Sexually Transmitted Disease (STD)

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Abstract

Sexually transmitted disease (STD) can be infected through sexual contacts. Some of the common STDs are syphilis, gonorrhea and chlamydia. Different STDs have different transmission mechanism, signs and symptoms, complications, diagnosis and treatments. This review article focuses on the mechanism of disease transmission, bacterial resistance and type of antibacterial drugs used for three commonly known STDs which are syphilis, gonorrhea and chlamydia. It is found that syphilis is usually treated with penicillin with no bacterial resistance shown. Third generation of Cephalosporins is now usually used as the antibacterial agent for gonorrhea due to the bacterial resistance towards penicillin, tetracycline and earlier generations of cephalosporins. Azithromycin is found to be a more effective antibacterial agent compared to doxycycline for treating chlamydia. STDs can usually be effectively treated if early diagnosis and treatment seeking behaviour are present. These STDs can also be avoided if the proper prevention steps are followed.

Introduction

STD refers to sexually transmitted disease which can be infected from people to people through intimate contact such as sexual activities, open wounds or can even passed from a new mother to her baby through placenta or breast milk feeding. STD is now widely spread in many countries especially among younger generations and has brought a lot of embarrassment and fear in conservative Asian countries such as Malaysia.

With its significant morbidity and mortality plus its connection to HIV, STD is taken seriously in most developed and developing countries (Anwar and Syed Sulaiman, 2008). HIV is one of the most common STD diseases found in Malaysia in which Malaysia’s Ministry of Health has reported a total of 86,127 HIV infected cases up to June 2009, that shows a trend of feminisation with the decrease of female-male ratio from 1:14 in year 2000 to 1:4 in year 2008 (Malaysian AIDS Council & Malaysian AIDS Foundation, 2009). Young adults aged 20-29 and adults aged 30-39 are found to be the high risk age groups of getting HIV infection compared to old adults due to their higher frequency of sexual activity. (Malaysian AIDS Council & Malaysian AIDS Foundation, 2009).

Although there is no cure for HIV currently, there are some strategies that can be used to reduce the spread of HIV infections with certain limitations. One of the way is to treat curable STDs such as chlamydia, gonorrhea and syphilis in their earlier stages which helps to reduce the risk of getting infected by HIV and transmitting the disease to the others by a factor of 10 (World Health Organization, 2011). Research had shown that good management of STDs is able to reduce the incidence rate of HIV-1 infection in population by about 40% (Gibson et al, 2001).

There are 448 million new cases of curable STD infections occur every year (WHO 2011). South and Southeast Asia happened to be the region with the most new infection cases (WHO, 2001). Despite the acute discomfort at the site of infection at the beginning stage, these STDs are the main preventable cause of infertility in women. (WHO, 2011) Curable STDs can lead to serious complications in women and new-born babies if it is not treated early. It is sad to know that STDs are the second most common factor next to maternal factors of causing disease, death and loss of healthy life in fertile women. (WHO, 2001)

Although STD diseases usually can be diagnosed and cured at the earlier stage for the best treatment outcome, many STD patients might delay the diagnosis process due to their lack of knowledge about the disease or due to their concern on the confidentiality. Besides, they might even spread the diseases to the others without realizing that they are the disease carriers. Therefore, the aim of this review is to expose to the Malaysian public about some of the common curable STDs, disease symptoms and treatment available as well as the prevention steps to be done to decrease the risks of getting the diseases.

Syphilis

Transmission

Syphilis is a type of disease that can be transmitted through sex. It can be fatal and cause death if it is left untreated. This disease is caused by Treponema pallidum (T. pallidum). The disease is normally transmitted through sores that are in genitals, vagina anus or rectum. It is usually transmitted through vaginal, anal or oral sex. There are also low
possibilities of transmitting syphilis through injuries in the skin and kisses if the victim has a sore in his mouth or lips. Syphilis cannot be transmitted though sharing bathtub, eating utensils, cloths, swimming pools and toilet seats. Unfortunately, a pregnant woman will transmit syphilis to its infant through the placenta. (WedMD, 2009)

The infection starts when *T.pallidum* penetrates dermal microabrasions or intact mucous membrane. *T.pallidum* prefers to replicate at the point of entry leading to inflammatory response and formation of chancre. From the chancre treponemes spread rapidly to blood and lymphatics until it reaches different parts of body. There are evidence showing that *T.pallidum* induces production of matrix metalloproteinase-1(MMP-1) in dermal cells. MMP-1 plays a role in breaking down collagen, therefore *T.pallidum* is able to travel through the traverse junctions between endothelial cells and penetrate the tissues. (Nemose, 2009)

**Symptoms**

Syphilis is normally called “the great imitator” because there are many symptoms that are almost similar with other diseases, therefore hide the disease and delay the treatment. Dr. Richard C. Cabot of Harvard University and the Massachusetts General Hospital says: “The variety of rashes which can be seen is simply without end. Syphilis can imitate any kind of skin disease, and it is not worthwhile to even try to recognize it.” (Shelton, 1962) Illustration 1 shows different stages of syphilis and the symptoms that are shown in a syphilis patient.

**Complication**

At beginning, syphilis will only cause sores in body. If it is left untreated, syphilis will affect heart, nervous system, bones, joint and eyes at the final stage of syphilis. (Pharmacology Center, 2011) Some of the complications of syphilis are anemia, aortic regurgitation, aortic stenosis, dementia and difficulties in walking. It will also cause meningitis, osteomyelitis and neurosyphilis. (Schueler et.al, 2011) In neurosyphilis, nervous system is infected with bacteria and will cause headache, stiff neck, and fever. (Education Specialty Publishing, 2011)

**Diagnosis**

Syphilis is diagnosed with tests in laboratory through microscopic identification. Blood test can also provide evidence of the infection. (Cornforth, 2003) Unfortunately blood test is not accurate and may give a false result. Multiple blood tests must be carried out to confirm the diagnosis. Doctor’s recognition of syphilis signs and symptoms can also be useful in identifying syphilis.

*T. pallidum*, the cause of disease are unable to be grown in culture. The diagnostic methods are methods to detect the presence *T. pallidum*. Diagnostic methods can be classified into direct diagnostic and indirect diagnostic. Under direct diagnose, scraps from ulcer are examined under microscopes to identify the disease. There are 4 types of tests that can be carried out which are dark-field microscopy, fluorescent antibody test, direct test tissue sections and nucleic acid amplification methods.

In indirect diagnosis, serology test are carried out. There are two types of serological tests. Non-treponemal test detects syphilis by measuring immunoglobulin formed due to the lipoidal material damaged during infection and lipid from surfaces of *T. pallidum*. (Ratnam, 2005) Treponemal test examines the components in *T. pallidum*. Serological tests only confirm the presence of *T. pallidum* but do not identify the stages of disease. (Ratnam, 2005)

**Treatment**

In early stages, syphilis can be easily cured by injecting penicillin intramuscularly. (DSTD, 2007) At later stages, when patient is infected by syphilis for more than a year, different dose of antibiotics is required. Overall, antibiotics can treat all stage of syphilis, but cannot reverse the damage done to the body. An infant who contracted the disease from a mother will need ten daily dosages of penicillin. During the treatment, the patient is recommended to avoid any sexual activities. Their sexual partner should be notified and conduct a follow-up tests 6-12 months after the treatment ends. Having syphilis once does not provide the person immunity toward reinfection. Penicillin is normally used to treat syphilis. In individual sensitive to penicillin, ceftriaxone may be used.

*T. pallidum* has cell wall composing of peptidoglycan which provides mechanical support. The cell wall is composed of N-acetylglucosamine and N-acetylmuramic acid linked together by peptide chains. There are various enzymes involved in cell wall synthesis. The last enzyme involved is transpeptidase which links the glycine to D-alanine. Penicillin inhibits this final step in synthesizing cell wall by binding to transpeptidase, the Penicillin Binding Protein (PBP). By inhibiting the synthesis of the cell wall, *T. pallidum* will have osmotic instability and cell lysis occurs.

*T. pallidum* is unable to be cultured and therefore cannot be tested with penicillin in broth media. However, penicillin has been proven effective in treating syphilis diseases. Therefore the mechanism of
action is assumed to be the same. Yet why resistance of syphilis disease towards penicillin has never occurred? This can be explained by the newly discovered PBP named Tp47 in *T. pallidum*. This Tp47 acts as both beta lactamase and PBP. Penicillin binds to the Tp47 and penicillin is broken down. (Rougas, 2009) During this process, by products are produced and surprisingly they have high affinity towards the Tp47 than the penicillin’s beta lactam. (Rougas, 2009) Therefore, Tp47 is constantly occupied and is unable to link glycine to D-alanine, leading to inhibition of cell wall synthesis. (Patrick, 2009)

### Gonorrhea

#### Transmission

Gonorrhea is caused by bacterium *Neisseria gonorrhoeae* that can grow and multiply easily in a warm and moist area especially in reproductive tract, including the cervix, uterus and fallopian tubes in women. Besides that, gonorrhea can infect the urethra of both men and women. *N.gonorrhoeae* also can infect mouth, throat, eyes and anus (CDC, 2011).

Gonorrhea can be easily transmitted to any sexually active person and also can be passed from a mother to her baby during delivery. People who recover from this disease do not have immunity against it and thus can be reinfected if they have sexual contact with another infected person.

During sexual intercourse, the transmission of *N. gonorrhoeae* occurs when it adhere to columnar epithelial cells of the genital areas, penetrate and multiply on the basement membrane. The bacteria enter epithelial cells through parasite-directed endocytosis, in which the membrane of mucosal cell retracts and pinches off a membrane-bound vacuole which contains the bacteria. The bacteria-containing vacuole is transported to base of cell and is released by exocytosis into subepithelial tissue. A major porin protein in the outer membrane of bacterium is said to be the point of invasion which assists in the penetration of a host cell. During infection, bacterial lipoooligosaccharide (LPS) and peptidoglycan are released by autolysis of cells or ingestion of a neutrophil. Both bacterial polysaccharides activate host alternative complement pathway, while LPS stimulates production of tumor necrosis factor that causes cell damage. Gonococcal LPS mediates tissue damage and helps in resistance of *N.gonorrhoeae* to the bactericidal activity of normal human serum. (Todar, 2011)

#### Symptoms

Gonorrhea can infect both men and women. In men, gonorrhea is asymptomatic. However, the symptoms in men appear 1 to 14 days after infection. The signs and symptoms include burning sensation during urination and the white, yellow or green discharge produced by the penis. Sometimes infected men will feel pain or have swollen in their testicles (CDC, 2011).

While in women, the symptom is mild and not easily detected. Even if they have the symptoms, they cannot tell whether the infection is in the vagina or the bladder. The early symptoms in women are the same in men which are the painful feeling or burning sensation during urination, increase in vaginal discharge which are yellowish or greenish in colour and produce a strong bad odour or cause vaginal bleeding between the periods.

#### Complication

The complication can happen to both men and women who are not treated well for their gonorrhea infection. However, women with gonorrhea are at risk of developing serious complications from the infection compared to men (CDC & AVERT, 2011). In women, the complication of gonorrhea can be identified with presence of salpingistis or Pelvic Inflammatory Disease (PID), infertility, ectopic pregnancy or eccysis, a complication of pregnancy in which the embryo is implanted outside the uterine cavity, and cause conjunctivitis. For women who have PID because of gonorrhea, they have certain symptoms including high fever, stomach-ache, chills, vomiting, feeling of pain during sex, nausea, vaginal discharge and irregular menstruation cycle (The Permanente Medical Group, 2007).

In men, the common complication of gonorrhea is epididymitis, infertility and conjunctivitis. Epididymitis is the inflammation of the tubes that are linked to the testes. It causes the testes to become swollen, pain and causes redness to the scrotum. Gonorrhea also can cause infertility in men. Conjunctivitis causes the eyes to become red, swollen and secrete a pus-like water discharge. This complication is not serious and can recover by itself after a few months. Nevertheless, it can be chronic if not treated well.

#### Diagnosis

Gonorrhea can be diagnosed using several laboratory tests. The fastest test to detect the infection is by using Gram stain test. It can be done in clinic by doctor and the result can be obtained immediately after microscopic inspection. Another more accurate test is by using urine test or cervical swab to detect the
bacterial gene contained in it. The laboratory culture test can also be used by placing the sample onto the culture plate and incubate for 2 days to allow the bacterial growth. The sensitivity of this test depends on the site where the sample is taken. By using this technique, the accuracy is almost 90 percent of the time (Schoenstadt, 2006). A newer test to diagnose gonorrhea involves DNA probes or amplification techniques using polymerase chain reaction (PCR) to identify the genetic material of the bacteria. This test is more expensive compared to the other test but it gives rapid results (CDC, 2011).

Treatment

Studies carried out after 1970 found that the host has initiated immune response to treponemal assault with a slow but rather robust rate. This causes macrophages to begin to infiltrate the lesions, resulting in clearance of overwhelming number of parasites from the tissue as treponemes reach peak numbers. However, some portion of treponemes remain unharmed and continue to live in the host which leads to persistent infections. In this case, treatment comes in handy. (Nemose, 2009)

For treatment of gonorrhea, usually physicians will give penicillin, tetracycline and fluoroquinolone in single dose and this always manages to cure the patient. However, the first case which showed high level of resistance to these broad spectrum antibiotics is reported in year 1991 (CDC, 2009). In 2007, 14.8% isolates tested by the Gonococcal Isolate Surveillance Project (GISP) shows resistance to Ciprofloxacin, which is the 2nd generation of Cephalosporin (CDC, 2009).

Most of the gonorrhea bacterium are resistant to penicillin and tetracycline and multiple agents. There is a cross-resistance between penicillin and earlier-generation of cephalosporin. Resistance may be due to the alteration of the antibiotic’s target or by exclusion or destruction of the antibiotic. The emergence and spread of resistance in N. gonorrhoea is mainly because of the changes in gonorrhea DNA via conjugation and transformation and thus the location on the chromosome or in the plasmid is determined. Chromosomal alteration which affects permeability can simultaneously reduces the susceptibility to penicillin and tetracycline (Tapsall, 2001) File and Siama (2000, cited in Stancik, 2001) claimed that a reduction in porin diffusion channels in outer membrane of N. gonorrhoeae or an increase of efflux mechanism activity also decreases fluoroquinolones’ permeability into bacterial targets.

Nowadays, third generation of cephalosporin is widely used in treated gonorrhea infection. Ceftriaxone and several oral cephalosporin drugs in third generation agents are most frequently used for treating gonococcal infection. Cephalosporin inhibits cell wall synthesis through binding and inhibiting the enzymes that are responsible in inserting peptidoglycan cross-linkage structure into the bacterial cell wall. The enzymes are transpeptidase, carboxypeptidase and endopeptidase which are also known as penicillin binding protein (PBP). Cephalosporin is a time-dependent bactericidal drug and the maximum bacterial killing is 4 times of the minimum inhibitory concentration (MIC). This characteristic of cephalosporin is important to reach the peak serum drug level and rate of elimination as a one-time dosing agent. (Barry and Klausner, 2009)

Cefixime is recommended as the first-line therapy. Cefixime 400mg is recommended by WHO and is used in USA’s antigonococcal oral therapy. Cefixime is one of the drugs that reach the criteria of 95% lower boundary of confidence interval of the cure rate. Meanwhile, ceftriaxone is the best regimen in treating gonorrhoea parenterally. It is the first-line antibiotic that is recommended by UK, USA and also WHO. The chemical structure of ceftriaxone has a heterocyclic thiomethyl group at R2 while the carbon-3 gives the ceftriaxone a longer half-life because of the extended protein binding. Different countries use different doses of ceftriaxone in treating gonorrhea infection. WHO and USA use 125mg of ceftriaxone while many other countries use 250mg. In Japan, they use 1000mg of ceftriaxone in intravenous infusion (Barry and Klausner, 2009).

Gonorrhea infection in cervix, urethra and rectum is usually treated by giving single injection of third generation of Cephalosporin antibiotic which is Ceftriaxone at intramuscular or by giving 400mg of Cefixime in a single dose. For infection in pharynx, they can give 125mg of Ceftriaxone in single intramuscular dose. Besides, 2g of Spectinomycin can be given to non-pregnant women that having uncomplicated gonorrhea in single IM dose or single dose of Cephalosporin group which are, Cefixime, 500mg IM, or Cefoxitin in 2g IM, administered with Probencid in 1g orally or just give Cefotaxime for 500mg by IM (Stöppler and Shiel Jr., 1996-2011).

Treatment of gonorrhea also needs to involve treatment of chlamydia because both bacteria are usually present in the same person. They can give Azithromycin or Doxycycline to treat chlamydia as well as gonorrhoea. The treatment is given to both partners to avoid transmission to the partners and reinfection cases. Pregnant woman is not recommended to use
Doxycycline (Stöppler and Shiel Jr., 1996-2011).

Chlamydia

Transmission

Chlamydia infection is one of the most common sexually transmitted disease (STD) which is caused by the bacteria Chlamydia trachomatis which usually infects the genitals of both men and women. (PudMed Health, 2010) However, in some rare cases, chlamydia can infect the throat, rectum and eyes too. (Rochester: Freedom network, 2005)

Chlamydia is usually passed through sexual activity which involves vaginal or anal sex with an infected partner, or oral sex which is less commonly found. Most of the sexually active individuals or individuals with multiple partners are the high risk group which will be exposed to this infection at higher chances. Other than that, sharing of sex toys and touching parts of the body which is infected with fingers (such as eyes) will also pass the infection from one to another. However, this infection will not be transferred through simple kissing, sharing bath, sharing of towels, cups or from the toilet seats. (Rochester: Freedom network, 2005)

Chlamydia trachomatis is a gram-negative bacterium with a unique biphasic life cycle. The life cycle of the chlamydiae organisms is different from the other microorganisms in which their replication only happens within the cells of their eukaryotic hosts. Therefore, they are also known as obligate intracellular parasites. When the chlamydiae present outside of the host cells, they exist in the form of elementary bodies or EBs which is spore-like. These EBs are taken up by the host epithelial cells into their membrane-bound vacuoles and is then differentiate into reticulate bodies or RBs, a more conventional form of the bacteria. After it is in RB form, it will undergo the binary fission and multiply. The vacuoles which contain the chlamydiae bacteria will not undergo destruction by the lysosomes of the host cell. Therefore, they can continue to multiply and after 24-48 hours of multiplication, the RBs will convert back into EBs form which is then released out of the cell. This final step complete the dimorphic intracellular life cycle of chlamydiae. (Engel, 1992)

Symptoms

Usually, most of the infected patients of chlamydia infection will show no symptoms. Even if they show some symptoms, the symptoms are usually very mild which is hardly noticeable and therefore will cause delayed treatment. (Rochester: Freedom network, 2005) There are 25% of chances whereby the men with chlamydia will show no symptoms. However, in men, this infection will produce symptoms that are similar to gonorrhea and these includes burning sensation during urination, white or cloudy watery discharge from the penis or rectum, testicular tenderness, pain or swelling, and rectal discharge. (PudMed Health, 2010) Meanwhile, in women, only approximately 30% of them will have symptoms of chlamydia. The symptoms that have higher probability to occur in women are burning sensation during urination, pain felt during sexual intercourse or bleeding after it, rectal pain or discharge, vaginal discharge, bleeding during the time between the menstruations, low abdominal pain with comes together with nausea, or some symptoms similar to PID, salpingitis and also liver inflammation similar to hepatitis. (PudMed Health, 2010)

Complication

The primary site of the infection in women is the columnar epithelial cells of the endocervix while in men, it is the urogenital epithelium. In women, if the chlamydia infection is left undetected or if the woman is infected for multiple times, the infection will move up to the reproductive tract and severe reproductive sequelae may develop. This includes pelvic inflammatory disease which may in turn lead to ectopic pregnancies and tubal infertility. Ectopic pregnancy is a pregnancy that does not happen in the uterus, whereby the fertilized egg grows in any location other than the inner lining of the uterus, and is mostly in the Fallopian tube. (Medicine Net, 2011) Meanwhile, tubal infertility means the infertility caused by the defect in the Fallopian tube such as tubal obstruction or absence of tubes. (Brown University, 2011) It is believed that the chlamydia can move up by attaching itself on sperm or through the general flow of fluids. In other hand, men will suffer from prostatitis and epididymitis. (Carey and Beagley, 2010)

Diagnosis

Up to date, there is still no uniform screening practice that can be used. (Carey and Beagley, 2010) However, in order to diagnose the chlamydia infection, a sampling of the urethral discharge can be done in males while cervical secretions can be done in females. (PudMed Health, 2010) If the person involves in anal sexual contact, samples from the rectum may need to be collected also. Swab test will be done to collect fluid from the penis or vagina. This test is carried by briefly placing a swab in the opening of the urethra at the tip of the penis, which causes brief discomfort and a burning sensation. (Rochester: Freedom network, 2005) After collecting the samples, they are sent for a fluorescent or monoclonal antibody
test, DNA probe test or cell culture. (PudMed Health, 2010) Sometimes, urine samples are needed as required by some of the tests.

Treatment

The immune responses in human body towards Chlamydia trachomatis infections is not much known, but usually the natural immunity towards an infection is short lived and serovar specific. However, if multiples infections occur which involves different serovars, a longer term and cross-serovar immunity will be induced. (Carey and Beagley, 2010) It is thought that inflammation occurs at the infected tissues and is mediated by the immune mediators. (Roan and Starnbach, 2008) However, it’s constantly attempt are not successful in eliminating the organisms. Since these natural immunity is not enough to combat there infections, antibiotics need to be used instead.

The current antibiotic treatment failed to prevent the increased incidence due to the increasing resistance, and no vaccine is available for this infection too. (Carey and Beagley, 2010) There are few treatments that are recommended to treat genital tract infections that are caused by C. trachomatis such as the usage of azithromycin or doxycycline. (Carey and Beagley, 2010) Azithromycin (AZI) is a new antibiotic which is under the azalide group. (Engel, 1992) This group of antibiotic has an improved potency towards the gram-negative organisms. This drug is most preferably to treat the chlamydia infection since only one dose is needed to eradicate the infection, which is much effective compared to doxycycline which is a 7-day course. (Carey and Beagley, 2010) Therefore, compliance can be enhanced by using azithromycin. It is found that when azithromycin is injected into the patient, it will have synergistic effect with the phagocytic cells in our body and enhance the bacterial killing. (Engel, 1992)

Azithromycin works by binding effectively to the erythromycin ribosome binding sites. This binding will inhibit the protein synthesis process in the bacteria which may be enough to stop the chlamydia growth and replication. Some studies also suggest that azithromycin might block a specific stage in the chlamydia intracellular life cycle instead of the protein process only. These specific stages can be the differentiation of EBs to RBs or vice versa. This is suggested based on how penicillin acts on the chlamydia bacteria. When penicillin is used in the chlamydia infection, the result observed will be the accumulation of the RBs, which indicates that the RBs-to-EBs differentiation is blocked. Lastly, some researchers suggested that the azithromycin may work on chlamydia bacteria by blocking the chlamydia-specified inhibition of phagolysosomal fusion which is vital to its survival in the host cells. Not many details are known about this process other than the process requires chlamydial protein synthesis to be done actively. However, in a research done by Joanne N. Engel showed that instead of inhibiting the mRNA transcription process of the chlamydia, the azithromycin works by inhibiting the protein synthesis in both RBs which present in the cell or in the RBs which are purified and are host-free. She found that the formation of chlamydial vacuoles is stopped upon the usage of azithromycin, which suggests that the block in chlamydial development occurs early in its life cycle. This is different from the action of penicillin which only blocks the RBs-to-EBs transition state in chlamydial life cycle and thus large amount of chlamydia-containing vacuoles still can be observed. The concentration in which azithromycin completely inhibits the protein synthesis of chlamydia and its growth is found to be around 100ng/ml. (Engel, 1992)

However, it is found that intervention by antibiotics will actually increase the rates of re-infection of Chlamydia infection. This may because the early usage of antibiotics will disrupt the development of protective immune response in the patient, causing them to have less natural immune response if they are exposed to the same infection again the next time. (Carey and Beagley, 2010)

Prevention

The objectives of STDs prevention and care are to reduce prevalence of STDs by interrupting the transmission of disease, minimizing infection duration and preventing complication in infected patient. Illustration 2 shows the prevention stages of STDs.

Primary prevention is the prevention steps that can be made before STD infection occur. STDs can be prevented by avoiding sexual contact. This can be promoted by exposing the general public to STDs risk factors through health education. Safe sex should be practiced to prevent sexually transmitted diseases (STDs). Use a condom during sex to protect from STDs. Sometimes, concurrent use of water-based spermicides with latex condoms will be able to provide additional protection during the vaginal intercourse. (Freedom Network, 2005) Avoid the use of alcohol because these activities normally lead to risky sexual behavior. (DSTDP, 2007)

It is also important to talk face to face with their partner before begin any sexual activity. This is to know whether your partner is having the disease or not.
because some symptoms of STDs such as gonorrhea are difficult to be observed.

Secondary prevention is the steps carried out when patients find out some signs and symptoms which resemble STDs. See a doctor when there is any unusual discharge, sore and even rashes. Early diagnosis and treatment is therefore essential. Regular check up for STDs should be part of life routine in people who are above age 25 and is sexually active as well as STD patients to make sure no infection and to prevent reinfection cases. (PudMed Health, 2010) During early pregnancy, mothers should screen infant and take part in treatment of infected infant to prevent congenital syphilis.

If an individual is proven to be infected by STDs infection, they are discouraged to have sex until all their partners have been treated as well in order to prevent further infection to the others. (Freedom Network, 2005) In order to break this disease cycle, qualified and appropriate medical intervention, treatment and follow-up are crucial. (Freedom Network, 2005) Proper counselling might also be needed to avoid the patients from thinking negatively about their life. Besides that, proper hygiene is important to avoid infection. Patients should wash their hand properly after touching the infected part because the bacteria can be transferred to the eyes.

Conclusion

High incidence rate of sexually transmitted diseases such as syphilis, gonorrhea and chlamydia have always been associated with an increased mortality and morbidity rate in many countries. However, these diseases can be easily cured if they are diagnosed earlier and treatment is given immediately. If a person is sexually active, he or she should have the regular genital check-ups to discover the disease earlier before it is too late. Nevertheless, the public in Malaysia will not take the initiatives due to the lack of education about sexually transmitted diseases and shame. Therefore, there is no doubt that more efforts will be needed to equip the public with the knowledge and the prevention steps that can be done to improve their quality of life.

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Illustrations

Illustration 1

Stages of Syphilis (DSTD, 2007)

- **First few years**: No signs and symptoms are observed
- **Primary stage**: Sore/chancres found in genital area; inner part of vagina in women, penis for men; Chancres do not result in pain and will disappear without treatment
- **Secondary stage**: Skin rash - rough, red or reddish brown spots on palms of hands and bottoms of feet; Mucous membrane lesions throughout body without itching; Fever, sore throat, headache, swollen gland, weight loss, muscle ache, fatigue
- **Tertiary stage**: Blood vessels, cardiac, nerve system problems; Damaged internal organs; Death cases
- **Latent stage**: Symptoms disappear for 1-20 years; Diagnosis through blood testing; Relapse symptoms

Illustration 2

Prevention Stages of STDs (WHO, 2001)

- **Primary Prevention** - before infection
  - Health education
  - Promotion of safer sex and risk reduction
  - Information campaigns regarding association of HIV and STDs
  - Promotion of condoms

- **Secondary Prevention** - reduce prevalence by shortening duration of disease
  - Promotion of early health care seeking behaviour
  - Accessible, effective and acceptable care
  - Education and counseling
  - Early detection and treatment through case finding and screening
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