- conjunctivitis, and genital cancers, particularly cancer of the cervix uteri and penile cancer (Laga et al 1986, Cates et al 1985, Brown et al 1985, Kestelyn et al 1987, Schulz et al 1987).

(d) The epidemiology of the acquired immunodeficiency syndrome (AIDS) is very different from that in Western countries: level of sexual activity, not sexual orientation is apparently the risk factor and heterosexual transmission of human immunodeficiency virus (HIV) is the predominant mode (Quinn et al 1986, Piot et al 1988). There is evidence, however, that genital ulceration, and perhaps also other STD as well facilitate the sexual transmission of HIV infection (Kreiss et al 1988, WHO 1989, Pepin et al 1989).

Although the health, social and economical consequences of STD are huge, until recently, many governments and international donor agencies tended to ignore the real magnitude of the problem. It needed a fatal sexually transmitted infection to alert decision makers worldwide and the community to the STD problem and to generate resources for prevention and control.
STD control programmes should be strengthened (or initiated where they do not exist). This will not only reduce the incidence of STD and their severe complications and sequelae, but will also decrease the spread of HIV. What clearly should be avoided is to drain resources for AIDS prevention from the STD control budget, and to keep AIDS prevention isolated from STD control programmes (Cates W 1988, Piot & Laga 1989).

1. SURVEILLANCE OF STD - NEED FOR HEALTH INFORMATION SYSTEMS

STD are hyperendemic in many African countries, often including rural

areas where fewer facilities for appropriate diagnosis and treatment are available. This often results in a serious underestimation of the problem. Health-policy planners require convincing evidence of the magnitude and seriousness of the problem to justify the allocation of an appropriate share of scarce resources for their control (Willcox RR, 1976), and therefore a STD monitoring and surveillance system should be set up.

1.2. TYPES OF SYSTEMS

The first objective of a surveillance system is to define the size of the problem and its distribution in time, place and person. Three types of data systems can interact for this purpose: (1) clinician notification; (2) laboratory notification and (3) sentinel and ad hoc surveillance.
The second important objective is a management-oriented information system that focuses on the process of control strategies rather than on their impact on disease epidemiology.

The following sections discuss briefly the nature and purpose of information systems for STD.

1.2.1. "CLINICAL" NOTIFICATION

A variety of clinicians see patients suffering from sexually transmitted diseases (specialists in venereology, other specialists, general practitioners, medical assistants, nurses, etc.) and are potential reporters of cases. The precision and detail of the notification is a function of the interest and the sophistication of the clinician. On all levels, however, regular notification will occur only if the system is simple and provides periodic feedback to the clinicians.

Simplified notification systems have been proposed and are used by health care providers in areas without access to complex diagnostic tests (WHO 1985, Meheus et al 1989). Cases notified should be subdivided by sex, by broad age-categories (under 15, 15-19, 20-29, 30 years and over) and by STD syndrome (urethral discharge, vaginal discharge, genital ulcer, etc.). This type of data allows for some estimate of the occurence of STD in a population, and projection of the medication supplies required for the health services. Such a simplified system can be useful for both assessing STD

trends and for providing information on effectiveness of STD case management, by collecting data on cases referred to a next level of care. The quality of a system in general does not depend on the used technology but is related to the thoroughness with which the required data are obtained, the accessibility of the data, and the usefulness of the information to programme managers.

1.2.2. LABORATORY NOTIFICATION

The laboratory may provide important adjuncts to the reporting system based on the clinicians. The number of positive isolates, positive serological tests and specimens processed is a useful indicator of overall activity and gives some cross-check on official notification.

1.2.3. SENTINEL AND AD HOC SURVEILLANCE

No routine notification system identifies all cases of infection. A method for identifying the notification biases is required in order to extrapolate the results obtained to the entire population. Sentinel surveillance systems and/or ad hoc surveys can be used to identify these biases, supplementing the notifications received.

1.2.3.1. SENTINEL SURVEILLANCE

Sentinel surveillance is the identification of representative health care facilities that perform pre-defined disease tests on their patients and report the results to the control programme. Selection of the sentinel facilities will depend upon the setting but could include:
- random chosen health facilities
- private practitioners
- outpatient departments
- special group clinics (eg students, military, STD clinics if existing).

1.2.3.2. AD HOC SURVEYS

Periodic studies can identify etiological diagnosis among patients with urethral discharge, vaginal discharge or genital ulcer and this information is very useful for standardization of case management.

Epidemiological surveys may be used to identify prevalence and distribution of STD in the population. Such surveys are expensive and are of rather limited use for STD. However, when such surveys are being conducted for other health problems, it is worthwhile to add STD data to the survey.
Epidemiological surveys in selected population groups yield useful data on STD prevalence. Groups at different risk for STD that can be considered are:
1. Low risk: blood donors
2. Normal risk: antenatal patients
3. High risk: prostitutes, STD patients.

2. EPIDEMIOLOGY OF STD

2.1. GONORRHOEA AND SYPHILIS

As incidence rates are dependent on the accuracy of reporting, most comprehensive data on incidence are from a few industrialized countries. The incidence figures for developing countries are in general very unreliable, but estimates for large cities in Africa suggest an annual incidence rate for gonorrhoea of 3000 - 10.000 cases per 100.000 inhabitants (Arya Lawson 1977). While in industrialized countries, gonorrhoea morbidity is gradually decreasing, gonorrhoea prevalence in Africa countries remains at a high level. **Table 1** summarizes the prevalence of gonorhoea in women attending prenatal clinics; gonorrhoea prevalence varied from 0,5 to 15% in those studies and is generally between 5 and 10%, indicating an important risk of postpartum salpingitis and of transmission of the infection to the eyes of the newborn (gonococcal ophthalmia neonatorum).
Reasons for the continued high infection rates are socio-behavioural patterns associated with urban migratory movements, increasing treatment failure rates which often go undetected and the virtual absence of contact tracing.
The interpretation of the data on the prevalence of positive serological tests for syphillis given in **table 2** is more difficult, as this may be due to venereal syphilis (infectious or non-infectious), to biological false-positive reactions, or in some areas, to past infection with a non-venereal treponematosis.
However, from a study on syphilis in pregnancy in Libreville, Gabon, it was concluded that most of the positive serological tests were due to venereal

Table 1

Prevalence of gonorrhoea in women attending antenatal clinics

Country	Gonorrhoea (%)	Reference
Cameroon	15	Nasah et al 1980
Central African Republic	9,5	Widy Wirsky & D'Costa 1980
Gabon	5,5	Yvert et al 1984
Gambia	6,7	Mabey et al 1984
Ghana	4,4	Bentsi et al 1985
Kenya	6,6	Laga et al 1986
Nigeria	5,2	Okpere et al 1987
South Africa	11,7	Welgemoed et al 1986
Swaziland	3,9	Meheus et al 1980
Tanzania	6	Urassa 1985
Zambia	11,3	Hira 1986

syphilis and that the country was facing a recrudescence of this disease. Of 47 seropostive pregnancies followed up to delivery, one resulted in a syphilitic stillbirth and 11 newborns developed early congenital syphilis. This convincingly demonstrates the presence of early syphilis in pregnant women in Libreville and also the inadequacy of appropriate treatment of infected patients (Mefane & Toung-Mve 1987).
In Zambia, STD are the third most frequent cause for attending health care facilities. In both urban and rural pregnant women, 12,5% were found to have a positive treponemal test for syphilis but less than one-tenth of these women were routinely detected and treated (Hira 1986). Zambia has since implemented a control programme for maternal syphilis which decreased significantly adverse pregnancy outcome due to syphilis.

2.2. CHLAMYDIA TRACHOMATIS INFECTIONS

Until recently the spectrum of STD commonly identified in Africa was limited to the classical "venereal" diseases, including the "tropical STD" typically found under conditions of poverty and poor hygiene, i.e. chancroid, lymphogranuloma venereum, granuloma inguinale (donovanosis). Sexually transmitted pathogens of the second generation have started to be identified in the African region. With the introduction of chlamydial antigen detection tests, which are easier to perform and are less costly than the culture procedure, many studies have been undertaken to investigate the prevalence of genital chlamydia infections and they are summarized in tables 3 and 4.
In general, in African countries, the prevalence of C. trachomatis infections in women is similar to the rates in industrialized countries, while infection rates for men with urethritis rates seem to be lower (WHO Working Group 1986). As these agents cause a more indolent infection patients are not motivated to seek treatment, which is an important factor in the rapid spread of chlamydial infection and the development of complications.
The growing recognition of the major role that STD play in reproductive health, pregnancy outcome and perinatal infections has added a new dimension to the STD problem. There is increasing evidence that in Africa C. trachomatis and N. gonorrhoeae are responsible for a large proportion of salpingitis, puerperal sepsis and infertility in both sexes (Frost et al 1987, Mabey 1985).

Table 2

Prevalence of a positive serological tests for syphilis in women attending antenatal clinics

Country	Positive syphilis serology		Reference
	VDRL/RPR	TPHA/FTA-Abs	
Central African Republic	9,5%	-	Widy Wirski & D'Costa 1980
Ethiopia	17,6%	16,9%*	Perine 1983
Gabon	-	14%	Mefane & Toung-Mve 1987
Gambia	15%	11%	Mabey 1986
Malawi	17,6%	13,7%*	Watson 1985
Mozambique	8,2%	6,3%*	Mabey 1986
Nigeria	0,7%	2,1%	Fakeya et al 1986
Rwanda	4,4%	-	De Clercq 1982
Somalia	3%	3%	Jama et al 1987
South Africa	-	20,8%	Welgemoed et al 1986
Swaziland	10%	33,3%	Meheus et al 1980
Tanzania	19,2%	16,4%*	Cooper-Poole 1986
Zambia	14,4%	12,5%	Ratnam et al 1982
Zimbabwe	0,5%	-	Latif 1981

*THPA/FTA-Abs performed only if VDRL was positive.

2.3 CHANCROID

The global incidence of chancroid greatly exceeds that of syphilis (Lancet 1982). The disease is highly endemic in many tropical countries, in particular in South-East Asia and in East and Southern Africa. At the Nairobi Special Treatment Clinic, more than 5000 patients a year are seen with chancroid (D'Costa, 1988).

A resurgence of interest in chancroid has occured since a selective medium for the isolation of Haemophilus ducreyi was developed. This allowed a better identification of patients with the disease and further study of the epidemiology, clinical management and microbiology of the pathogen.

For this purpose an international research team established itself in Nairobi.

Hammond's gonococcal agar further enriched by the addition of 5% fetal calf serum was shown to grow H. ducreyi from 61% of males with presumed chancroidal ulcers (Dylewski et al 1986, Lubwama et al 1986).

An enriched Müller-Hinton agar which had shown similar sensitivity in Johannesburg was less efficient when used in Nairobi. Howerver, 11% of Nairobi strains grew only on the enriched Müller-Hinton and these strains continued to grow poorly, if at all, when subcultured on the gonococcal agar medium. These findings were explained by strain-specific variations of nutritional requirements.

The search for the classical "school of fish" grouping of gram-negative rods in the stained smear of exsudate remains a controversial procedure because of its lack of sensitivity and specificity (Lubwama et al 1986, D'Costa et al 1986).

Recently, an enzyme immunoassay for detecting serum IgG antibody to H. ducreyi was developed using an ultrasonicated whole-cell antigen. The value of this test for diagnostic purposes has still to be assessed, but it could be a valuable tool for epidemiological studies on H. ducreyi infection (Museyi et al 1988).

Prostitutes play a very important role in the spread of chancroid (Blackmore et al 1985). In Nairobi, Kenya, prostitutes and casual sex partners accounted for 57% and 36% of sources of chancroid infection respectively (Plummer et al 1983). This study also indicated that women who transmit H. ducreyi have clinical chancroid lesions, as all female source contacts of men with chancroid had genital ulcers. Chancroid lesions are also highly infectious

Table 3

Prevalence of C. trachomatis infection in women attending antenatal clinics

Country	Culture %	Serology %	Reference
Gabon	8,3	ND	Leclerc et al 1988
Gambia	6,9	ND	Mabey & Whittle 1982
Ghana	7,7	25,3	Bentsi et al 1985
Kenya	29	ND	Laga et al 1986
Nigeria	ND	8,4	Darougar et al 1982
Somalia	18,8	ND	Jama et al 1987 b
South Africa (urban)	12,5	ND	Ballard et al 1986
South Africa (rural)	1,3	ND	Ballard et al 1986

Table 4

Prevalence of C. trachomatis infection in different population groups

Population group	Country	Culture %	Sero-logy %	Reference
Men with urethritis	South Africa	19,2	ND	Ballard et al 1986
	Swaziland	3,7	ND	Ballard et al 1986
	Gambia	15,4	ND	Mabey & Whittle 1982
	Gabon	15,7	ND	Leclerc et al 1988
Men treated for gonorr-hoea	Central Afri-can Republic	5,0	ND	Meheus et al 1984
	Kenya	8,9	78,6	Nsanze et al 1982
Women with vaginal discharge	Gabon	13,6	ND	Leclerc et al 1988
Gynecolo-gic outpa-tients	Ghana	4,9	ND	Bentsi et al 1985
	Gambia	13,6	ND	Mabey & Whittle 1982
Women at STD Clinics	South Africa	13,3	ND	Ballard et al 1986
Patients with PID	Gabon	10,8	ND	Leclerc et al 1988
Patients at family plan-ning clinics	South Africa	16,1	ND	Ballard et al 1986
Interfertile women	Gabon	7,0	ND	Leclerc et al 1986
Prostitutes	Kenya	4,9	ND	Nsanze et al 1982
	Somalia	32,8	ND	Jama et al 1987 b

with 63% of secondary contacts of male chancroid cases being infected with H. ducreyi or showing genital ulcers.
These results, however, should be interpreted with caution because the number of source and secondary contacts was very small (10 female source contacts and 29 female secondary contacts for 300 index cases).
Genital ulcers are prevalent in lower and middle class prostitutes, the figure being 10% in Nairobi, of which 4% were culture-proven chancroid. A further 4% of prostitutes are symptomless genital carriers of H. ducreyi, but their role in transmission is not clear.
The ability to isolate H. ducreyi now permits laboratories to determine the antimicrobial susceptibility pattern of circulating strains. This is an important method of surveillance of the rapidly spreading resistance of H. ducreyi to a wide range of antimicrobials. Pattern of antimicrobial resistance and treatment effectiveness were reviewed (D'Costa et al 1986, Schmid 1986).
Recent studies confirmed a decreasing efficacy of sulphamethoxazole-trimethoprim at a single dose and the high efficacy of a single-dose 500 mg regimen of ciprofloxacine, which could become the first-line treatment (Naamara et al 1987).
Genital ulceration due to any of the three classical aetiological pathogens - H. ducreyi, Treponema Pallidum or Herpes Simplex virus - can be extremely variable in appearance and in the absence of diagnostic tests the clinical diagnosis is unreliable. In Africa, even in areas where syphilis is highly prevalent, most genital ulcers are due to chancroid. In the Gambia, a very similar frequency of aetiologies of genital ulcerations was found as had previously been reported from Swaziland, Nairobi and Johannesburg (Mabey et al 1987). It was also found that 10% of patients with genital ulcers had both chancroid and syphilis; in Nairobi both infections occured concurrently in 5% of patients with genital ulcers (D'Costa et al 1986). Due to unreliability of clinical diagnosis and the frequent presence of the two agents in the same genital ulcer, it was recommended to combine an appropriate chancroid treatment with benzathine penicillin therapy.

3. COMPLICATIONS OF STD

3.1. COMPLICATIONS IN ADULTS

3.1.1. PELVIC INFLAMMATORY DISEASE (PID)

The frequency of PID in the third world is not very well documented but the yearly incidence in some parts of Africa has been estimated at 360 cases per 100.000 (Muir & Belsey 1980).
In Africa, C. trachomatis and N. gonorrhoeae are the two most isolated pathogens in PID (Adelusi et al 1987, Burchell & Welgemoed 1988).
The relative importance of C. trachomatis as an aetiologic agent was recently confirmed in a study in Gabon where 49% of women with laparoscopically confirmed acute salpingitis had evidence of chlamydial aetiology (Frost et al 1987).

3.1.2. MATERNAL INFECTION

In developing countries post partum endometritis is an important source of maternal morbidity and death.
In Kenya, it was recently shown in a prospective study that the incidence of postpartum upper genital tract infections was 20,3%, the development of which was significantly correlated with gonococcal infection, chlamydial infection, presence of ophthalmia neonatorum, labour lasting for more than 12 hours and area of residence.
Approximately 35% of these upper genital tract infection observed was due to N. gonorrhoeae, C. trachomatis or both agents (Plummer et al 1987).

3.1.3. ECTOPIC PREGNANCY

The risk of ectopic pregnancy increases approximately 7-10 fold after 1 or more episodes of PID (Westrom & Märdh 1989). Incidence of ectopic pregnancy is higher in African countries than in industrialized countries (Piot & Meheus 1983).

3.1.4. INFERTILITY

3.1.4.1. INFERTILITY IN WOMEN

Incidence of infertility after first, second and third episodes of PID in women has been calculated to be 13, 35 and 75% respectively (Weström & Märdh, 1989). There is increasing evidence that chlamydial infections play an important role because chlamydial PID is in general less symptomatic than gonococcal but tubal damages caused by chlamydial PID are equal or even larger than those caused by gonococcal PID (Cates W 1984).
In Africa, the prevalence of infertility is remarkable widespread. It occurs in a broad zone of Central Africa including the Central African Republic, South-Western Sudan, North Zaire, Congo, Gabon and Cameroon, called the infertility belt (Frank 1983).
Also the pattern of infertility is different in Africa from the rest of the world. A WHO multicentre study has shown that the rate of bilateral tubal occlusions is 3 times higher in Africa than in Asia or industrialized countries; more than 85% could be attributed to PID. The aetiologic organisms are N. gonorrhoeae and, more and more C. trachomatis (Meheus et al 1986, Cates et al 1985, Mabey et al 1985, Collet et al 1988).

3.1.4.2. INFERTILITY IN MEN

Urethritis in the male can lead to epididymitis, which is commonly bilateral and total azoöspermia by complete obstruction may occur (Bernitsky & Roy 1986). This condition is extremely common in Africa.
In Uganda, 28% of a community sample of men had evidence of chronic epididymitis of which 6% was bilateral, while in Lagos, Nigeria, 40% of the husbands of women attending an infertility clinic were infertile themselves, and most of them gave a history of 2 or more attacks of urethritis which was either untreated or undertreated (Osoba 1984).

3.2 COMPLICATIONS IN CHILDREN.

3.2.1 CONGENITAL SYPHILIS.

With the high rates of seropositivity to a serological test for syphilis in pregnant women, it should come as no surpise that congenital syphilis, which causes fetal and perinatal death of 40% of the infants affected (CDC 1988), is rampant in African countries. Rates are 850/100 000 in Lusaka and 3200/100 000 in Addis Ababa (Hira et al 1982, Perine 1983). In Zambia, 8,6% of the infants less than 3 months admitted to hospital had congenital syphilis, as had 7,5% of neonates admitted to intensive care units (Mabey, 1986).

3.2.1.1 SPONTANEOUS ABORTION AND STILLBIRTH.

The most common outcome of syphilis during pregnancy is probably spontaneous abortions during the second and early third trimester. In Zambia, 19% of miscarriages are attributed to syphilis, while in Ethiopia, pregnant women who were found to be seroreactive to syphilis were five times more likely to have an abortion or stillbirth than women who were seronegative (Ratnam et al 1982, Schulz et al 1986).
A case-control study from Zambia demonstrated a 28-fold increased risk for stillbirths among women with a high-titer RPR card test seroreactivity (Watts et al 1984).

3.2.1.2 PERINATAL, NEONATAL AND INFANT DEATHS.

In Zambia, congenital syphilitic infection is implicated in 20 to 30 percent of the total perinatal mortality which is 50 per 1000 (Hira 1986).
This probably underestimates the problem because postneonatal infant deaths are not included and because many stillborn infants do not have clinical evidence of congenital syphilis.
In Ethiopia, syphilis was the fourth most common cause of perinatal death, accounting for 10% of the approximately 70 perinatal deaths per 1000 births and nearly 5% of all postneonatal deaths (Naeye et al 1977).

3.2.2. CONGENITAL CONJUNCTIVITIS.

This complication which can lead to blindness has virtually disappeared from industrialized countries, mainly due to the introduction of Credé's silver nitrate eye prophylaxis.
Chlamydia trachomatis has replaced N. gonorrhoeae as the most important single aetiology even in developing countries, causing up to 32% of all cases (Laga et al 1986). The transmission rate from an infected mother to the newborn is 30-45% for N. gonorrhoeae and 30% for C. trachomatis (Galega et al 1984, Laga et al 1986).
In some developing countries, Credé's prophylaxis has been abandoned : the consequence has been a considerable increase in the incidence of gonococcal ophthalmia neonatorum up to 5% of births in some settings. Reintroduction of the prophylaxis drastically reduced the incidence by 83% when using silver nitrate and by 93% when using tetracycline ointment (Laga et al 1988) so it is clearly necessary to reintroduce the prophylaxis where it has been revoked and to enforce the practice where it exists.

3.2.3 PREMATURITY, LOW BIRTH WEIGHT, NEONATAL AND INFANT INFECTIONS.

Prematurity is still an important cause of neonatal death, mostly as a consequence of infection. The aetiologic link with N. gonorrhoeae and C.trachomatis is suspected but has not been clearly established (Gravett et al 1986, Sweet et al 1987, Berman et al 1987, Harrison et al 1983).
Apart from T. pallidum, other STD pathogens can also cause neonatal and infant infection.
In a study in Kenya, 12% of the infants born to C. trachomatis culture-positive mothers developed pneumonia, while none in a control group of non-exposed did so (Datta et al 1988).

4. ANTIBIOTIC SENSITIVITY OF *N. GONORRHOEAE.*

Resistance to antimicrobial agents by the gonococcus has been evolving since the availability of sulphonamides (Dunlop EM 1949); and the same pattern has been seen for penicillin. While initially 150.000 units of peni-

cillin cured gonorrhoeae, this dose increased to 4.800.000 units of Procaine Penicillin G plus lg of Probenicid in the seventies (Meheus 1987).
A similar and genetically linked increase in tetracycline resistance has been observed. In many areas of Africa and Southeast Asia, tetracycline resistance has reached levels associated with unacceptable high treatment failure rates (Meheus et al 1984, Brown et al 1982). Beginning in 1975, the first beta- lactamase producing strains of N. gonorrhoeae (PPNG) emerged in the Far East and in West Africa (Meheus 1987); the West African strain spread to West and Central Africa an to Europe while the Asian strain spread to all areas of the world, including West, Central and East Africa (Perine et al 1977). PPNG strains are now distributed worldwide and can be found in any country if laboratory capabilities allow for their identification. The prevalence of PPNG is highest in South East Asia and Subsaharan Africa, now ranging from 20 to 80%.
The subject has been reviewed recently (Osoba 1986) and the presence of PPNG strains was confirmed in at least 30 of 45 African countries. Once PPNG strains were introduced in an African country they increased quickly and nearly exponentially and reached levels of 10-30% prevalence in two or three years. In Ibadan, Nigeria, PPNG strains were first detected in 1979 and by 1984, 81% of gonococci were PPNG (Osoba 1986).
Similarly in Nairobi, Kenya, PPNG strains increased from 4% in 1981 to 50% in 1984 (Laga et al 1986).
Whereas outbreaks of PPNG could be contained in most European countries, these strains established themselves quickly and very firmly in African countries, where they are now highly endemic. An explanation for this is the poor effectiveness of gonorrhoea control programmes in sub-Saharan Africa. In particular the abandonment of treatment of gonorrhoeae with penicillin in favour of the more effective antimicrobials such as spectinomycin or the newer cephalosporins has not been inplemented. Another factor has probably been that the "Africa" PPNG strains acquired the large 24.5 MDa conjugative plasmid in addition to the small 3.2 MDa plasmid promoting greater stability.

Conclusion

Although the health and economic consequences of STD remain enormous,

particularly in developing countries, many governments and international donor agencies still tended to ignore the real magnitude of the STD problem, until recently.

Unfortunately, a fatal sexually transmitted infection, AIDS, was needed to alert worldwide decision makers and the community alike to the STD problem and to generate resources for the control of these infections. This is particularly true in developing countries because the AIDS epidemic has been increasing more rapidly there than anywhere else and evidence is accumulating that other sexually transmitted diseases, in particular genital ulcers, enhance HIV transmission. For optimal efficiency, AIDS prevention should be closely linked or integrated with comprehensive STD control. Separating AIDS and the other STD in national control programmes creates a false dichotomy which detracts from the commonality of intervention strategies.

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