

Prevalence of *Mycoplasma* species in urine samples collected from females attending University of Abuja Teaching Hospital, Gwagwalada, FCT-Nigeria

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Abstract: Prevalence of *Mycoplasma* species among females attending University of Abuja Teaching Hospital, Gwagwalada-Abuja was conducted. A total of one hundred urine samples were collected from females aged 15-40 years. 0.5 ml of each urine sample was poured into a universal bottle containing 5 ml of freshly prepared Brain-Heart Infusion broth and seeded with 1 ml suspension of sterilized yeast, 1 ml suspension of penicillin, 5 ml of phenol red and 5 ml of L-arginine and was incubated at 37°C for 24 hours. Furthermore, 0.3 ml of the mixture was inoculated onto freshly prepared Brain-Heart Infusion Agar and incubated at 37°C for 3 days. The result obtained showed that the overall prevalence rate of *Mycoplasma* species was 14%. Younger age group (15-20 years) had higher prevalence rate (42.90%) of *Mycoplasma* species infection than the older female subjects. However, out of 14 positive samples identified, nine (64.30%) were infected by *Ureaplasma urealyticum* and five (35.70%) were infected by *Mycoplasma hominis*. This study has highlighted the need to raise awareness of colonization of the urinary tracts by *Mycoplasma* species, hence there is need to expand services for prevention and treatment of this infection among females.

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1.0 Introduction

Urinary tract infection (UTI) is a serious health problem affecting millions of people each year. The urinary tract can be infected from above (by bacteria entering the kidneys from the blood stream and travelling downward) or from below by bacteria entering the urethra and travelling upward (Zahoor *et al.*, 2005). Urinary tract may be inhibited by a relatively consistent normal flora consisting of *Staphylococcus epidermitis*, *Enterococcus faecalis* and some alpha-hemolytic Streptococci. *Chlamydia* and *Mycoplasma* have also been implicated to be among the organisms found in the urinary tract (NIDDK, 2005). From a microbiological perspective, urinary tract infection exists when pathogenic microorganisms are detected in the urine, urethra, bladder, kidneys or prostrate (Graninger *et al.*, 1992).

Microorganisms such as *Mycoplasma* can also cause urinary tract infection in both human and animals. Genital *Mycoplasma* (*Ureaplasma urealyticum* and *Mycoplasma hominis*) are frequently isolated in the genitourinary tract, particularly in sexually active women. It is generally difficult to determine whether these agents cause colonization or infection. The incidence of infection is affected by the menstrual cycle and pregnancy, and the use of vaginal contraceptives. The prevalence of these organisms is significantly associated with socio-economic

conditions, i.e. poverty, and large numbers of sexual partners (Kreiger *et al.*, 1996).

Colonization with *M. hominis* and *U. urealyticum* can occur during birth but in most cases, the infection will be cleared. Only in a small number of cases does colonization persist. However, when individuals become sexually active, colonization rates increase. Approximately 15% are colonized with *M. hominis* and 45% - 75% with *U. urealyticum*. The carriers are asymptomatic but the organisms can be opportunistic pathogens.

Ureaplasma species have been isolated from cervico-vaginal specimens in 40-80% of women who are asymptomatic and sexually active (Razin *et al.*, 1998) while *M. hominis* has been isolated from cervico-vaginal specimens in 21-53% of women who are asymptomatic and sexually active. These rates are somewhat lower in males. Only subgroups of adults who are colonized in the lower uro-genital tract develop symptomatic illness from these organisms. Non gonococcal urethritis is the most common sexually transmitted infection. *Ureaplasma* species and *M. genitalium* may account for a significant portion of cases that are not due to *Chlamydiae*. More than 20% of live born infants may be colonized by *Ureaplasma* species and infants born preterm most likely harbor the organisms. Colonization declines after 3 months of age. Less than 5% of children and 10% of adults who are not sexually active are

colonized with genital mycoplasmal microorganisms (Tsunoe *et al.*, 2000).

Immunosuppression (e.g, from antibody deficiency or prematurity) increases the likelihood of developing disseminated disease. Much less is known about the epidemiology of species such as *M genitalium* and *M fermentans*. Some organisms, such as *M pirum* and *M penetrans*, have been primarily isolated from persons with HIV infection but their significance as pathogens in this population has not been established (Tsunoe *et al.*, 2000).

However, the aim of this work is to determine the prevalence of *Mycoplasma* species among females attending University of Abuja Teaching Hospital, Gwagwalada, Federal Capital Territory, Abuja, Nigeria.

2.0 Materials and Methods

2.1 Study Area

Gwagwalada is located in Abuja, the Federal Capital Territory of Nigeria. It lies between latitude 8° – 9°N and between longitude 7° – 8°E, with a total land area of 1, 043km² and annual humidity of 20% - 30%, and average temperature of between 27°C – 32°C. It has an estimated population of 157, 770 at the 2006 census.

2.2 Study Population

One hundred (100) early morning clean-catch urine samples were collected randomly from female patients (between the ages of 15-40 years) with symptoms of vaginitis who were referred to the Microbiology Laboratory of University of Abuja Teaching Hospital, Abuja.

2.3 Collection and storage of the urine samples

Early morning mid-stream “clean catch” urine samples were collected from female patients, using universal sterile containers with screw caps. The patients were instructed on how to collect the samples observing all aseptic conditions such as washing the vagina with sterile water and avoiding the vagina from making contact with the container. After collection, the samples were stored in the refrigerator at temperature of 4°C until when needed.

2.4 Preparation and sterilization of media

The media used were Brain- Heart Infusion Broth and Brain-Heart Infusion Agar. The media were prepared based on manufacturer’s instructions and sterilized by autoclaving for 15 minutes at 121°C.

2.5 Microbiological analysis of the urine samples

About 0.5ml of each urine sample was poured into the smaller bottles containing 5 ml of freshly prepared Brain heart infusion broth. About 1 ml of the sterilized yeast suspension, 1 ml of penicillin suspension, 5 ml of phenol red and 5 ml of L-arginine were added to it to serve as an inoculated transport media. The bottles were labeled accordingly for easy identification. It was then incubated at 37°C for 24 hours. Color change was taken as a criterion for growth i.e. a change from pink color to golden yellow or yellow color.

Furthermore, 0.3 ml of medium sample was inoculated unto a freshly prepared Brain-Heart Infusion agar using spread plate technique. The plates were incubated at 37°C for 3 days. “Fried egg” appearance and growth of colony into the agar was observed and are typical characteristics of *Mycoplasma* species. The colonies were further characterized by their hemolytic and glucose fermentation properties.

2.6 Statistical analysis

The data were subjected to Chi-square test at 5% level of significance (P≤0.05).

3.0 Results

The identification of genital mycoplasmas was based on colonial morphology and growth properties. The colonies of a fried-egg appearance represented a prominent feature that started as a central dense growth in agar.

Table 1 shows the overall prevalence rate of *Mycoplasma* species infection among female patients visiting University of Abuja Teaching Hospital, Abuja. Out of one hundred urine samples collected from the female patients that were examined, 14 (14%) were infected with *Mycoplasma* spp.

Table 1: Rate of *Mycoplasma* species infection among female patients

| Number of samples examined | Number infected by <i>Mycoplasma</i> species | Percentage Rate of Infection |
|----------------------------|--|------------------------------|
| 100 | 14 | 14.00% |

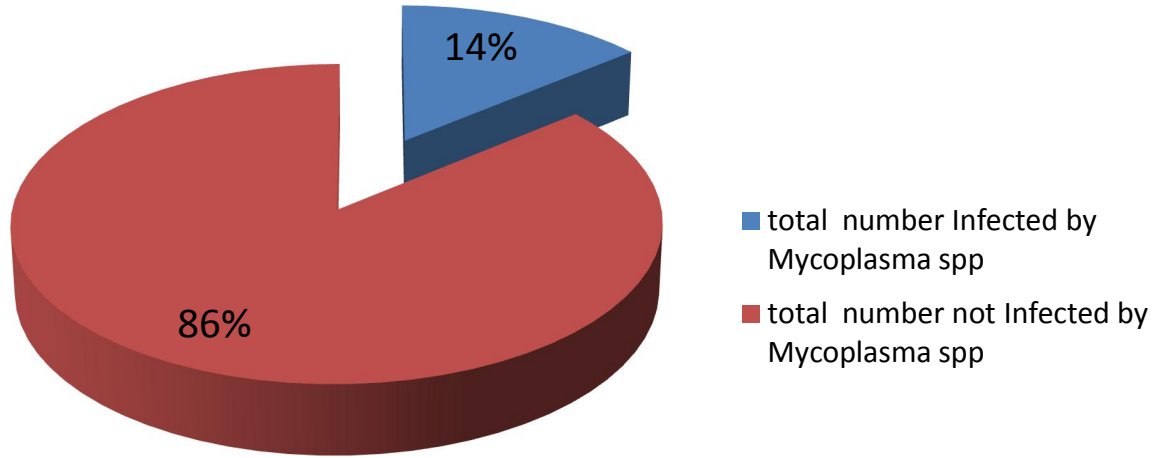


Fig 1: Rate of *Mycoplasma* spp Infection among female patients

Table 2 shows the age specific prevalence rate of *Mycoplasma* spp Infection among female patients visiting University of Abuja Teaching Hospital, Abuja. No *Mycoplasma* spp was isolated in the urine samples of patients between the ages of 15-20 years. Seven per cent infection rate was recorded for the ages of 21-25 years. 14.30% infection rate was recorded for the ages of 26-30 years. 35.7% infection rate was recorded for the ages of 31-35 years. 42.9% infection rate was recorded for the ages of 36-40 years.

Table 2: Sex Specific Prevalence Rate of *Mycoplasma* spp Infection among Female Patients Visiting University of Abuja Teaching Hospital, Abuja

| Age Group | Total Number infected by <i>Mycoplasma</i> spp | Rate of Infection (%) |
|--------------|--|-----------------------|
| 15-20 | 6 | 42.9 |
| 21-25 | 5 | 35.7 |
| 26-30 | 2 | 14.3 |
| 31-35 | 1 | 7.0 |
| 36-40 | 0 | 0 |
| Total | 14 | 14 |

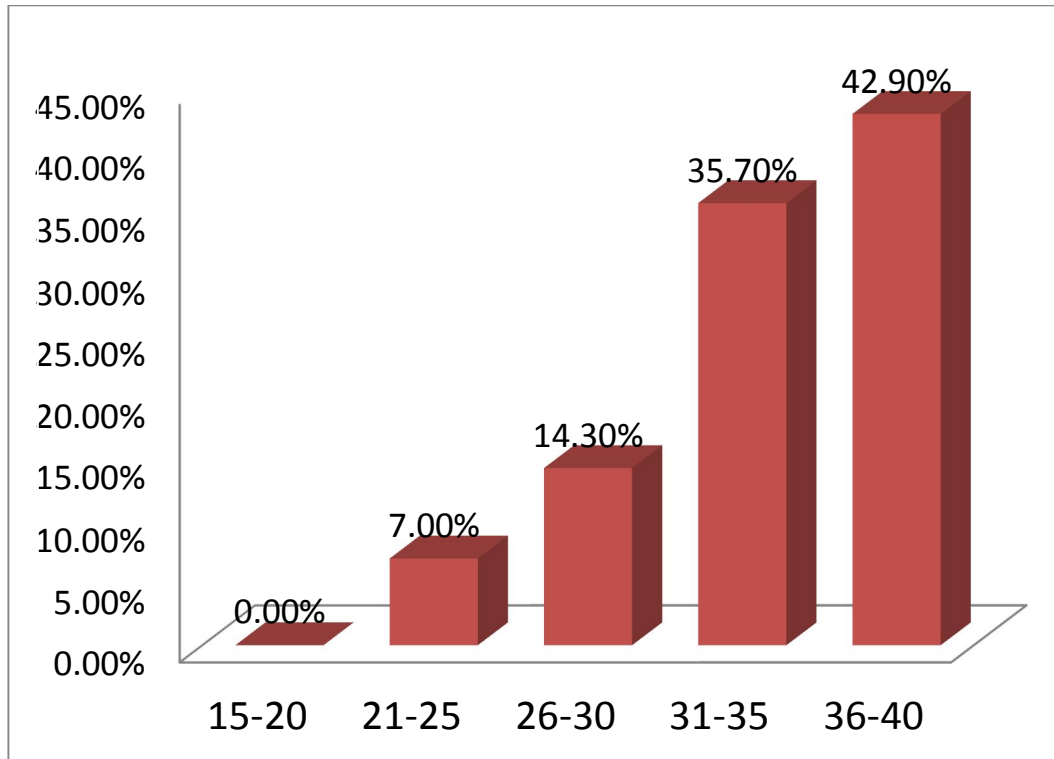


Fig 2: Sex Specific Prevalence Rate of *Mycoplasma* spp Infection among Female Patients Visiting University of Abuja Teaching Hospital, Abuja

Table 3 shows the species specific prevalence rate of *Mycoplasma* spp Infection among female patients visiting University of Abuja Teaching Hospital, Abuja. Out of 14 positive samples identified, 9 (64.30%) were infected by *Ureaplasma urealyticum* and 5 (35.70%) were infected by *Mycoplasma hominis*.

Table 3: Species- Specific Prevalence Rate of *Mycoplasma* Infection among Female Patients Visiting University of Abuja Teaching Hospital, Abuja

| Species | Total Infected | Percentage Rate of Infection (%) |
|-------------------------------|----------------|----------------------------------|
| <i>Ureaplasma urealyticum</i> | 9 | 64.3 |
| <i>Mycoplasma hominis</i> | 5 | 35.7 |
| Total | 14 | 100 |

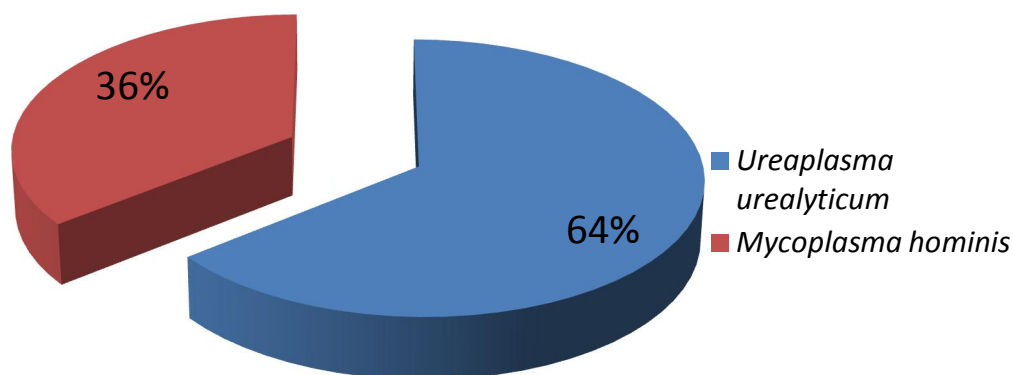


Fig 3: Species- Specific Prevalence Rate of *Mycoplasma* Infection among Female Patients Visiting University of Abuja Teaching Hospital, Abuja

4.0 Discussions

The overall incidence rate of *Mycoplasma* species in this study population was 14% (Table 1). The incidence of *Mycoplasma* spp reported in this study may also be attributed to such factors as poor housing conditions of some rural areas in Gwagwalada, lack of proper personal and environmental hygiene among the female patients. These can serve as a contributory factor in increasing the rate of *Mycoplasma* spp infection among the female patients.

The age specific prevalence rate of *Mycoplasma* spp infection among female patients attending University of Abuja Teaching Hospital, Abuja showed that younger age groups had higher prevalence rate of *Mycoplasma* spp infection than older years, hence the prevalence rate of *Mycoplasma* spp infection decreases as age increases. No *Mycoplasma* spp was isolated in the urine samples of patients between the ages of 35-40 years. This confirms the report of Gonzalez *et al.* (2003) that the risk of UTIs decreases with age.

The species specific prevalence rate of *Mycoplasma* spp infection among female patients visiting University of Abuja Teaching Hospital, Abuja showed that out of 14 positive samples identified, 9 (64.30%) were infected by *Ureaplasma urealyticum* and 5 (35.70%) were infected by *Mycoplasma hominis* (Table 3), hence *Ureaplasma urealyticum* had higher

prevalence rate than *M. hominis*. This is in accordance with the findings of Chua *et al.*, (1998) on maternal cervical colonization rates where *U. urealyticum* had higher prevalence rate (58%) than *M. hominis* (16%). The findings of this study revealed that *Mycoplasma* species were found to be the commensals of peri anal and vaginal regions and this call for increase in personal hygiene. This study has highlighted the need to raise awareness of UTI and to expand services for prevention and treatment among females. To do this effectively, however, it may be necessary to improve the quality of health care provided at the community level. Since UTI may be symptomatic and asymptomatic in most cases, it is therefore suggested that routine screening of patients with unexplained sources of fever be done and the appropriate chemotherapy administered in order to prevent the cases becoming symptomatic later with resultant renal damage.

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