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IO1 Training Materials

SEXUALLY TRANSMITTED DISEASES

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OBJECTIVES

At the end of the module, the participants will be able to:

1. Define and describe the most encountered sexually transmitted diseases;
2. Describe the most important aspects related to sexual behavior of adolescents and young people;
3. Describe the most important interventions aimed to contribute to the behavior change of adolescent and young people in order to prevent the sexually transmitted diseases;
4. Describe how behavior can change and the role of professionals in behavior change.

Abbreviations

Over the document the terms Sexually Transmitted Diseases (further on abbreviated as STD) and Sexually Transmitted Infections (further on abbreviated as STI) are used interchangeably and the authors have started from the premise that, for the purposes of this material, these terms are having the same meaning and are carrying the same weight.

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1. General description of Sexually Transmitted Diseases

1.1. Context. Description/definition of topic

According to WHO, sexually transmitted infections (STIs) in general, and among adolescents in particular, are of paramount concern to all people who work on improving the health status of populations. Worldwide the highest reported rates of STIs are found among people between 15 and 24 years; up to 60% of the new infections and half of all people living with HIV globally are in this age group. STIs are still widely connected with stigmatization, embarrassment and denial among health workers and patients alike. Sexuality, and associated health risks, are still a major taboo in many societies. This is especially true for young people. While their rights and needs may be acknowledged in theory, in practice they are still confronted with many barriers when it comes to obtaining the practical support they need to avoid problems. (WHO, 2005)

STIs are not evenly distributed among the many young people who engage in sexual activity. Sex, frequency and type of intercourse engaged in, the number and characteristics of sexual partners, the extent of condom use, the risk of violence and the epidemiology of STIs locally are all factors that influence STI risk. The relative importance of each of these risk factors is determined by the specific sociocultural and economic context in which young people live. Adolescents at highest risk of STIs tend to be adolescent sex workers and their clients, adolescent boys who have sex with men or other boys, street children and children in correctional homes. Generally, STIs are probably more common among those who are not going to school than among school-going adolescents. However, in high STI prevalence regions, such as Africa, the Caribbean and, since the 1990s, parts of Eastern Europe, most adolescents – including rural school-going ones – are at risk of contracting STIs, even though differentials remain. Girls are more vulnerable to STIs than boys biologically and, in many settings, are at higher risk because they have older partners (Oringanje *et al.,* 2016).

Community interventions to promote condom use are considered to be a valuable tool to reduce the transmission of human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs). In particular, special emphasis has been placed on implementing such interventions through structural changes, a concept that implies public health actions that aim to improve society's health through modifications in the context wherein health-related risk behavior takes place. This strategy attempts to increase condom use and in turn lower the transmission of HIV and other STIs. (Moreno *et al.,* 2014)

Sexually transmitted disease is a term used to describe more than 20 different infections that are transmitted through exchange of semen, blood, and other body fluids; or by direct contact with the affected body areas of people with STIs. Sexually transmitted diseases are also called venereal diseases.

Some of the most common and potentially serious STDs/STIs include:

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- **Chlamydia**. This STD is caused by the bacterium Chlamydia trachomatis, a microscopic organism that lives as a parasite inside human cells. The CDC estimates that nearly three million cases occur annually because 75% of women and 50% of men show no symptoms of the disease after infection. Approximately 40% of women will develop pelvic inflammatory disease (PID) as a result of chlamydia infection, a leading cause of infertility. Chlamydia is the most common reportable STD in the United States. In 2017, rates of reported cases of chlamydia were highest among AYA, representing 62.6% of all cases in the United States. Among females, the highest age-specific rates were among those aged 15 to 19 years (3266 cases per 100,000) and 20 to 24 years (3986 cases per 100,000). Among males, age-specific rates were highest among 20 to 24 year olds (1705 cases per 100,000). (Sieving *et al.*, 2019)
- **Human papillomavirus (HPV).** HPV causes genital warts and is the single most important risk factor for cervical cancer in women. Over 100 types of HPV exist, but only about 30 of them can cause genital warts and are spread through sexual contact. In some instances, warts are passed from mother to child during childbirth, leading to a potentially life-threatening condition for newborns in which warts develop in the throat (laryngeal papillomatosis).
- **Genital herpes**. Herpes is an incurable viral infection thought to be one of the most common STDs in the USA. It is caused by one of two types of herpes simplex viruses: HSV-1 (commonly causing oral herpes) or HSV-2 (usually causing genital herpes). The CDC estimates that 45 million Americans (one out of every five individuals 12 years of age or older) are infected with HSV-2; this number has increased 30% since the 1970s. HSV-2 infection is more common in women (one out of every four women) than men (one out of every five men) and in African Americans (45.9%) than Caucasians (17.6%).
- **Gonorrhea**. The bacterium Neisseria gonorrhoeae is the causative agent of gonorrhea and can be spread by vaginal, oral, or anal contact. The CDC reports that approximately 650,000 individuals are infected with gonorrhea each year in the United States, with 132.2 infections per 100,000 individuals occurring in 1999. Approximately 75% of American gonorrhea infections occur in persons aged 15 to 29 years old. In 1999, 75% of reported gonorrhea cases occurred among African Americans. In 2017, reported cases of gonorrhea were highest among adolescents and young adults, representing 44.7% of all cases in the United States. Among females, the highest age-specific rates were among those aged 15 to 19 years (557 cases per 100,000) and 20 to 24 years (685 cases per 100,000). Among males, age-specific rates were highest in those aged 20 to 24 years (705 cases per 100,000) (Sieving *et al.,* 2019)
- **Syphilis**. Syphilis is a potentially life-threatening infection that increases the likelihood of acquiring or transmitting HIV. In 2018, in the USA, according to CDC, the total case count of reported syphilis (all stages combined: primary and secondary, early non-primary non-secondary, unknown duration or late, and congenital) was the highest recorded since 1991. The total number of reported cases of syphilis (all stages) increased 13.3% during 2017–2018 (from 101,584 cases to 115,045 cases). Congenital syphilis causes irreversible health problems or death in as many as 40% of all live babies born to women with untreated syphilis. Unlike chlamydia and gonorrhea, rates of primary and secondary syphilis are substantially higher among US males than females (Sieving *et al.,* 2019).

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- **Human immunodeficiency virus (HIV) infection.** In 2000, the CDC reported that 120,223 people in the United States are HIV-positive and 426,350 are living with AIDS. In addition, approximately 1,000-2,000 children are born each year with HIV infection. It is also estimated that 33 million adults and 1.3 million children worldwide were living with HIV/AIDS as of 1999 with 5.4 million being newly infected that year. US adolescents and young adults account for a substantial number of HIV infections. In 2016, the rate of HIV diagnoses was 5.8 per 100,000 among adolescents aged 13 to 19 years and 30.5 per 100,000 among young adults aged 20 to 24 years. Most new infections were attributed to male-to-male sexual contact, including 92% among male adolescents and 91% among male young adults. For females, most new infections were attributed to heterosexual contact, including 85% among adolescents and 88% among young adults. From 2011 to 2016, the rate of diagnosed infections declined among adolescents and remained stable among 20 to 24 year olds. (Sieving *et al.,* 2019)
- **Hepatitis B and C.** Among adults, hepatitis B transmission occurs primarily among unvaccinated adults with risk behaviors for hepatitis B transmission, including having multiple sex partners and sex partners of people with chronic hepatitis B infection. Hepatitis B is easily transmitted through sexual activity. Sexual contact is the most common way hepatitis B is spread in the USA. Among adults seeking treatment in STD clinics, as many as 10%–40% have evidence of past or current hepatitis B virus infection. Although not common, hepatitis C can be transmitted through sexual activity. Having a sexually transmitted disease or HIV, sex with multiple partners, or rough sex appears to increase a person's risk for hepatitis C. Case-control studies have reported an association between acquiring hepatitis C infection and exposure to a sex contact with hepatitis C infection or exposure to multiple sex partners. New research shows that gay men who are HIV-positive and have multiple sex partners may increase their risk for hepatitis C. There is no vaccine for hepatitis C. The best way to prevent hepatitis C is by avoiding behaviors that can spread the disease, especially sharing needles or other equipment to inject drugs. CDC now recommends one-time hepatitis C testing of all adults (18 years and older) and all pregnant women during every pregnancy. CDC continues to recommend people with risk factors, including people who inject drugs, be tested regularly.
- **Trichomoniasis** is a very common sexually transmitted disease. It is caused by infection with a protozoan parasite called Trichomonas vaginalis. Although symptoms of the disease vary, most people who have the parasite cannot tell they are infected. Trichomoniasis is the most common curable STD. In the United States, an estimated 3.7 million people have the infection. However, only about 30% develop any symptoms of trichomoniasis. Infection is more common in women than in men. Older women are more likely than younger women to have been infected with trichomoniasis.

In 2000, Panchaud C *et al*., showed in a study performed in 14 countries in Europe, the United States and Canada that the incidence data calculated per 100,000 for adolescents, for young adults and for the total population has generally decreased between 1990 and 2000, both in the general population and among adolescents, on three common bacterial STDs — syphilis, gonorrhea and chlamydia. Incidence data were obtained from official statistics, published national sources or scientific articles, and unpublished government data. However, the study showed that the Russian Federation is an important exception: Syphilis has risen dramatically in the 1990s. Except for the

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Russian Federation and Romania, the syphilis rate in the mid-1990s was quite low, with rates of less than seven reported cases per 100,000 teenagers in most developed countries. The study showed also that Gonorrhea incidence is many times higher than that of syphilis in several countries, and this disease disproportionately affects adolescents and young adults. Gonorrhea rates among adolescents can be as high as 600 per 100,000 (in the Russian Federation and the United States), although in many countries the reported rate among teenagers is below 10 per 100,000. In all countries with good reporting, chlamydia incidence is extremely high among adolescents (between 563 and 1,081 cases per 100,000). One explanation of these results could be that in the case of chlamydia, screening strategies are aimed primarily at women, so males have less of a chance to be screened or tested. The reported incidence of all three STDs is generally higher among female teenagers than among males of the same age; this is especially true for chlamydia. The conclusion of the study was that prevention programs, active screening strategies and better access to STD diagnosis and treatment services, especially for adolescents and young adults, are necessary in order to reduce the incidence and the burden of STDs among young people.

1.2. The impact of Sexually Transmitted Diseases on pregnancy /mother/child health proved

Sexual transmitted infections affect women all over the world at different ages. The most frequent are syphilis, 6 million new cases in 2012, for example. In the same year there were registered 78 million cases of Neisseria gononrrhoeae (NG), 131 million cases of Chlamydia trachomatis (CT) and 143 million cases of infections with Trichomonas vaginalis (TV)! The most affected countries in the world were in Africa, Asia and Latin America.

Statistics show that curable STIs are associated with different adverse pregnancy and neonatal outcomes: maternal morbidity, premature birth, low birth weight or stillbirth. Prematurity causes different complications, which conduct to children morbidity and mortality. About 50% of untreated maternal TG and CT infections are transmitted to the child, during the process of birth, causing eye and lower respiratory tract infections. Gonorrhea in pregnancy may be associated for mother with postpartum bartholinitis (infection and inflammation of the major vestibular glands also named Bartholin's glands), peri-hepatitis, arthritis, endocarditis and endometritis, and fever during the puerperium. For the child there is a higher risk of prematurity, premature rupture of membranes, fetal losses, and delayed intra-uterine growth. The gonococcal eye infection could produce corneal damage and blindness if untreated, and Chlamydia infant infection could produce atypical interstitial pneumonitis, bronchitis and otitis media. About 25% of women with gonorrhea or Chlamydia become infertile.

The main cause of the incidence of STDs for pregnant women globally is the lack of routine antenatal testing for CT, NG and TV infections.

Syphilis in pregnancy may lead to abortion, prematurity, neonatal death or development of the disease in the newborn (early and late congenital syphilis). The severity of congenital syphilis is due to the fact that transplacental infection is massive.

Although testing for prenatal syphilis is recommended by the WHO and available in most countries, there are still challenges related to the application of these recommendations.

For Genital herpes, there are cases where the maternal prime infection may result in abortion, microcephalia, delayed intra-uterine growth, congenital herpes, neonatal herpes and fetal death.

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When transplacental transmission may occur (1:3500 pregnancies), the studies shown that with natural births, 50% of newborns infections occur when there is a vaginal active lesion. The fetal contamination is produced more frequently through the birth canal leading to neonatal herpes, a disease with high morbimortality.

1.3. The root of negative behavior – how behavior starts in general Sexually Transmitted Diseases

In this chapter the focus will be on the behavior of adolescents and young adults and STIs. Although there is a remarkably uniform concept of adolescence in many countries today in terms of biological markers, such as age cohort and maturation, the meaning of being an adolescent needs to take into account socioeconomic differences and rural–urban divides. Urbanization has played an important role in the emergence of adolescence. The circumstances in which young people in rural areas live may be characterized by their lack of access to adequate education, formal employment, cash income or free time. In contrast, the exodus of young people to urban areas, because of poverty, has added still new elements, such as informal employment and living on the street. The large number of street children and informally employed adolescents, including those employed as sex workers in urban centres, are almost by definition not school-going. Children and young people working in cities are often obliged to accept conditions that are poorly paid or unpaid and dangerous to their health. Descriptions have been published by the International Labour Office and UNICEF of economic exploitation such as forced for bonded labour and commercial sex exploitation, particularly of girls (GTZ, 1997).

Thus, for example, in the Indian cities of New Delhi, Mumbai and Calcutta around 100,000 children either do “informal” jobs such as washing cars, pushing hand carts, cleaning gutters, or survive by begging or collecting edibles from garbage dumps (MOW, UNDP,UNICEF, WHO and NACO, 1996). In Thailand, an estimated 800,000 girls under the age of 20 are earning their living as sex workers (International Clearinghouse on Adolescent Fertility, 1991). In many of the countries of Eastern Europe, tens of thousands of young people are believed to be not attending school or not formally employed. Instead they are engaged in drug trafficking (and consumption), prostitution or a range of criminal activities which are associated with an increased risk of STIs and HIV (UNICEF, 1999). In Africa, many adolescents are affected by war, civil unrest and forced migration, with boys lured or forced into the army and girls subjected to violence and sexual abuse (UNICEF, 1996; WHO, 2005).

The emergence of a distinct adolescent lifestyle has consistently been associated with the gradual breakdown of traditional family life, the diminishing role of parents and the larger family unit, and an increasing role of peers. The family is becoming far less important in the individual development of young people while peers and the media have become more influential. *“Parents are finding it increasingly difficult to fulfil their role of providing advice and nurturing the young into society.”* (Mkandawire, 1994)

The streets and temporary shelters have become “home” to some 100 to 200 million children and adolescents worldwide, many of them cut off from their parents and their extended families (WHO,

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2000). Left to rely on their own resources, these young people develop their own means of survival, values, networks and structures, often as a reaction to the threat of violence (GTZ, 1997).

Adolescent sexuality today is viewed with much ambiguity in a large part of the world. In the developed countries, sociology and psychology often situate adolescent sexuality within a framework of deviant behavior, and public discussion about adolescent sexuality and childbearing accordingly describes adolescence as problem-laden (McCauley *et al.,* 1995).

Although the attainment of adulthood is getting later in most parts of the world, the age at first sex continues to be early. In some parts of the world, for instance in the Muslim countries of North Africa and in parts of Asia, most sexual activity reported even a decade ago among young people still took place within marriage (Singh and Wulf, 1990). Overall, however, age at marriage appears to have risen more rapidly than age at first sexual experience, thereby significantly increasing the numbers of young people who have sex before marriage. In only four of 27 countries studied in all regions, had the gap between the proportion of women who were sexually active and those married by age 18 declined (Blanc and Way, 1998).

Among girls in certain parts of Africa and South Asia, for example, first sexual experience usually takes place at 15–16 years of age. In South Africa, among a large sample of girls in KwaZulu Natal, almost half had already had first sexual intercourse at an age of 16 (Manzini, 2001). Similarly, in a smaller study in Maputo in Mozambique, the mean age at first sexual intercourse for girls of both poor and middle-class socioeconomic level was 15 (Machel, 2001). In certain population subgroups, e.g. young people in peri-urban areas in Zambia (CARE International, 1997) or Zimbabwe (UNAIDS, 1999), first sex for both boys and girls may occur as early as the age of nine. In contrast, in other parts of Africa (e.g. Rwanda and Burundi) and in Latin America, partially due to the influence of the Roman Catholic Church, the average age at first sex for girls is older, at 18–20 years of age.
However, certain segments of young population may be sexually active at younger ages as well. For instance, in a small sample of young people in Chile 32% had already had sex by age 15 (UNAIDS, 1999). Similarly, in many Asian countries, for instance in Indonesia, the Philippines and Thailand, although the median age at first sex among young women was in their early 20s, a substantial minority were starting sexual relations much earlier, including a large number of adolescents working in prostitution (McCauley and Salter, 1995). In a study among unmarried young people age 15-22 in Shanghai, China, 31% of girls and 44% of boys were sexually active, with a mean age of sexual debut of just under 20 for boys and just under 19 for girls, with the earliest age being 12 (Cui N *et al.,* 2001). In certain African countries, such as Liberia and Botswana, more than 60% of unmarried adolescent girls report having had sex, while in most Latin American countries, this proportion was much smaller, below 10%, and in the Philippines, it was less than 1% (McCauley and Salter, 1995). Another set of surveys seemed to suggest these proportions were higher, with between 10 and 20% of unmarried adolescent girls in Central America, and even higher proportions in Brazil and the Caribbean (e.g. 59% in Jamaica) (Morris, 1995).

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Very little is known about the frequency of sexual intercourse among sexually-active adolescents, the number of sexual partners they have had or their sexual practices, including whether they have sex protected by condom use. Sexual activity patterns seem to vary according to:

- religion,
- social class,
- schooling,
- ethnic group,
- family situation
- individual circumstances.

There is some evidence that young people in urban areas are more sexually active than those in rural areas. A few qualitative and quantitative studies seem to suggest that out-of-school girls may be sexually more active, have sex more frequently and with a higher number of partners than school-going girls.

2. Main researches/ studies concerning the Sexually Transmitted Diseases

2.1. Conclusions about negative aspects of future parents' behaviors concerning Sexually Transmitted Diseases and the impact on children's health

Risky sexual behaviors (RSB), such as unsafe sexual intercourse and multiplicity of partners are more frequent among adolescents and young adults (between 15 and 24 years old). Factors associated with the admission to the university may increase the occurrence of RSB, since they imply a series of social changes in the individual's life. RSB may result in STIs and unplanned pregnancy. STIs are among the most prevalent acute conditions in the world, with about one million new cases per day4. A study performed in Brazil in 2020 showed that the country has been experiencing a resurgence of STIs, especially human immunodeficiency virus (HIV) and syphilis, with a significant increase among young people aged between 15 and 29 years old.

The main consequences of STIs are infertility, ectopic pregnancy, stillbirths, pelvic inflammatory disease and neurological and cardiovascular implications in adults. On the other hand, unplanned pregnancy is particularly problematic in younger age groups, as it compromises the completion of school and academic life, besides increasing the risk of complications in the pregnancy itself. In Brazil, the evaluation of a representative sample of high school students indicated that 32% of the students did not use condoms in sexual intercourses that occurred in the month before the survey.

Among undergraduate students, non-use of condom in the last sexual intercourse ranged from 85.7% to 38.6%. The frequency of students who had between one and three sexual partners within three months before the survey was 95% in women and 89% in men. The use of psychoactive substances among Brazilian undergraduate students before the last intercourse was around 15%2. In the municipality of Pelotas, a survey with adolescents between 15 and 18 years old indicated that 10.7% ingested alcoholic beverages before the last intercourse and only 56% of adolescents

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used condoms in the last three sexual relationships. The non-use of condoms in both high school and undergraduate students was positively associated with males, alcohol intake and multiplicity of partners1,14 and inversely associated with the age of the individual and with socioeconomic level. Studies evaluating risky sexual behavior in Brazil were predominantly among school adolescents and had a descriptive approach focusing on the evaluation of outcomes related to sexual behavior such as the level of knowledge regarding STIs. Moreover, the impact of the psychosocial characteristics of undergraduate students, such as sexual orientation and gender identity, the variability between the areas of knowledge and the role of technology on sexual behaviors was little addressed. The study identified the main characteristics of the sexual behavior of freshmen undergraduate students according to gender and verified the prevalence of risky sexual behavior, as well as the main sociodemographic and behavioral associated factors, in a census of freshmen students of the Universidade Federal de Pelotas (UFPel), in Southern Brazil (Gräf DD *et al.,* 2020).

Studies from the United States showed that 48% of undergraduate students used condoms in the last sexual intercourse, and the prevalence of risky sexual behavior was 14%, considering those who reported not using condoms in the last intercourse and having had more than one partner within the last 12 months prior to the survey. A study conducted in 31 U.S. higher education institutions indicated that 44% of students had more than one partner within three months before the survey, and 16% used psychoactive substances (alcohol or illicit drugs) before the last sexual intercourse.

2.2. Conclusions about positive behaviors concerning Sexually Transmitted Diseases and the impact on children health

3. Recommendations (WHO) Examples of evidence-based interventions

Young people access sexual health information from a variety of sources including health care providers, parents, schools, community organizations, and digital media. Parents have a substantial influence on adolescence and young adults' sexual values, and beliefs. Research shows that quality parent-youth communication about sexual health can result in safer sex practices among youth (Widman L *et al.,* 2016). However, nearly one-fourth of youth report not discussing sexual topics with a parent (Widman L *et al.,* 2016). Within the context of providing confidential services, clinicians can facilitate parent-youth communication about sexual health. For example, clinicians can help their adolescents and young adults patients see potential advantages to communicating with their parents and offer to start parent-youth discussions in ways that support the young person. Clinicians can also provide parents with general anticipatory guidance about parent-youth communication and youth sexual health topics without specifically disclosing confidential information from their adolescents and young adults' patients (Ford CA *et al.,* 2011).

Findings from more than 3 decades of evaluating sex education programs in a variety of school and community settings are remarkably robust. Multiple studies indicate that participating in comprehensive sexuality education is linked to declines in STI risk behaviors, including delays in first intercourse, reductions in number of sexual partners, and decreases in unprotected sex. (Chin *et al.,* 2012)

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Comprehensive sexuality education programs emphasize abstinence as the safest behavior and also promote the use of condoms and other forms of contraception for young people who do have sex. Considerable evidence also demonstrates that abstinence-only sexuality education is not associated with prevention of STD risk behavior. Surveys on US health education practice document recent declines in adolescents' receipt of formal sexuality education (Lindberg *et al.,* 2016).

Digital technology, including the Internet and social media, represents an important new venue for sexuality education. Smartphone ownership has become nearly universal for young people, with 95% of teens in the USA reporting ready access to a smartphone. The anonymity offered by digital technology in searching sensitive topics makes it a likely source of sexual and reproductive health information. Although online sexual and reproductive resources are often inaccurate, sites such as Bedsider.org, StayTeen.org, and Scarleteen.com provide comprehensive, medically accurate sexual health information tailored to adolescents and young adults' audiences.
Ultimately, expanded, integrated, multilevel approaches are warranted to reverse recent increases in STDs and improve sexual and reproductive health outcomes for adolescents and young adults in the United States. Such approaches must reach beyond clinics and school classrooms; capitalize on cutting-edge, youth-friendly technologies; and change social contexts in ways that encourage young people's healthy sexual decision-making.

There is growing evidence that the reduction in HIV incidence in some countries can be linked to behavioral changes which are the result of behavioral intervention programs (UNAIDS 2001b; Darbes 2009).There are many theories and models about how behavioral change occurs. The most common models and theories on which behavioral interventions are built include the Information-Motivation-Behavioral skills (IMB) model (Fisher 2009), the Social Cognitive Theory (Bandura 2001) and Theory of Reasoned action (Ajzen 2007). Even though the details of the theories are different, they have similar ideas. They aim to change factors believed to be predictors of behavior, such as health beliefs (the risk of contracting HIV is negligible), cognitions (HIV is not an important risk for me), attitudes (nothing wrong with multiple partners), social norms (no sex before marriage) or skills (negotiation for safe sex). This involves conveying information to the target groups through education, training and counselling which could be done at individual or at group level. In the same vein, behavioral interventions for preventing HIV aim at changing these factors in order to reduce risky sexual behavior. In addition, based on economic theory, incentives such as monetary or non-monetary stimuli can be used to influence behavior such as free condoms. In 2011, a review was performed regarding the risky sexual behaviors such as unprotected sex with a partner whose status is unknown, multiple sexual partnerships, drinking alcohol before having sex and sex with commercial sex workers (ILO 2002). This review focused on behavioral interventions to reduce risky sexual behavior of workers to reduce the heterosexual transmission of HIV infection. One of the conclusions was that there was low quality evidence that educational interventions, when based on the IMB model, reduced sexually transmitted diseases, unprotected sex and sex with commercial sex workers but there was no significant decrease in sex with multiple sexual partners nor in use of alcohol before sex (Ojo_O., *et al.,* 2011).

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In another review performed by Morenoi *et al.,* in 2014, the authors assessed nine studies, involving 75,891 participants with a duration raging from one to nine years. Seven of these studies were conducted in Sub-Saharan Africa, one in Peru, and one in a multi-country location. Condom promotion was implemented in all the studies. The results did not provide clear evidence that condom promotion in these specific contexts led to a decrease in the transmission of HIV and other STIs. However, knowledge about HIV and other STIs increased, as did reported condom use. A likely reason for the negative results in this review is that sexual behaviors are difficult to change. The study found no difference in the number of sexual partners where the intervention was implemented. Also, if there is not consistent condom use the risk of transmission remains for HIV and other STIs. The quality of the evidence was deemed to be moderate. These findings should be interpreted with caution since most of the studies in the review were carried out in Sub-Saharan Africa, a region that is very diverse, and whose social and cultural characteristics are different from those in other developing nations.

Mason-Jones *et al.,* (2016) have evaluated the effects of school-based sexual and reproductive health programmes on sexually transmitted infections (such as HIV, herpes simplex virus, and syphilis), and pregnancy among adolescents. There were included eight cluster-RCTs that enrolled 55,157 participants. Five trials were conducted in sub-Saharan Africa (Malawi, South Africa, Tanzania, Zimbabwe, and Kenya), one in Latin America (Chile), and two in Europe (England and Scotland). The authors concluded that there is currently little evidence that educational programmes alone are effective at reducing STIs or adolescent pregnancy. Incentive-based interventions that focus on keeping young people, especially girls, in secondary school may reduce adolescent pregnancy but further high quality trials are needed to confirm this.

4. How behavior can change – the role of professionals

Adolescence is a rather new concept historically, comprising a lengthy period of transition from childhood to adulthood, associated with an emerging awareness of sexuality and an age-specific drive to experiment with sex. (WHO, 2005).
Adolescence is commonly associated with physiological changes occurring with the progression from appearance of secondary sexual characteristics (puberty) to sexual and reproductive maturity (WHO, 1995).
Teenagers are vulnerable to STIs; Centers for Disease Control and Prevention (CDC) from US showed that in 2018, people aged 15-24 represented a substantial proportion of all those with chlamydia (62%), gonorrhea (43%) and syphilis (22%).

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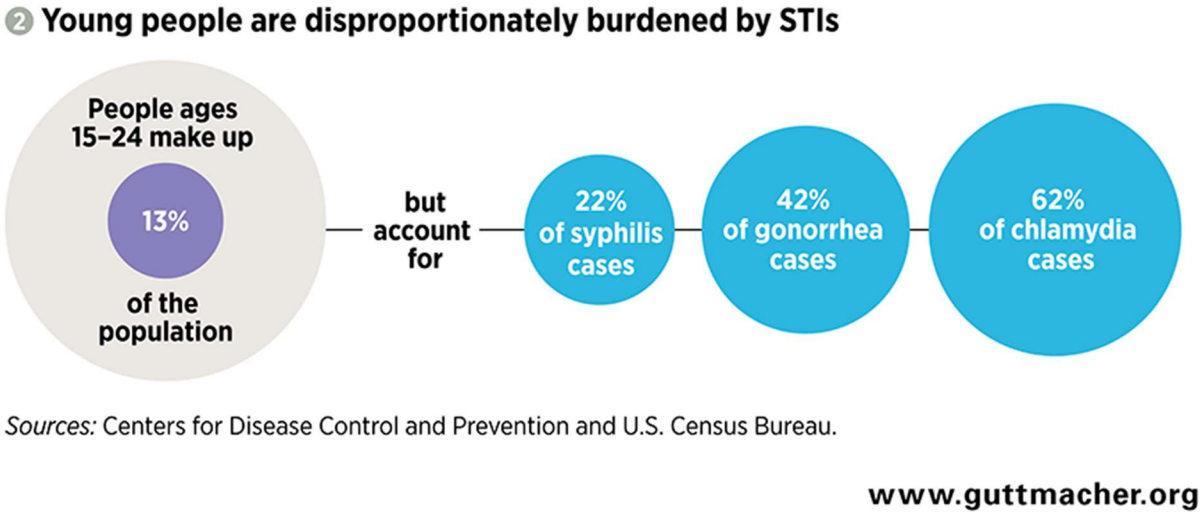

The main directions professionals can take to prevent STIs and reduce incidence of infections among young people are:

- Providing sexual health information on the one hand by programs which offer accurate information about prevention, transmission, main symptoms and treatment of STIs, and on the other by promoting healthy behavior and healthy relationship focusing in teenagers' sexual autonomy, understanding consent and being able to advocate for condom use;
- Tailoring sexual education programs in order to be age appropriate, respectful for different cultural backgrounds and specificities and responding to real educational needs of youngsters. Focusing only on abstinence programs is not offering a solution to teenagers who will become sexually active regardless these programs;
- Ensuring counselling in schools or in special services for teenagers to help them to make the healthiest and safest choice regarding their sexual behaviors;
- Making available and affordable tests and treatments for STIs, adapted to the school or work schedule of young people, including marginalized youth who abandoned school, with the respect of confidentiality and without discrimination;
- Offering preventing care by preventing the STIs and the spread of it. Health professionals from schools, cooperating with education staff should promote condom use and partners' treatment

In order to understand how to change adolescents' behavior in relation to STIs, one must understand what is important from the perspective of human behavior, namely what is the classical conditioning and the operant conditioning.

The **classical conditioning** was firstly explained by Ivan Pavlov which studied the salivation in dogs as part of his research project on digestion.

Classical conditioning is effective when a conditioned stimulus precedes the unconditioned stimulus. In Pavlov's studies, for instance, a bell or a buzzer was a signal that the meat was coming

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and the dog's salivation was preparation for digesting food. Starting with Pavlov's experiments, it was John B. Watson who believed that the whole array of human emotion and behavior could be accounted for by conditioning principles. It seems that, according to Watson, classical conditioning affects our preferences, emotions, behavior and plays an important role in our emotional responses to objects, symbols, events and places. Classical conditioning can explain the positive and negative emotions. We have learned the positive or negative emotions because, in the past, some objects, events, situations have been associated with positive or negative feelings (Tavris C *et al.,* 2001).

Operant conditioning theory explains that behavior becomes more or less likely, depending on its consequences. In operant conditioning, the organism's response operates or produces the effects on the environment which in turn, influence whether the response will occur again.
Behavior modification represents the use of operant techniques to help people change unwanted, dangerous or self-defeating habits in real-world settings.

Some of the successes attributed to behavior modification include:

- Teaching parents to toilet train their children
- Teaching teachers to be "behavioral change agents"
- Training of disturbed and mentally retarded adults to communicate, dress themselves, mingle socially with others and earn a living
- Teaching the brain-damaged patients to control inappropriate behavior, focus attention and improve their language abilities
- Helping people to eliminate unwanted habits, such as smoking and nail biting, or acquire wanted ones, such as practicing the piano or studying.

A behaviorally trained professional should begin by systematically studying the adolescent's behavior and the reinforcers that seems to be maintaining it, such as attention or sensory stimulation. It is also important to consider reinforcement and punishment techniques which can be positive and negative, e.g. in positive reinforcement something pleasant follows a response; in negative reinforcement, something unpleasant is removed. In positive punishment, something unpleasant follows the response; in negative punishment, something pleasant is removed (Tavris C *et al.,* 2001).

Reinforcement in Operant Conditioning is any event that strengthens or increases the behavior it follows. There are two kinds of reinforcers. In both of these cases of reinforcement, the behavior increases.

1. **Positive reinforcers** are favorable events or outcomes that are presented after the behavior. In positive reinforcement situations, a response or behavior is strengthened by the addition of praise or a direct reward. If you do a good job at school and your teacher gives you a higher note, that note is a positive reinforcer.

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2. **Negative reinforcers** involve the removal of an unfavorable events or outcomes after the display of a behavior. In these situations, a response is strengthened by the removal of something considered unpleasant. For example, if your child starts to scream in the middle of a restaurant, but stops once you hand them a treat, your action led to the removal of the unpleasant condition, negatively reinforcing your behavior (not your child's).

In **operant conditioning,** schedules of reinforcement are an important component of the learning process. When and how often we reinforce a behavior can have a dramatic impact on the strength and rate of the response.

A schedule of reinforcement is basically a rule stating which instances of behavior will be reinforced. In some cases, a behavior might be reinforced every time it occurs. Sometimes, a behavior might not be reinforced at all.

Either positive reinforcement or negative reinforcement may be used as a part of operant conditioning. In both cases, the goal of reinforcement is to strengthen a behavior so that it will likely occur again.

Reinforcement schedules take place in both naturally occurring learning situations as well as more structured training situations. In real-world settings, behaviors are probably not going to be reinforced every time they occur. In situations where you are intentionally trying to reinforce a specific action (such as in school, sports, or in animal training), you would follow a specific reinforcement schedule.

Some schedules are better suited to certain types of training situations. In some cases, training might call for one schedule and then switch to another once the desired behavior has been taught.

The two foundational forms of reinforcement schedules are referred to as continuous reinforcement and partial reinforcement.

Continuous Reinforcement. In continuous reinforcement, the desired behavior is reinforced every single time it occurs. 1 This schedule is best used during the initial stages of learning to create a strong association between the behavior and response.

Imagine, for example, that you are trying to teach a dog to shake your hand. During the initial stages of learning, you would stick to a continuous reinforcement schedule to teach and establish the behavior. This might involve grabbing the dog's paw, shaking it, saying "shake," and then offering a reward each and every time you perform these steps. Eventually, the dog will start to perform the action on its own.

Continuous reinforcement schedules are most effective when trying to teach a new behavior. It denotes a pattern to which every narrowly-defined response is followed by a narrowly-defined consequence.

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Partial Reinforcement. Once the response is firmly established, a continuous reinforcement schedule is usually switched to a partial reinforcement schedule.1 In partial (or intermittent) reinforcement, the response is reinforced only part of the time. Learned behaviors are acquired more slowly with partial reinforcement, but the response is more resistant to extinction. (https://www.verywellmind.com/what-is-a-schedule-of-reinforcement)

Punishment, when used properly, can be effective in discouraging undesirable behavior but it is often misused and has unintended consequences and may produce fear and rage. Extinction of undesirable behavior, combined with reinforcement of desired behavior, is generally preferable to the use of punishment (Tavris C *et al.,* 2001).

Punishment in Operant Conditioning

Punishment is the presentation of an adverse event or outcome that causes a decrease in the behavior it follows. There are two kinds of punishment. In both of these cases, the behavior decreases.

1. **Positive punishment**, sometimes referred to as punishment by application, presents an unfavorable event or outcome in order to weaken the response it follows. Spanking for misbehavior is an example of punishment by application.
2. **Negative punishment**, also known as punishment by removal, occurs when a favorable event or outcome is removed after a behavior occurs. Taking away a child's video game following misbehavior is an example of negative punishment.

In conclusion, operant conditioning relies on a fairly simple premise: Actions that are followed by reinforcement will be strengthened and more likely to occur again in the future. If you tell a funny story in class and everybody laughs, you will probably be more likely to tell that story again in the future.

If you raise your hand to ask a question and your teacher praises your polite behavior, you will be more likely to raise your hand the next time you have a question or comment. Because the behavior was followed by reinforcement, or a desirable outcome, the preceding action is strengthened.

3. Conversely, actions that result in punishment or undesirable consequences will be weakened and less likely to occur again in the future. If you tell the same story again in another class but nobody laughs this time, you will be less likely to repeat the story again in the future. If you shout out an answer in class and your teacher scolds you, then you might be less likely to interrupt the class again. (https://www.verywellmind.com/operant-conditioning)

For preventing

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In 2011 a systematic review was performed so as to determine awareness and knowledge of school-going male and female adolescents in Europe of STIs and if possible, how they perceive their own risk of contracting an STI. A total of 15 studies were included in the review. All were cross-sectional surveys conducted among school-attending adolescents aged 13 to 20 years. Generally, awareness and knowledge varied among the adolescents depending on gender. Six STDs were focused on in the studies included in the review, with awareness and knowledge being assessed in depth mainly for HIV/AIDS and HPV, and to some extent for chlamydia. For syphilis, gonorrhoea and herpes only awareness was assessed. Awareness was generally high for HIV/AIDS (above 90%) and low for HPV (range 5.4%-66%). Despite knowing that use of condoms helps protect against contracting an STD, some adolescents still regard condoms primarily as an interim method of contraception before using the pill. In general, the studies reported low levels of awareness and knowledge of sexually transmitted diseases, with the exception of HIV/AIDS. Although, as shown by some of the findings on condom use, knowledge does not always translate into behavior change, adolescents' sex education is important for STD prevention, and the school setting plays an important role. Beyond HIV/AIDS, attention should be paid to infections such as chlamydia, gonorrhoea and syphilis. (Samkange-Zeeb *et al.,* 2011)

4. Education for future parents/population for a healthy life style concerning the Sexually Transmitted Diseases and in general – the role of educational programs, the role of community, schools. How information can be spread

Adolescents learn about sex, reproduction, contraception and STIs from a range of sources: parents, siblings, peers, radio, television, print media, gossip and observation of others. In many cultures and settings, parents and other adult relatives, e.g. aunts or uncles, do not talk about such issues to their children, and many do not feel informed or comfortable about giving advice (Görgen 1994). Hughes and McCauley (1998) point to surveys which show that both parents and young people alike often prefer parents to be the main source of information for adolescents about sexuality and reproductive health (Castillo, 1993; Hawkins and Ojakaa, 1992; Kumah *et al.,* 1992). These studies have shown that parents feel too embarrassed, confused or ill-informed about these topics to be an effective source of information and support (Kumah *et al.,*1992, UNFPA, 1993).
Peers and in some cases, mass media seem to have become the main sources of information about STIs for most adolescents, e.g. in Burkina Faso (Population Council, 1998). Similarly, in Zimbabwe and Tanzania, young people had received most of their information on STIs from peers and/or the media (CRHCS, undated a,b). In Tanzania, young people would nevertheless have preferred to receive more information from their parents than the media (CRHCS, undated b).
Teachers, other school staff and health-care providers have the potential to become a major source of information on STIs. In Nairobi, Kenya, the media were the main source of information on STIs such as gonorrhea and syphilis, followed by teachers, friends and relatives (Lema and Hassan, 1994). In Colombia, school teachers were the most common source of information on STIs, and girls also frequently mention their mothers; health services were only described as an important source of information by 5% of young people (Profamilia, 1996). In South Africa, friends were considered a valuable source of information, but nearly three quarters of young people indicated that they preferred to speak to an adult about sexuality. Clinics would have been their preferred

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source of reproductive health information, services and products, but unfortunately most clinics did not have an environment in which young people felt comfortable to seek the advice and services they needed and wanted (Transgrud, 1998).

Adolescents often experience feelings of guilt and shame when they realize that they have contracted an STI, and many may not have acquired the skills needed for telling someone that they have a sexual health problem (Brabin, 1998).
For adolescent girls contracting an STI is sometimes associated with prostitution (CRHCS, undated b). As a result, even if they have an unusual discharge or a sore, they may not confide to anyone that there is a problem. When adolescents do present at a clinic, their reports are often vague, especially if unwanted sex or sexual abuse is involved.

Factors preventing adolescents with STIs from getting effective treatment (Adapted from Brabin 1998)

Nature of STIs and of diagnostic methods

- Infection often asymptomatic
- Lack of affordable screening tests
- Inaccurate risk assessments

Adolescents' knowledge, attitudes and skills related to STIs and care-seeking

- Lack of knowledge of symptoms
- STI treatment a low priority
- Do not know where to go for treatment
- Do not have the skills needed to express a sexual health problem
- Fear of examinations
- Fear of parents and other adults finding out

Access to services

- Long distances to clinics or lack of (money for) transport
- Inconvenient opening times for adolescents (e.g. clinic closed after school)
- Legal/policy restrictions (e.g. parental consent; need to bring partner)
- Unfriendly/judgmental providers
- High cost of treatment

Poor case management

- Drug shortages
- Ineffective drugs or suboptimal doses used
- Failure of informal providers to educate, promote and offer condoms, and to notify partners

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Best practice recommendations for STIs prevention with adolescent and young adults include:

- correct and consistent condom use;
- expedited partner therapy for gonorrhea and chlamydia;
- pre exposure prophylaxis for HIV prevention;
- Evidence-based prevention approaches in community settings
- Short counselling interventions using personalized risk reduction plans.

Peterman TA mentioned in his editorial published in 2016 that STIs interventions include both traditional approaches and broader interventions. Traditional approaches include: partner notification and screening programs in clinical settings, schools, and outreach settings while broader interventions include social marketing, behavioral counseling, linkage and referral to care, and policy interventions.

Screening programs work amazingly well if they are done automatically, such as routine syphilis screening of HIV-infected MSM when they have blood drawn for a CD4 count or viral load. Convincing providers to implement such systematic changes would likely be a low-cost, highly effective intervention for syphilis prevention. Other approaches to screening for syphilis, such as outreach testing, are much more costly and less productive.

Partner notification remains an effective method of finding important cases, but the cost is high, and it is often not the most efficient method of finding infected persons. A challenge for partner services is how to assure that partners of persons with gonorrhea or chlamydia are treated at a reasonable cost. Giving patients medication to bring to their partners has been proven to help reduce reinfection rates. Newer approaches such as text messaging have great potential, but are not fully evaluated.

Policy changes can have long-lasting impact, but changing a policy does not immediately change practice. Laws allowing patients to bring medicine to their partners are an important step in partner treatment, but the drop-off at different levels of the treatment cascade demonstrates that more work is needed at various levels.

Brief behavioral counseling often works, especially for young, moderately high-risk heterosexual men and women. It has been shown to be effective both in and outside STD clinics, but it requires moving beyond didactic instruction.

Providing care for persons with STIs extends beyond treating the 35 sexually transmissible infections and includes addressing other conditions that are commonly seen among persons with STIs taking into account that passive referral of STIs patients to medical or social services is unlikely to be effective. (Peterman T.A., 2016).

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