Control of Sexually Transmitted Infections Through Integrated Reproductive Health Services

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Learning Objectives

At the end of this chapter, the reader will be able to:

- Identify challenges for an evidence-based approach to the control of sexually transmitted infections in developing countries
- Describe linkages with other components of sexual and reproductive health
- Discuss the relative value of alternative strategies
- Adapt available protocols and tools for preventive care, risk assessment, diagnosis and treatment to local circumstances
- Appreciate the need for integrating community-based interventions with clinical treatment

41.1 Introduction

With the increasing provision of comprehensive reproductive health services, it is compelling to integrate the control of sexually transmitted infections (STIs). Efforts at achieving effective and sustainable integration have had variable success. The move towards integration requires a considerable paradigm shift in the role of healthcare providers. Moreover, there is a critical need for clarity about the precise model of integration of programmes besides evidence from operational research on the feasibility and cost-effectiveness of integration. In this chapter, we examine approaches, challenges and strategies for prevention and control of STIs through integrated reproductive health services.

Globally, more than one million sexually transmitted infections are acquired every day with one of the following four STIs: chlamydia, gonorrhoea, syphilis and trichomoniasis. STIs can have profound consequences beyond the immediate impact of the infection including: (a) enhanced risk of HIV acquisition, (b) mother-to-child transmission resulting in congenital malformation, prematurity, low birthweight and neonatal death, (c) pelvic inflammatory disease leading to chronic pelvic pain and infertility and (d) cervical cancer related to human papilloma virus (HPV) infection. Current STI control efforts are hampered by several behavioural and implementation challenges including a large proportion of asymptomatic infections, lack of readily available diagnostic tests, repeat infections, drug resistance and barriers regarding access to care [1].

41.1.1 Integrated Reproductive Health Services

The word 'integrate' means to coordinate or blend into a functioning or unified whole; to unite one thing with another; to incorporate something into a larger unit; or to end the segregation of something. All of these are descriptive of what it means to talk about sexual and reproductive health (SRH) services being integrated in national health services. In order to have a lasting impact, activities cannot be isolated events but must be integrated into a larger framework. The rationale behind integration is simple. Individuals with known or suspected STI would feel more at ease seeking care at facilities that they are already familiar with instead of seeking care at an STI clinic. Incorporating STI diagnosis, treatment and prevention into reproductive health services may enhance contraceptive uptake and maternal and perinatal outcomes because STIs impact both maternal and foetal health. Integrated reproductive health services may be seen as a network of pathways aimed at linking the various systems to strengthen reproductive health policy, training and services. Utilising existing infrastructure for the control of STIs represents a potential cost-saving model of 'one-stop shopping' that is particularly relevant to low-resource countries. As

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noted earlier, there is an urgent need for clarity about the precise model and operational methodology of integration STI control into reproductive health services. An emerging concept is the use of risk assessment tools.

41.1.2 STI Risk Assessment

STI risk assessment is a practical tool that uses responses of clients regarding symptoms and demographic characteristics besides behavioural and clinical information, other than laboratory test results, to assess the likelihood that persons are currently infected with an STI or are at high risk of future infection. Risk assessment can be done in various ways and used for various purposes. It can be used as part of prevention counselling, as a way to determine who should be tested or treated for STIs, or as an adjunct to syndromic management algorithms [2]. These factors can be either incorporated into guidelines for clinical management of specific patients or aggregated into graduated scales predicting STI risk. The results can then be used as tools for effective STI management and appropriate family planning counselling. For example, individual clients determined to be at increased risk of current or future STIs would be poor candidates for intrauterine devices (IUDs) but may be good candidates for barrier methods. By helping family planning providers assist women in choosing the most appropriate contraceptive method, STI risk assessment provides a unified pathway for integrated reproductive health services. Having been a traditional part of disease control programmes for decades, STI risk assessment can help make the most cost-effective use of increasingly limited resources. Since the risk of infection is an important consideration in choosing a contraceptive method, family planning providers can use STI risk assessment not only for disease control but also for counselling clients about behavioural and contraceptive choices that will help them achieve their future childbearing goals.

41.1.3 Programme Linkage

The control of STIs, provision of contraceptive services and maternal health care are intimately linked through sexual intercourse and constitute central elements of SRH. The prevention of STIs, including HIV, has lost importance to interest in the treatment of infection with the human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS). Unfortunately, the relationship of STIs with other components of reproductive health has been largely neglected over the years in most countries albeit for commonalities pertaining to HIV/AIDS: sexual transmission being the most common mode of infection besides blood products and vertical transmission from mother to child.

HIV infections are overwhelmingly associated with SRH, whether through sexual transmission, pregnancy, delivery or breastfeeding [3]. Interest for an integrated approach for the control of HIV has led to unexpected opportunities for the management of STIs, both for prevention and treatment through integrated reproductive health services [4, 5]. The treatment of STIs has been shown to be one of the most effective interventions to reduce the transmission of HIV in resource-scarce settings [6].

It is difficult to determine the actual prevalence of STIs because (a) those infections are often asymptomatic, (b) individuals with symptoms might not seek health services and (c) the epidemiological reporting system is often deficient. However, the extent of the problem can often be estimated from the incidence of STIs among well-defined populations such as pregnant women receiving antenatal care and individuals attending family planning clinics.

With an annual incidence of around 500 million cases, curable STIs consist largely of syphilis, gonorrhoea, chlamydia and trichomoniasis. Among women of reproductive age in Africa, the prevalence of syphilis is around 3.5% as opposed to 2.3% for gonorrhoea, 2.6% for chlamydia and 20% for trichomoniasis [7]. Among the viral STIs, the most important ones for SRH are hepatitis B, human papillomavirus and herpes simplex virus type 2 (HSV-2). As hepatitis B is transmitted through blood and affects the liver, its importance for reproductive health is often overlooked despite the importance of direct transmission from mother to child and through the exchange of body fluids during sexual intercourse.

41.1.4 International Agreements

Current efforts for international development focus on attaining the Sustainable Development Goals where reproductive health features prominently in the third goal with its consolidation of health issues [8]. It is noteworthy that the issue of universal access to reproductive health, as agreed upon at the International Conference on Population and Development, has now been given increased importance by being included not only within the health goal 3 but also in the gender goal 5 of the Sustainable Development Goals [9].

Targets of the health goal include the reduction of maternal, neonatal and child mortality besides ending the epidemics of AIDS and communicable diseases by 2030 and ensuring universal health coverage including access to reproductive health services. Major challenges will consist of addressing inequity in the provision of services and producing reliable health statistics to monitor progress in meeting those targets [10, 11].

41.1.5 Strategy

The strategy for controlling STIs consists of three prongs: (a) decreasing the infectivity of sexual partners, (b) decreasing the risk of transmission from sexual partners and (c) reducing the number of sexual partners. The overlap between those three components can be appreciated from the fact that a decrease in the infectivity of sexual partners can be achieved by the prompt treatment of infections, contact tracing to decrease the pool of infections and in some cases, long-term therapy and vaccines.

Moreover, related activities could be perceived along a different set of axes to consist of healthy sexual practices of individuals and accessible health care at the community level. Special attention should be paid to disadvantaged populations, such as poor people and adolescents, with their decreased access to health care.

41.1.6 Prevention

A clear distinction between individual and community perspective must be made so that the value of interventions can be appreciated. Whereas the individual is concerned with personal outcomes, the community should have the wider perspective on the effective use of scarce resources. As far as possible, prevention should go hand in hand with treatment. Numerous preventive interventions are described much later on under the rubric of integrated reproductive health services, but the following three topics deserve a separate consideration immediately below.

41.1.6.1 Screening

Effectiveness should by no means be the only criterion for the implementation of a screening programme as other considerations such as cost-benefit, nature of test, age and sex groups are critically important. Screening for chlamydia can be effective [12], but the modality of how it should be used has yet to be decided. As the case has not yet been made for its use for mass screening, it should be used largely for opportunistic screening. A prime example is in the United Kingdom where proposals for mass screening subsequently faced major problems when implementation issues were considered.

Opportunistic screening should ensure that it occurs in situations such as contraceptive services, antenatal care, youth clinics including street children and high-risk groups such as commercial sex workers, prisoners, men having sex with men, refugees and during clinical consultations after gender-based violence.

41.1.6.2 Risk for HIV

The presence of an STI lesion, whether of an ulcerative or untreated inflammatory nature, increases the risk at an individual level for HIV transmission. With genital ulcer disease being responsible for a substantial proportion of heterosexual transmission of HIV in sub-Saharan Africa, the control of STI is a central pillar in the strategy to fight HIV [13]. However, it should be appreciated that STIs of a non-ulcerative nature are as important in the aetiology of HIV when a population perspective is considered: despite a lower magnitude in the level of the relative risk, the population attributable risk may be as great with their much increased prevalence in the community. For programmatic purposes, it is imperative to go beyond the philosophy of comparisons of attribution to aetiology so as to appreciate the concept of the impact of interventions. It is reassuring to know that a randomised trial at the primary care level in Mwanza demonstrated that case management of STIs decreased the incidence of HIV by about 40% in a rural population [14].

41.1.6.3 Vaccines

The sexual transmission of hepatitis B is well documented [15], and for more than a decade, it has been recommended that vaccination should occur at puberty, and this has not caused any controversy. However, the introduction of a vaccine against HPV has already led to controversy because the preventable outcome relates to an STI as compared to a liver condition without an obvious direct sexual association [16, 17].

With HPV being present on both male and female external genitalia, barrier methods have a limited role in preventing its transmission, and primary prevention will depend largely on prophylactic HPV vaccines. Operationalisation issues for the introduction of HPV vaccine will need to draw upon a sexual health approach as opposed to an infectious disease one. Special attention needs to be paid to gender issues besides sexual and reproductive health services as entry points for reaching adolescents [18, 19].

41.1.7 Clinical Presentations

In women health settings, STIs usually present as vaginal discharge, genital lesion or lower abdominal pain. Special consideration should be given to STIs in pregnancy as pertaining to congenital syphilis and neonatal ophthalmia.

Although the emphasis in this chapter is on the health care of women for the sake of brevity, it is appreciated that services for men are important. Nevertheless, the implications regarding numerous issues have commonalities

whether for men having sex with men or women having sex with women [20].

41.1.7.1 Vaginal Discharge

Vaginal discharge represents a most common presentation in clinical consultations in reproductive settings. Lactobacilli in the vaginal flora protect from infection by promoting an acidic environment in the vagina with a pH around 4.0. Personal perceptions are primordial in the self-reporting that leads to the consideration of an abnormality in vaginal discharge, and it is likely that psychosocial factors play a substantial role [21]. Whereas the aetiology of a presenting symptom of vaginal discharge is usually physiological, it is important to exclude pathological causes that include both infective and non-infective ones such as neoplasms, fistulae and foreign bodies. Neoplasms consist commonly of cervical ectopy and polyps that typically lead to copious clear discharge, but genital cancer is also a cause. When left in the vagina for a prolonged period of time, condoms and tampons usually lead to a foul-smelling discharge. With those numerous causes, vaginal discharge is not a reliable indicator of an STI, but its presence often leads to worry and decision to obtain screening. Special consideration should be given to the clinical management of vaginal discharge as related to either pregnancy, children or the menopause.

Among the causes of vaginal discharge, *Trichomonas vaginalis*, *Chlamydia trachomatis and Neisseria gonorrhoeae* are STIs, whereas bacterial vaginosis and candidiasis are infections that are not sexually transmitted.

41.1.7.2 Bacterial Vaginosis

Usually presenting as a mild non-itchy white discharge with a fishy smell, bacterial vaginosis is the usual cause of vaginal discharge of infectious aetiology when lactobacilli are overtaken by other organisms such as *Gardnerella vaginalis*. It occurs when there is disruption of the vaginal flora, as can happen with vaginal douching [22], and the possibility of sexual transmission is gaining more credibility.

41.1.7.3 Candida albicans

Under certain circumstances, *Candida albicans*, which is a commensal organism in the vagina of about a fifth of asymptomatic individuals, can become so prominent as to lead to a vaginal discharge from vulvovaginal candidiasis, another cause being *Candida glabrata*. Presenting typically as a thick white cheesy vaginal discharge with vulval pruritus, vulvovaginal candidiasis is commonly caused by oestrogen and antibiotic therapy.

41.1.7.4 Trichomoniasis

Presenting typically with a frothy yellow offensive discharge and sometimes accompanied by a strawberry cervix, trichomoniasis is associated with poverty [23].

41.1.7.5 Gonorrhoea

The symptom of vaginal discharge occurs in only half of women with gonorrhoea which causes cervicitis. Whereas diagnosis is feasible through culture of a high vaginal swab on chocolate agar, it is better to use an endocervical swab.

41.1.7.6 Chlamydia Trachomatis

The presence of *Chlamydia trachomatis* is asymptomatic in about 80% of cases. When they occur, symptoms include intermenstrual or postcoital bleeding, dyspareunia and lower abdominal pain. Cervicitis causes vaginal discharge.

41.1.8 Genital Lesion

The aetiology of genital ulcers varies tremendously according to the regional variations in the prevalence of infections: herpes, syphilis, chancroid, lymphogranuloma venereum and granuloma inguinale. Whatever the cause, genital ulcers are important as the presence of an open skin surface increases the risk of transmission of HIV.

Genital herpes is caused by the herpes simplex virus type 2 (HSV2) that is the commonest cause of genital ulcerative disease. Whereas there is no cure for herpes, the prompt administration of systemic acyclovir decreases the severity of symptoms. Recurrent episodes are common, and repeat treatment from the outset of a new episode is beneficial. Neonatal herpes is a risk in cases where the primary infection occurred just prior to delivery: consideration should be given to delivery by caesarean section in those cases [24].

Primary syphilis usually consists of an ulcer at the site where the infection was transmitted, whereas secondary syphilis manifests itself as extensive lymphadenopathy and skin rash.

Genital warts and cervical cancer are caused by the human papillomavirus. There is no known treatment for HPV itself. Whilst only 30 of the more than 100 types of HPV cause genital infections, the latter are largely asymptomatic. However, they infect transiently about two-thirds of women who are sexually active. Whereas some HPV types, such as 6 and 11, are non-oncogenic but lead to genital warts, types 16 and 18 are high risk for the development of cervical cancer, accounting for two-thirds of cases. As HPV is present in around 99% of squamous cell carcinoma of the cervix, preventive vaccines against HPV have recently been introduced into health services. However, protection would be effective only if vaccination occurs before sexual debut.

41.1.9 Lower Abdominal Pain

The diagnosis of pelvic inflammatory disease should be considered when lower abdominal pain is associated with

abnormal vaginal discharge, dyspareunia and tenderness upon cervical motion and in the vaginal adnexae. Pelvic inflammatory disease is important sequelae of infections with *Chlamydia trachomatis and Neisseria gonorrhoeae* with the risk of infertility and ectopic pregnancy from damage to the fallopian tubes [25].

41.1.10 Pregnancy

A distinction should be made between congenital syphilis which is an antenatal infection and those, such as herpes, gonorrhoea and chlamydia, which occur around the time of birth. Congenital syphilis is fully preventable through screening at the first antenatal visit and in high-risk areas, with repeat testing around 28 weeks of pregnancy and at delivery. Around a million cases of congenital syphilis continue to occur annually due to the lack of awareness of the problem, political will and commitment to strengthen available services for the appropriate tasks: early antenatal attendance, decentralised blood testing and presumptive treatment of partners [26].

Ophthalmia neonatorum can be due to *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Delay in treatment can cause blindness. The mainstay in the management of ophthalmia neonatorum consists of prophylaxis for all infants immediately after delivery: careful cleaning of the eyes prior to the application of 1% tetracycline ointment as compared to the original prophylaxis with an aqueous solution of silver nitrate which is not that effective against chlamydia besides sometimes causing chemical conjunctivitis [27]. When the mother is known to have either a gonococcal or chlamydial infection, the neonate should be treated accordingly with supplementary therapy.

41.1.11 Diagnostic Challenges

In the ideal situation, laboratories provide services for both the identification of organisms and their sensitivities to antimicrobials. In developing countries, the operational level of laboratories can vary enormously as exemplified by a national reference laboratory, this role being often assumed by a university laboratory as opposed to a peripheral one attached to a dispensary. Although an infection may be suspected because of disease in a partner or the presence of another STI, the infection may be diagnosed only by a specific laboratory test. This approach, with laboratory confirmation of clinical diagnoses, often cannot be used in resource-scarce settings: besides being expensive, there is delay in initiating treatment in situations where the individual is unlikely to return for a follow-up visit.

Around 2000, WHO had focussed on syndromic case management as a pragmatic tool to enable treatment for individuals with clinical features, whether symptoms or signs, in low-resource settings without any recourse to laboratory tests: its algorithms had to be adapted to local epidemiological characteristics of STIs and the approach could not be used for screening. Modelling of flowcharts should incorporate factors such as the prevalence of organisms besides their clinical relevance, pattern of resistance to antimicrobials and their cost [28, 29]. Furthermore, periodic aetiological assessments are necessary to validate treatment recommendations [30].

Syndromic case management alone is inadequate because infections with important pathogens such as *Chlamydia trachomatis* and *Neisseria gonorrhoea* may be present without any symptoms or findings. Besides, syndromic approach can either overdiagnose STIs, thereby exposing individuals to unnecessary treatment, or fail to diagnose an existing infection or even cause relationship problems when partners are given a false result. With those severe limitations of syndromic case management, WHO now promotes a move towards an aetiological approach. With the identification of the causative organism becoming very important, the WHO monograph on laboratory services has become a very valuable resource [31].

The diagnosis of vaginal discharge is aided by a high vaginal swab for microscopy, gram stain and culture for bacterial vaginosis, *Trichomonas vaginalis* and *Candida*. Resources should be sought to enable on-site microscopy [32].

Candida albicans can be diagnosed at the bedside by direct wet mount microscopy. A high vaginal swab is put in saline before placing a drop on to a slide and adding a drop of potassium hydroxide solution. Light microscopy shows the presence of yeast or mycelia. It is also possible do a Gram stain from the swab. When this is not satisfactory for the identification of yeast cells, the diagnosis of *Candida albicans* can be confirmed through culture using Sabouraud's agar.

The diagnosis of *Trichomonas vaginalis* is made easily by microscopy: a vaginal swab from the posterior fornix is placed in a saline solution and a wet mount leads to the bedside diagnosis through the visualisation of motile flagellate protozoa.

The diagnosis of bacterial vaginosis is made from a high vaginal swab with microscopy and Gram stain to satisfy Amsel's criteria which consist of the presence of at least three of the following four items: (1) sticky greyish white discharge on vaginal wall, (2) positive whiff amine test consisting of a fishy smell upon adding a drop of 10% solution of potassium hydroxide, (3) vaginal pH greater than 4.5 and (4) clue cells consisting of bacteria around epithelial cells of the vagina.

The identification of *Neisseria gonorrhoeae* by microscopy of a Gram stain of a urethral specimen, with the visualisation of gram-negative diplococci, is easy in men but not in women as there are other similar-looking organisms in the endocervix. Whereas Gram staining, as currently used in most developing countries, is simple and inexpensive, it is relatively insensitive. The identification of *Neisseria gonorrhoeae* and *Chlamydia trachomatis* remains problematic. Although highly sensitive for chlamydia and gonorrhoea, the nucleic acid amplification tests are expensive and complex thereby limiting their utility in low-income countries. Being simple and able to provide rapid results for clinical decisions and follow-up, rapid point-of-care tests [33] have demonstrated promising value for chlamydia and gonorrhoea: whereas some tests have reported specificity (98%) in field trials, their sensitivity in symptomatic women (50–70%) is considered to be low for widespread use and their utility in asymptomatic women has not been fully investigated. It seems prudent to utilise a combination of syndromic management, effective laboratory testing and emerging point-of-care tests for the diagnosis of many STIs in low-resource situations.

Rapid laboratory testing for HIV and syphilis currently exists in many low-resource countries. The tests are simple, accurate and provide results within 15–20 minutes. Testing for these infections is especially important for preconception and antenatal care of women to reduce the burden of mother-to-child transmission of infection. *Treponema pallidum* can only be identified directly by using a specimen from a lesion, and as laboratory culture is not possible, dark-field microscopy is used to demonstrate the typical coil-like morphology. Non-treponemal tests, such as the rapid plasma reagin (RPR), are valuable for screening for syphilis: they are sensitive besides being simple and cheap to carry out provided that facilities enable the refrigeration of reagents and have electrical power. Excellent for detecting early syphilis, they suffer from a relatively high false positive rate which constitutes around 25% of positive results for tests carried out during pregnancy. A treponemal test, such as *Treponema pallidum* haemagglutination assay or fluorescent treponemal antibody absorption test, must be performed subsequently to confirm positive cases. Serologic tests for syphilis are simple to perform, and both the test and treatment are inexpensive. Experience in developing countries has shown that clinic staff with little or no laboratory experience can be trained to perform syphilis blood tests with a high level of accuracy.

Human papillomavirus and herpes simplex, the two common viral infections of the genital tract, are often subclinical. Laboratory detection techniques for the diagnosis of HPV are still largely limited to research settings. The laboratory diagnosis of genital herpes simplex consists of cell culture from a swab.

41.1.12 Drug Treatment

Access to appropriate antimicrobial therapy is crucial for the control of STIs, whether the diagnosis was made on the laboratory identification of organism with antimicrobial sensitivity or syndromic approach with locally determined algorithms. The selection of antimicrobials for the control of STIs is facilitated by use of the WHO model list of essential medicines which allows countries to make the final selection of essential drugs by taking into account local circumstances such as cost [34]. It should be appreciated that commodities such as intrauterine devices and condoms might not be, strictly speaking, considered as being drugs. However, in the control of STIs, it is imperative that this wider perspective be acknowledged. Whenever the term condoms is mentioned, both female and male condoms should be considered whilst appreciating that much more evidence is available for male as compared to female condoms. For both contraception and the control of STI including HIV, the cost of drugs and consolidated procurement procedures must be considered.

Antimicrobial resistance is increasingly leading to worries in global health [35], and the emergence of resistant strains of *N. gonorrhoeae* is so serious that the risk of untreatable gonorrhoea is being discussed seriously [30]. Resistance of organisms to antimicrobials is usually due to inappropriate selection of drugs, inadequate dose or too short duration of therapy. With the success of directly observed therapy in the management of tuberculosis, there is interest in single-dose therapy for STIs. This approach is especially appealing with the anticipated decrease in cost due to the expiration of patents on certain antimicrobials. The global surveillance system that has been set up by WHO to monitor antimicrobial resistance will be useful for routine reports regarding appropriate treatment for gonorrhoea.

As gonococci are now largely resistant to antibiotics such as penicillin and tetracycline, treatment of uncomplicated gonorrhoea in gynaecological practice normally consists of a single dose whether orally, with ciprofloxacin or cefixime, or intramuscularly, with ceftriaxone or spectinomycin. Besides being contraindicated in pregnancy, ciproflaxin should be avoided in the treatment of adolescents. Antimicrobial resistance to gonorrhoea shows such marked geographical differences that ideally each jurisdiction should decide on recommended treatment regimens by drawing upon the best available information. Azithromycin should not usually be used for treating gonorrhoea in view of increasing resistance but is still appropriate for treating chlamydial infections. With the strong association between infections with gonorrhoea and chlamydia, it is advisable for treatment to be provided for both unless there is laboratory evidence for the absence of chlamydia.

The treatment of uncomplicated chlamydia consists of oral therapy usually with either a single dose of azithromycin or a 7-day course of doxycycline, but it is also possible to prescribe a 7-day course of amoxycillin, tetracycline, erythromycin or ofloxacin. There is a contraindication for use of doxycycline and other tetracyclines during pregnancy and breastfeeding as opposed to erythromycin estolate during pregnancy only.

Candidiasis is treated with a 3-day course of intravaginal clotrimazole or miconazole or a single dose of intravaginal clotrimazole or oral fluconazole. Trichomoniasis is treated with oral metronidazole or tinidazole, either as a single dose or a 7-day course. Bacterial vaginosis is usually treated with a 7-day course of oral metronidazole and otherwise as a single dose besides the intravaginal application of metronidazole gel for 4 days or clindamycin cream for 7 days. During pregnancy, a 7-day course of oral metronidazole is given from the second trimester but as a single dose if treatment is needed earlier.

Symptomatic treatment of genital herpes consists of oral acyclovir or valaciclovir for 7 days for the first episode but 5 days for recurrent infections.

External genital warts can be treated with the local application of podophyllin, trichloroacetic acid, podophyllotoxin or imiquimod: the latter two have the advantage of self-application and should be tried first, but it might be necessary to use cryotherapy with liquid nitrogen or surgery. Treatment of vaginal warts consists of cryotherapy using liquid nitrogen, podophyllin or trichloroacetic acid.

Early syphilis is treated by the intramuscular administration of a single dose of benzathine benzylpenicillin or alternatively with a 10-day course of intramuscular procaine benzylpenicillin. Those individuals who are allergic to penicillin should receive a 14-day oral course of either doxycycline or tetracycline with erythromycin being used for treatment during pregnancy. Congenital syphilis is treated with intravenous aqueous benzylpenicillin for the newborn during the first 17 days of the neonatal period.

41.1.13 Coverage

In common with the control of other infections, success with STIs depends largely on coverage to decrease the presence of the incriminated organism in the population. Therefore, all opportunities should be used whether within the health sector or other sectors such as education, work and youth.

Within the health sector, STIs are related to most components of reproductive health services, prime examples being family planning, adolescent health and gender violence besides maternal, newborn and child health. Those relationships should be formally acknowledged at the local level through integrated reproductive health services by strengthening linkages for mutual benefits, especially increased coverage.

It is imperative to ensure the collaboration of the private sector in view of their extensive implication in the provision of services for the treatment of STIs. Even poor individuals would rather pay for private services that are perceived as being of better quality, than receive free public services.

41.1.14 Adapting Protocols

In view of the specificities of each country, it is important that protocols be adapted as necessary to meet the local situation even if it necessitates certain changes to reflect the unique situation in each country. Those specifications include social and cultural norms with their implications for behavioural aspects of health-seeking behaviour, economic conditions with their effect on the availability of resources for health service provision.

The control of STIs has faced major issues associated with stigma, whereby symptomatic individuals either fail to seek care altogether or attend too late, leading to further spread of the STI in the intervening period. Stigma is often the reason for seeking private health care, whether from medical practitioners, nurses or pharmacists besides over-the-counter purchases and encounters with traditional healers simply for easier access to care which is unfortunately related to human rights issues such as privacy and confidentiality. The situation is made even more complex because affected individuals are often asymptomatic when infected or, as in the case of men with trichomonas, even infested. Therapy can become complicated when the issue of treatment of partners is raised.

The identification of individuals with asymptomatic infections consists of either mass screening or case finding. Whereas mass screening aims at comprehensive coverage of a community without any emphasis on clinic attendance, case finding focusses on a specific group such as attendees at clinics providing reproductive health services such as contraception or antenatal care. Screening poses major logistical problems, and the well-entrenched procedures for the testing of blood donations for infections, such as HIV, syphilis and hepatitis B, reflect the importance that is attached to the perceived risk for recipients of blood products. The prime example of case finding in antenatal care refers to the detection of congenital syphilis.

41.1.15 Service Standards

As was the case with family planning services more than a decade ago, bold actions are needed to ensure that services for the control of STIs are effective through the elimination

of medical barriers and the promotion of appropriate healthcare-seeking approaches.

Women often seek STI services from health facilities that do not have dedicated STI clinics, prime examples being primary health care and specialist obstetric and gynaecological clinics. Beyond prevention, STI control emphasises case management with its four-pronged approach: diagnosis, antimicrobial therapy, behaviour change communication including condoms and finally, treatment of sexual partners. High-risk groups deserve targeted services but not to the detriment of coverage of the rest of the population even at low risk as a reflection of the epidemiological concept of population attributable risk.

41.1.16 Contact Tracing

Contact tracing with partner notification leads to treatment which serves as primary prevention to prevent infection of others besides persistent or recurrent infection of the index case [36]. This aspect of the management of STIs is sensitive for various reasons.

The selection of drugs for treatment, also called epidemiological treatment, simply follows the same regimen that was adopted for the index case. A careful approach, respecting privacy and confidentiality in accordance with the accepted principles of human rights, should be used for partner notification whilst respecting the sociocultural context and avoiding any coercion.

41.1.17 Surveillance

With sparse and scarce data in most jurisdictions, an excellent case can be made for ensuring that STIs are notifiable like many infectious diseases. However, the limited resources that are available in resource-poor settings raise the issue of a balance between resources for services as opposed to data. Besides the usual aspects of monitoring and evaluation that are in common with other reproductive health services, epidemiological surveillance of STIs is important for detecting antimicrobial resistance which should not be limited to the central referral hospital but sentinel posts should also cover the entire community specially to ensure that rural areas are monitored.

STI surveillance should be complemented by ad hoc studies to investigate issues as they arise, prime examples being the investigation of outbreaks. It is desirable for data from surveillance to be linked to other healthcare utilisation data in order to facilitate community-wide epidemiological investigations.

41.1.18 Implementing Integrated Reproductive Health Services

A life-cycle approach should be used to address reproductive health with special attention to women empowerment and male responsibility [37] besides the consideration of social capital regarding gender and sexuality. The integration of reproductive health services was recommended for the last two decades but major issues have been encountered during attempts at its implementation especially in the configuration of linkages for service delivery. The integration of services for STI and family planning tends to occur de facto at the peripheral level with the employment of multipurpose staff, but at the more central level, there seems to be missed opportunities from the dispersed units of the management structure. Further epidemiological studies on the cost-benefit of integration are needed [38].

41.1.18.1 Contraception

The basic principle in the provision of contraceptive services is to enable individuals to have access to a range of safe and effective methods so that they can exert their choice in the selection of the best method to suit their need. The intrinsic linkages of sexuality with the implications of sexual intercourse for STIs must emphasise the close association of the management, both prevention and treatment, of STIs to the provision of contraceptive services by promoting dual method use. However, the close interface between contraception and STI leads to important considerations to ensure that the selection of contraceptive method is appropriate. With the risk of both a pregnancy and an STI from sexual intercourse, it is not all surprising that there has been much interest in a relation between contraception and the acquisition of STIs.

Whatever the nature of any association, the relatively low use of barrier methods is worrying. When used correctly and consistently, male condoms are effective for preventing the transmission of HIV, syphilis, gonorrhoea, chlamydia, genital HSV-2 and trichomonas [39]. In view of their contraceptive effect, male condoms are therefore extremely valuable for dual protection against pregnancy and STIs, including HIV. As the prevention of STIs is often ignored when condom users change method to more effective hormonal contraceptives, consistent use of condoms is more common when used for contraception as opposed to hormonal methods. Whilst recognising the value of condoms for dual protection, it should be acknowledged that dual-method use is preferable for those who prefer to combine the excellent contraception from hormonal methods with condoms for preventing STIs. The production, marketing and distribution of female condoms will need to complement other activities to

promote their utilisation, like male condoms, for dual protection [40]. Furthermore, there is much interest in a revival of the diaphragm as a female-controlled method [41].

An increase in the risk of infections from sex hormones could be due to cervical ectopy, higher vaginal pH from a decrease in lactobacilli, increased infectivity of certain microbes, suppression of the immune system with local humoral dysfunction of the cervix and for HIV, increased shedding in vaginal and cervical secretion. With the impossibility of carrying out a randomised trial, an observational approach is needed.

There is concern that those women who harbour STIs might be at increased risk from pelvic inflammatory disease from use of the intrauterine contraceptive device through an ascending infection with transfer of organisms, during the insertion procedure, from the lower genital tract through cervical canal and uterine cavity to the upper genital tract. Whereas users with an STI have a higher risk with insertion, the lack of comparable data for non-users makes it impossible to determine whether there is any increased risk with the insertion of an intrauterine contraceptive device. Medical eligibility criteria of the World Health Organization for the utilisation of contraceptive methods are useful as service guidelines to guide clinical practice [42, 43]. Nonoxynol-9, a spermicide considered to have microbicidal properties, was impregnated into male condoms, but this well-intentioned approach was squashed with the finding of an increased risk of HIV acquisition when nonoxynol-9 was used often by high-risk women [44].

41.1.18.2 Fertility

STIs can have adverse effects on fertility such as increased incidence of ectopic pregnancy and foetal mortality. The role of STIs in the aetiology of male infertility can be substantial [45], and affected individuals have a pattern of inappropriate health-seeking behaviour regarding STIs [46].

41.1.18.3 HIV Programmes

The intertwining of STIs and HIV with numerous components of reproductive health is well recognised. Moreover, the coexistence of STIs and HIV should be fully appreciated as treatment of STIs has the potential to decrease HIV transmission [47]. With shared causal determinants for undesired outcomes in those diverse areas, relevant interventions would be complementary and intensified linkages should be sought to improve impact, a win-win situation for the major investments in reproductive health services.

Service providers should be fully aware of their potential role in the control of HIV and STIs through integrated reproductive health. The interface of STI and HIV control programmes includes areas such as advocacy for increased resources both for donors and national authorities to improve joint services. Sexual behaviour change, communication to decrease risk including the availability, accessibility and utilisation of both female and male condoms are important. Counselling regarding both screening for STIs and voluntary testing for HIV and implementation of policies for the inclusion of the comprehensive range of reproductive health commodities, especially antimicrobials for the treatment of STIs and condoms, both female and male, in national lists of essential medicines are essential components of integrated reproductive health services. The primacy of joint services is of such importance that there have been international declarations in this area. Whereas much is being done to ensure common activities, it would be valuable for substantial resources to be allocated only for joint activities with the conditionality that those funds would be released only upon full agreement of policy makers and managers of STI and HIV programmes.

41.1.18.4 Maternal, Newborn and Child Health

The effect of STIs on maternal, foetal and neonatal morbidity and mortality is exemplified by conditions such as congenital syphilis, low birthweight and ophthalmia neonatorum. The high incidence of asymptomatic STIs in pregnant women is well recognised [48], and much can be achieved during antenatal care.

With increasing evidence in 2016 of its sexual transmission, the Zika virus became an emerging STI with concerns for complications such as microcephaly and Guillain-Barré syndrome. WHO issued recommendations for safer sexual practices during pregnancy in affected areas besides for 8 weeks afterwards by visitors who should also avoid pregnancy for 6 months [49].

41.1.18.5 Adolescent Health

Services for the control of STIs provide a most valuable entry point for HIV prevention through the treatment of STI, counselling with voluntary testing, promotion of healthy sexual behaviour and provision of barrier methods of contraception. Sexual health education of adolescents does not increase their sexual activity [50], and it is crucial that they understand their sexuality for protection from STIs through the provision of sex education, including negotiation skills before puberty [51].

Adolescents often seek services from the informal sector for treatment of STIs, the likely reason being confidentiality of services but the quality of care is usually poor. Gender-specific messages should be directed at adolescents. Also, counselling of adolescents tends to be poor in both the formal and informal parts of the health sector [52, 53]. Much needs to be done to draw upon the value of the private sector

both for public-private partnerships and the involvement of a wide range of private non-medical health workers for the management of STIs [54].

Youth-friendly services should be accessible and appropriate to local circumstances to be welcoming to address their disadvantage regarding lack of information and access to services. There is a need to safeguard the privacy and confidentiality of adolescents to services with special attention to the special vulnerability of adolescent girls due to their social circumstances and biological factors. Efforts should include the provision of services through multiple outlets such as youth centres and school clinics to take advantage of circumstances.

The aetiologies of cervical and liver cancer have commonalities through infections with HPV and hepatitis B, respectively, that are both preventable through vaccination in adolescence. It would be most unfortunate when the introduction of HPV vaccine faces opposition due to a misconception as being a sex vaccine with moralistic implications [1].

41.1.19 Barriers to Integration and Opportunities for Change

Despite recent positive signs that governments in many developing countries are in favour of integrated reproductive health services, service provision is full of barriers that are unnecessary and often discouraging to both providers and potential users. Such barriers include lack of adequate training and resources, socio-cultural barriers, lack of strong and active government commitment and resistance to integration by health professionals who believe that reproductive services should be provided only in a medical setting using unnecessary and time-consuming medical and laboratory examinations [55, 56]. Significant reduction in outside funding also affects integration of STI prevention into reproductive health services because of urgent priorities including the HIV/AIDS epidemic. When resources for social sector activities are reduced, those who suffer the most are disadvantaged populations, such as those in rural areas, because that share of the resources is usually cut first. Besides, most health activities in urban centres have higher associated costs that are not readily discernable in the form of staff salary and other recurrent costs.

Recently, there has been heightened awareness of the importance of STI prevention to HIV/AIDS control with a new appreciation of the pivotal role of the impact of untreated STIs to reproductive health. Renewed attempts at integration of reproductive health services are investing in operational research to develop sound methodology for integration [57]. Concerted efforts are needed to strengthen the infrastructure, trainers and curricula in pre-service training of service providers to provide family planning and STI services for immediate on-the-job application upon graduation. Besides technical capacity building for STI control, efforts are being directed towards changing the provider attitudes to deal with these infections. Operational research evidence is needed to identify the best approach to integration of STI control into family planning and services for mothers and adolescents in different settings and identify other potential options where full integration is not feasible.

41.1.20 Sector-Wide Approach

Scaling-up implies increased coverage of the population with quality services and long-term sustainability, a situation that is likely to necessitate resource mobilisation through the availability of funds from a sector-wide approach mechanism in line with national priorities for reproductive health. Therefore, the ultimate control of STIs will rely upon political commitment for resource mobilisation besides the complementary short-term objective of exploiting the current opportunity whereby increasingly available funds for HIV activities could be used for common resources that will benefit tasks pertaining also to STIs.

Experience should draw upon the lessons learned from the failures of primary health care to ensure that the delivery of reproductive health services would achieve the goals that were feasible for the available level of resources. A sector-wide approach should promote health sector reform to emphasise coordinated activities as opposed to vertical programmes besides a holistic perspective to include issues such as male involvement which is crucial to address gender inequalities in the context of masculinity as pertaining to social norms for behaviour change communication [58] including solutions to overcome problems that were faced by the approach focussing on information, education and communication for population education. Nevertheless, health professionals will continue to devote much precious resources, especially in the form of their time, to address rumours from the public and misinformation from professionals that merely constitute a distraction from priority tasks that would advance the control of STIs.

Capacity building constitutes a major task. Training in STIs should be incorporated in the curricula of health professional schools [59] besides being incorporated in on-the-job training especially in conjunction with supervisory visits.

41.1.21 Programme Effectiveness

The evaluation of the effectiveness of STI control programmes is a complex process yielding mixed findings in both developed and developing countries. Overall, the preva-

lence of STIs has shown a decline over the past three decades. Several countries in Asia have reported sharp decline in the incidence of common STIs, such as gonorrhoea and chlamydia, following the introduction of integrated STI control programmes, public sexual health education, condom utilisation and improved access by commercial sex workers to STI services. On the contrary, some industrialised countries in Europe and North America have observed a rise in the occurrence of some STIs. However, it is unclear whether those observed increases are due to an actual surge in STIs or merely more accurate diagnostic and reporting procedures. Nevertheless, STIs remain a public health concern for most developing countries particularly in Africa where resources are lacking for STI control efforts besides inadequate surveillance that prevent the assessment of time trends. As STI control is a relatively dynamic process that is vulnerable to political, social and economic change, a coordinated and integrated effort is needed for a sustainable outcome.

41.1.22 Conclusions and Recommendations

With the close interactions of STIs with contraception, maternal health, adolescent health and sexuality besides other components of sexual and reproductive health, opportunities should be used to form strategic partnerships specially to produce the evidence base, bridge the gap in service provision, promote synergies for reproductive health and scale-up activities [60, 61].

Much can be done for the prevention, diagnosis and treatment of STIs by exploiting the potential of services, particularly for women and adolescents, that have been recognised globally [62]. Procedures, especially for diagnosis, will depend largely on the availability of resources, especially human and laboratory. A contraceptive service should serve as an entry point for the control of STIs, whether prevention or treatment, and encourage healthy behaviour including the utilisation of condoms whether for dual protection or dual method use. Integrated reproductive health services should be promoted so that various interventions can be implemented.

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