# Study of the infections in the male genital system in the western region of Saudi Arabia

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Prostate diseases as benign prostatic hyperplasia (BPH), chronic prostatitis and erectile dysfunction are a major worldwide male health problem affecting men during their lifetime. It is accepted that inflammation especially that is due to infections has a role in prostate diseases and it could stimulate carcinogenesis probably by causing genome damage enhancing cell replication.[1] Association of sexually transmitted diseases (STD) with the development of prostate cancer specifically human papillomavirus (HPV) and *Neisseria gonorrhoeae* was studied as a possible risk factor. Pathogens infecting the male genital area may induce either symptomatic or asymptomatic chronic prostatic inflammation that could be an important factor in the development of prostatitis, BPH, and prostate cancer. Multiple sexual partners with unprotected sex increase risk of STD as Syphilis and Gonorrhea, which may produce a sexually transmissible factor that increases the risk of prostate cancer. There are several aspects that require further investigation to properly define, characterize, and categorize prostatitis.[2] Skerk et al[2] found *Chlamydia trachomatis* (*C. trachomatis*), *Trichomonas vaginalis* (*T. vaginalis*), *Escherichia coli* (*E. coli*), *Enterococci, Proteus mirabilis, Klebsiella pneumoniae, Streptococcus Agalactica (Strept. agalactica), Ureaplasma urealyticum* in patients with chronic prostatitis. The Centers for Disease Control (CDC) suggested STD treatment guidelines and recommend inclusion of Trichomonas therapy for men with recurrent non-gonococcal urethritis (NGU).

Persistent NGU and prostatitis due to *T. vaginalis* was described by Abdolrasouli et al[3] proving the importance of the laboratory diagnosis of Trichomoniasis in persistent or recurrent urethritis. Sherk et al[4] studied again the etiology and the role of unusual pathogens in chronic prostatitis syndrome-chronic bacterial prostatitis, and inflammatory as well as non-inflammatory chronic pelvic pain syndrome suggested that many patients with inflammatory as well as non-inflammatory pelvic pain syndrome may have unusual pathogens as *C. Trachomatis, Ureaplasma urealyticum, Mycoplasma hominis* (*Mh*) and *T. vaginalis* in their prostate as suggested in many the literature. Infection of the testis and prostate is implicated in a deterioration of sperm, possibly affecting fertility. The difficulty arises because the male reproductive tract is an immune-privileged site that can be disrupted, potentially affecting spermatogenesis, if inappropriate inflammatory responses are provoked.

The objective of this study was to identify and report the pattern of sexually transmitted infections in random male subjects in Jeddah, Saudi Arabia.

In order to accomplish this goal among other screening services freely provided to males in our community, men were invited to voluntarily attend a men's health screening clinic set at King Abdulaziz University Hospital, Jeddah, Saudi Arabia; public advertisements were placed for this purpose. During a 10 month period from April 2010 to February 2011, volunteers aged (19-70 years) underwent systematic clinical urogenital evaluation, who also provided male urethral swabs. All participants enrolled signed an informed consent form as required by the Hospital Medical Ethics Committee.

The design of the particular laboratory screening of specimens focused on the detection of a wide range of sexually transmitted organisms including *C. trachomatis, Ureaplasma urealyticum, Mycoplasma hominis*, *Herpes simplex (HSV)*, *Cytomegalovirus* (CMV), HPV, *Candida albicans, Neisseria gonorrhoeae*, *T. vaginalis, E. coli, Proteus mirabilis, Klebsiella pneumonia, Enterococci* and *Strept. agalactica.*

Inclusion criteria were asymptomatic volunteer males above 18 years with sexual exposure, those complaining of either lower urinary tract symptoms (LUTS) or urethral discharge or those presented with ejaculation symptoms as painful or premature ejaculation. Exclusion criterion was asymptomatic young male <18 years of age.

A total of 882 specimens from 63 male subjects with no evidence of structural or functional lower genitourinary tract abnormalities were examined. Specimens were collected by rotating swab in the male urethra to contain as many epithelial cells as possible, as some organisms as Chlamydia are intracellular and infect epithelial surfaces. Specimens were collected, transported and preserved in such a way as to maintain the viability of organisms.

All specimens were cultured in cell lines (Human foreskin (HFS) and green monkey (VERO) cell) to test for the presence of HSV and CMV. *Chlamydia trachomatis*[5] was examined in urethral swab by culturing

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the samples in McCoy cells and then confirmed using DAKO Immunofluorescent assay (IFA). The diagnosis of urogenital *Mycoplasma hominis* and *Ureaplasma urealyticum* and antimicrobial susceptibility were performed by using Mycofast screening test from International Microbio. Digene Hybrid Capture 2 (HC2) was used for the detection of HPV. The specimen for HPV DNA was collected in Digene Specimen Transport Medium (STM). Cultures and bacterial identification were performed by using standard microbiological methods on males urethral discharge for the detection of *Neisseria gonorrhoeae*, *T. vaginalis, E. coli, Enterococci, Proteus mirabilis, Klebsiella pneumoniae, Strept. agalactica,* and *Candida albicans.*

Collected data were classified and analyzed by bar charts graphic. The results obtained during the term of the project using different tests, 18 men were considered STD infected (**Figure 1**). Out of 63 males, 18 (28.6%) were positive (*Strept. agalactica* were detected in 9 [14.3%], HPV in 4 [6.4%], *Enterococci* in 3 [4.8%], *Mycoplasma hominis* in 1 [1.6 %], and Candida species in 1 [1.6 %]. There were no cases of sexually transmitted infections in 71% of the study group. The age average in years according to each isolated organism is illustrated in **Figure 1**.

Numerous reports have revealed a potential link between chronic prostatic inflammation and multiple types of prostate cancer.[1-7] In order to study the previous mentioned relation, we had first to evaluate the presence of STD infections in some Saudi subjects, which was the aim of the present study. Some data were published regarding STD in Saudi Arabia, but was either for limited organisms as Gonorrhea and Syphilis only as in old work carried out by Pareek and Chowdhury.[8] In this study 716 men attending consecutively a dermato-venereological clinic in Riyadh, Saudi Arabia, over a period of one year, 70.1% had non-specific genital infection, a figure which is 4 times that for gonorrhea and 13 times that for syphilis. Most of the patients were single men aged between 20 and 29 years and had acquired their infections abroad. Retrospective studies as in Madani[9] getting information from Ministry of Health (MOH) Archives and concluded that non-gonococcal urethritis, trichomoniasis, and gonococcal urethritis were the most commonly reported sexually transmitted infections in Saudi Arabia. In other study by Memish and Osoba[10] concentrated on International travelers who are at great risk of contracting any of these STDs, including HIV, if they have been sexually exposed to persons with any of these diseases. They concluded that population movement has been shown to be a major contributing factor in the global spread of STDs. Increased sexual promiscuity and casual sexual relationships tend to occur during travel abroad to foreign countries. Travelers should be aware that the risk of STDs is high and sexual encounter with casual partners or commercial sex workers (CSWs) carries a high risk of infection. Prevention of STDs during travel can be achieved by complete abstinence from sexual exposure. In a previously related study, Mosli et al[11] carried a prospective study on 63 patients with idiopathic infertility and 23 male controls. They indicated that there was a significantly higher incidence of genital infection among male patients with idiopathic infertility than in normal fertile controls who were not infected or colonized with microbial agents ($p$=0.0004). *Ureaplasma urealyticum* was isolated from 29 patients out of the infected 40 (72.5%), *Mycoplasma hominis* from 11 patients (27.5%), Chlamydia from 10 (25%) and bacteria from 9 patients only (22.5%). Three cases with Group B streptococcal infection, one with hemophilus para influenza, one with Group F streptococci, one with Enterococci, 2 with Strept B-hemolytic and one with *Klebsiella pneumonia*. Kelly et al[5] suggested that *C. trachomatis* is an etiological agent, with incidence of up to 39.5% reported in patients with prostatitis while no *C. trachomatis* was detected in the current study. The Minnesota Department of Health (MDH)[12] reported in 2010 a total number of 17,760 STD cases where 15,294 are *Chlamydia positive*, 2,119 are gonorrhea positive, 347 are Syphilis positive (all stages) and no chancroid cases.[12]

The significance of Group B Strep infection (9 positive cases more frequently isolated in our study) is illustrated as it colonized in the male urethra and could cause sepsis and meningitis in neonates and young infants of the female partner. It also causes other serious infections, such as bacteremia and cellulitis, in non-pregnant adults with underlying medical conditions and

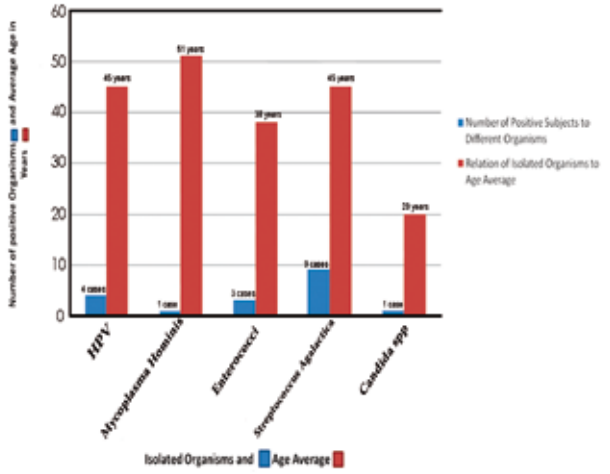


**Figure 1** - Number of positive organisms in relation to average age of male subjects at King Abdulaziz University Hospital, Jeddah, Saudi Arabia.

is transmitted vertically to the newborn during labor and delivery. Among non-pregnant adults, transmission occurs via direct contact; some studies suggest that sexual transmission occurs. Four (6.45%) cases of HPV infections is highly significant, as the males' partners are at risk to contact HPV infection and cancer of the cervix as studies show that HPV DNA is found in high percentage of cervical carcinomas and cells derived from those cancers.[4] Human Papillomavirus is a sexually transmitted infections, yet previous study[5] did not find a single positive HPV tissue specimen obtained from 66 patients undergoing prostatic biopsy or resection[13] while Gazzaz[14] obtained 5 (5%) positive high risk HPV in endocervical swabs. In our present study, one (1.59%) case of Candida infection in a young healthy male is not common (Figure 1). Fewer infections were detected in the studied population. The most likely explanation for this finding is either the fact that STD is low in our country or more selective cases with sexually transmitted infections signs and symptoms should be tested. The number of subjects was smaller than expected and that was due to the invasive procedure to obtain the urethral specimens especially in normal healthy subjects, however the wide spectrum of the investigations and the number of the specimens was substantially large. We suggest that more cases should be included by selecting males based on the presence of STD signs and symptoms or prostatic diseases. These patients need help and will not refuse investigations. Sexual health awareness among Saudi married couples is lacking. Even though the incidence of STIs in Saudi Arabia is limited, appropriate preventive strategies that follow the Islamic rules and values are essential and should be of highest priority in community education to avoid the potential of such infections to spread.

We hope that the results of this study on STD pathogens could contribute to further clarification of etiology of infectious prostatitis leading to prostate cancer. We believe that sexually transmitted infections are present in our community, but in a lower rate than in Western countries.

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