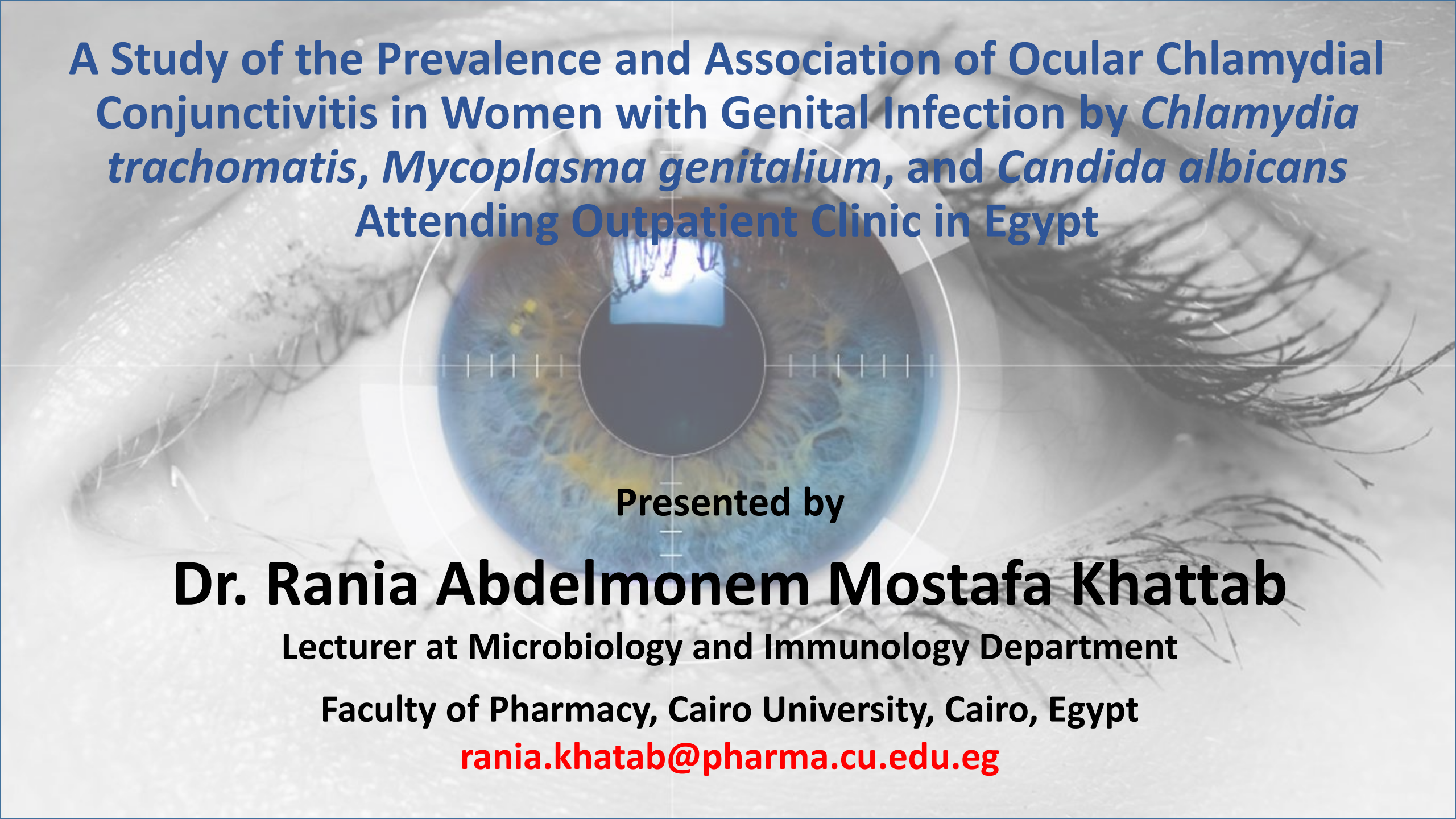
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# A Study of the Prevalence and Association of Ocular Chlamydial Conjunctivitis in Women with Genital Infection by *Chlamydia trachomatis*, *Mycoplasma genitalium*, and *Candida albicans* Attending Outpatient Clinic in Egypt




**Presented by**

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# Introduction



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- **The composition of the normal ocular flora plays an essential role in:**
  - The normal flora of the eye.
  - Maintenance of surface homeostasis.
  - In preventing ocular infection.
- **The bacterial flora of the female genital tract is highly dynamic and the local microbial community consists of a large multitude of different species.**
- **The balance therein may be disturbed due to physiologic variability or the presence of disease-causing microorganisms.**

# Introduction



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- ***Chlamydia trachomatis*** **is a ubiquitos pathogen world wide and causes:**
  - Ocular.
  - Urogenital.
  - Respiratory infections in humans.

- ***Chlamydia trachomatis*** **is classified into 15 distinct serovars based on antigenic variation of the ompA genes that encode the organism's major outer membrane protein (MOMP).**

- **Serovars A, B, Ba, and C are the causative agents of trachoma. Serovars D–K are associated with oculogenital infections.**

# Introduction



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- **MOMP is regarded the dominant surface protein (60% of the total protein mass in the outer membrane).**

- **About 0.3-2% of genital infection with *Chlamydia trachomatis* are complicated by a chlamydial eye infection which is not sight threatning.**

- ***Chlamydia trachomatis* has currently emerged as the most common sexually transmitted pathogen.**

  **Chlamydial infection produces less severe symptoms than other sexually transmitted diseases.**

# Introduction



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- ***Mycoplasmas*** **are the smallest free living bacteria, lacking a cell wall, colonies may take up to 3 weeks to develop and are usually very small.**

- **One of its 4 human species, *Mycoplasma genitalium* is so fastidious and immensely difficult to isolate from clinical specimens.**

- ***Mycoplasma genitalium*** **is a sexually transmitted pathogen, specifically it causes:**
  - Cervicitis.
  - Pelvic inflammatory infection in women.
  - Urethritis in both men and women.

# Introduction



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- **Fungal infections of the eye are important amongst the clinical conditions responsible for ocular morbidity and blindness.**

- ***Candida albicans* is implicated in a variety of ocular infections:**
  - Keratomycosis
  - Endophthalmitis
  - Dacryocystitis

- ***Candida albicans* are commensal organisms that reside in the human body and are found normally in the female genital tract.**

# Introduction



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- **Genital candidiasis occurs mainly in women referred as *Vulvovaginal candidiasis.***
- ***Vulvovaginal candidiasis* is one of the most common causes of infectious vaginitis.**
- ***Vulvovaginal candidiasis* is classified by the World Health Organization (WHO) as a pathological condition that is frequently sexually transmitted.**

# Work Objectives



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- To determine the association between chlamydial conjunctivitis and genital infection by:
  - *Chlamydia trachomatis*
  - *Mycoplasma genitalium*
  - *Candida albicans*
- The possible relationship between cultured bacterial pathogens and oculogenital chlamydial infection.

# Population Studied



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- 100 *(50 symptomatic and 50 asymptomatic)* women.
- Age Range between 22-45 years.
- Attending the Gynecological and Obstetric outpatient clinic of Alzahraa Hospital, Al Azhar University.

## Symptoms

- **Study group:** Vaginal discharge, itching and lower abdominal pain.
- **Control group:** Women in outpatient clinic for contraceptive advice, follow up after abortion and delivery.

# Experimental Work



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## ➢ Collection of Sample

Bacterial

Vaginal swabs were collected from both groups.

Simultaneously a conjunctival swab was taken from these patients

- Gram Stain (vaginal smear)
- Direct Examination (KOH 10%)
- Culture Plates (blood, chocolate, and Wilkins anaerobe agars)
- Culture Plates (Sabouraud's Dextrose Agar)
- Identification of Isolate
- Identification of Isolate
  - Colony Morphology
  - Colony Morphology
  - Gram Staining
  - Pigment Production
  - Biochemical Tests
  - Lactophenol Cotton Blue Staining

# Experimental Work



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## Polymerase Chain Reaction (PCR)

DNA was extracted from each vaginal and conjunctival swab using QIA amp DNA Blood Mini kit and QIA amp DNA Micro extraction kit from Qiagen respectively. The primers used in this study are

- ***Chlamydia trachomatis*, 144 bp.**
- ***Candida albicans*, 402 bp.**
- ***Mycoplasma genitalium*, 495 bp.**

# Results

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## Conjunctival and Vaginal Culture

| | Frequency | % |
|---|---|---|
| *Candida albicans* | 10 | 20.0 |
| *Staphylococcus aureus* | 4 | 8.0 |
| *Staphylococcus epidermidis* | 4 | 8.0 |
| *Streptococcus pneumonia* | 2 | 4.0 |
| No growth | 30 | 60.0 |
| Total | 50 | 100.0 |

| | Frequency | % |
|---|---|---|
| *Candida albicans* | 20 | 40.0 |
| *Klebsiella* spp. | 5 | 10.0 |
| *Pseudomonas aeruginosa* | 6 | 12.0 |
| *Staphylococcus aureus* | 8 | 16.0 |
| *Streptococcus aglactiae* | 6 | 12.0 |
| No growth | 5 | 10.0 |
| Total | 50 | 100.0 |

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## *Chlamydia trachomatis* conjuncival and Vaginal PCR

| | Frequency | % |
|---|---|---|
| Positive | 30 | 60.0 |
| Negative | 20 | 40.0 |
| Total | 50 | 100.0 |

| | Frequency | % |
|---|---|---|
| Positive | 15 | 30.0 |
| Negative | 35 | 70.0 |
| Total | 50 | 100.0 |

# Results



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## *Candida albicans* conjuncival and Vaginal PCR

| | Frequency | % |
|---|---|---|
| Positive | 15 | 30.0 |
| Negative | 35 | 70.0 |
| Total | 50 | 100.0 |

| | Frequency | % |
|---|---|---|
| Positive | 25 | 50.0 |
| Negative | 25 | 50.0 |
| Total | 50 | 100.0 |

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## *Mycoplasma genitalium* Vaginal PCR

| | Frequency | % |
|---|---|---|
| Positive | 5 | 10.0 |
| Negative | 45 | 90.0 |
| Total | 50 | 100.0 |

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## Conjunctival and vaginal culture of 30 Positive Conjunctival *C. trachomatis* PCR

| | Frequency | % |
|---|---|---|
| *Staphylococcus aureus* | 3 | 10.0 |
| *Staphylococcus epidermidis* | 3 | 10.0 |
| *Streptococcus pneumonia* | 2 | 6.7 |
| No growth | 22 | 73.3 |
| Total | 30 | 100.0 |

| | Frequency | % |
|---|---|---|
| *Candida albicans* | 6 | 20.0 |
| *Klebsiella* spp. | 5 | 16.7 |
| *Pseudomonas aeruginosa* | 3 | 10.0 |
| *Staphylococcus aureus* | 7 | 23.3 |
| *Streptococcus aglactiae* | 4 | 13.3 |
| No growth | 5 | 16.7 |
| Total | 30 | 100.0 |

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## Conjunctival And Vaginal Culture Of 15 Positive Vaginal *C. Trachomatis* PCR

| | Frequency | % |
|---|---|---|
| ***Staphylococcus aureus*** | 1 | 6.7 |
| ***Staphylococcus epidermidis*** | 2 | 13.3 |
| **No growth** | 12 | 80.0 |
| **Total** | 15 | 100.0 |

| | Frequency | % |
|---|---|---|
| ***Klebsiella* spp.** | 4 | 26.7 |
| ***Pseudomonas aeruginosa*** | 2 | 13.3 |
| ***Staphylococcus aureus*** | 4 | 26.7 |
| **No growth** | 5 | 33.3 |
| **Total** | 15 | 100.0 |

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## Concomitant oculogenital PCR results for *Chlamydia trachomatis*

| | | | *CT* CONJ. PCR | | Total |
|---|---|---|---|---|---|
| | | | Negative | Positive | |
| *CT* VAG PCR | Negative | Count | 20 | 15 | 35 |
| | | % within CT VAG PCR | 57.1% | 42.9% | 100.0% |
| | | % within CT CONJ PCR | 100.0% | 50.0% | 70.0% |
| | Positive | Count | 0 | 15 | 15 |
| | | % within CT VAG PCR | 0.0% | 100.0% | 100.0% |
| | | % within CT CONJ PCR | 0.0% | 50.0% | 30.0% |
| **Total** | | **Count** | **20** | **30** | **50** |
| | | **% within CT VAG PCR** | **40.0%** | **60.0%** | **100.0%** |
| | | **% within CT CONJ PCR** | **100.0%** | **100.0%** | **100.0%** |

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# Concomitant oculogenital PCR results for *Candida albicans*



| | | | *CA* CONJ. PCR | | Total |
|---|---|---|---|---|---|
| | | | Negative | Positive | |
| *CA* VAG PCR | Negative | Count | 22 | 3 | 25 |
| | | % within CA VAG PCR | 88.0% | 12.0% | 100.0% |
| | | % within CA CONJ PCR | 62.9% | 20.0% | 50.0% |
| | Positive | Count | 13 | 12 | 25 |
| | | % within CA VAG PCR | 52.0% | 48.0% | 100.0% |
| | | % within CA CONJ PCR | 37.1% | 80.0% | 50.0% |
| **Total** | | **Count** | **35** | **15** | **50** |
| | | **% within CA VAG PCR** | **70.0%** | **30.0%** | **100.0%** |
| | | **% within CA CONJ PCR** | **100.0%** | **100.0%** | **100.0%** |

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## Relation between *Chlamydia trachomitis* conjunctival PCR and *Candida albicans* Vaginal PCR

| | | | *CT* CONJ PCR | | Total |
|---|---|---|---|---|---|
| | | | Negative | Positive | |
| *CA* VAG PCR | Negative | Count | 3 | 22 | 25 |
| | | % within CA VAG PCR | 12.0% | 88.0% | 100.0% |
| | | % within CT CONJ PCR | 15.0% | 73.3% | 50.0% |
| | Positive | Count | 17 | 8 | 25 |
| | | % within CA VAG PCR | 68.0% | 32.0% | 100.0% |
| | | % within CT CONJ PCR | 85.0% | 26.7% | 50.0% |
| **Total** | | **Count** | **20** | **30** | **50** |
| | | **% within CA VAG PCR** | **40.0%** | **60.0%** | **100.0%** |
| | | **% within CT CONJ PCR** | **100.0%** | **100.0%** | **100.0%** |

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## Relation between *Chlamydia trachomitis* conjunctival PCR and *Mycoplasma genitalium* Vaginal PCR

| | | | *CT* CONJ. PCR | | Total |
|---|---|---|---|---|---|
| | | | Negative | Positive | |
| *MG* VAG PCR | Negative | Count | 19 | 26 | 45 |
| | | % within MG VAG PCR | 42.2% | 57.8% | 100.0% |
| | | % within CT CONJ PCR | 95.0% | 86.7% | 90.0% |
| | Positive | Count | 1 | 4 | 5 |
| | | % within MG VAG PCR | 20.0% | 80.0% | 100.0% |
| | | % within CT CONJ PCR | 5.0% | 13.3% | 10.0% |
| **Total** | | **Count** | **20** | **30** | **50** |
| | | **% within MG VAG PCR** | **40.0%** | **60.0%** | **100.0%** |
| | | **% within CT CONJ PCR** | **100.0%** | **100.0%** | **100.0%** |

# Conclusion



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- **Positivity of PCR for *Chlamydia trachomatis in the:***
  - 50 conjunctival swabs: 60%
  - 50 vaginal swabs: 30%
- **None of the patients were conjunctival negative, while having vaginal *Chlamydia trachomatis* positive by PCR.**
- **50% of the patients had *Chlamydia trachomatis* in the conjunctiva by PCR, while the concomitant vaginal swabs were negative for *Chlamydia trachomatis.***

# Conclusion



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- ***Candida albicans*** **was isolated and detected in 20% and 30% of the 50 total conjunctival swabs by Culture and PCR, respectively.**
- **For the 50 vaginal samples, Culture and PCR methods were able to detect *Candida albicans* in 40% and 50% of the cases, respectively.**
- ***Candida albicans*** **was genitally isolated in 20% of the total chlamydial conjunctivitis patients (30 cases), while it was not isolated in any of the ocular samples.**

# Conclusion



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- **Molecular methods are increasingly used for rapid detection of fungal spp.**
- **Concomitant oculogenital *Candida albicans* by PCR: a high detection rate for *Candida albicans* in concomitant vaginal and conjunctival swabs (80%), elucidating a significant fair positive agreement for the two results.**
- **The percentage of negative agreement (62.9%) was fairly significant.**

# Conclusion



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- There was a significant inverse agreement regarding the association between chlamydial conjunctivitis and genital infection with *Candida albicans* by PCR.

- In support of our findings were the results obtained by Schachter J. that the presence of yeast in genital specimens was associated with lower risk of *Chlamydia trachomatis* infection.

# Conclusion



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- All *Mycoplasma genitalium* tests for conjunctival swabs by PCR were negative.
- This was not in agreement with Eva *et al*., who described first case of detection of *Mycoplasma genitalium* in a conjunctival swab specimen from a patient with chronic conjunctivitis.
- Both conjunctival swab and urine specimens were positive for *Mycoplasma genitalium* DNA.

# Conclusion



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- **Prevalence of *Mycoplasma genitalium* in genital swabs, only 5 (10%) were PCR positive.**
- **Prevalence of genital *Chlamydia trachomatis* compared to *Mycoplasma genitalium* was 30% and 5%, respectively.**

# Conclusion



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- **Cultured bacterial organisms do not play a role in enhancement of *Chlamydia trachomatis* infection.**

- **Considering the strong association between chlamydial eye and genital infections and that chlamydial infections are often asymptomatic, any physician treating a patient with chlamydial genital infection should consider the probability of an ocular infection in this patient.**



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