

# Relationship between ocular anatomy and chlamydial infection in a sample of population in Basrah city

*By Nada Hashim Mohammed AL-Jassim*

## **Relationship between ocular anatomy and chlamydial infection in a sample of population in Basrah city**

Ghaidaa Jassim Al-Ghizzawi<sup>1</sup>, Zahraa Helal Thejel<sup>1</sup>, Nada Hashim  
Mohammed AL-Jassim<sup>2\*</sup>

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<sup>1</sup> Department of Biology, College of Education for Pure Science, University of Basrah, Basrah, Iraq

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<sup>2</sup> Department of Surgery, College of Dentistry, Al Maaqal Private University, Basrah, Iraq

Corresponding:

[nada.hashim@almaaqaal.edu.iq](mailto:nada.hashim@almaaqaal.edu.iq)

## Abstract

*C. trachomatis* is the causative agent of many diseases cause as blindness and is the most infection common sexually transmitted pathogen. This study aimed to determine the relationship between ocular anatomy and chlamydial infections. A 100 swabs were taken from a patient who suffering from an eye infection disease. The patients who attended the government hospitals in Basrah province from Feb to Jul 2021. DNA was extracted from swabs by a Bacall swab of DNA extraction kit and then molecular methods. *C. Trachomatis* isolated from patients who suffer from conjunctivitis, blepharitis, Lacrium cystitis, and keratitis. The infection rate of Chlamydia was 12%. Males were infected more than females at 66%:34%. This study diagnosed *C. Trachomatis* from eye infections for the first time in Iraq.

**Keywords:** blindness, *C. Trachomatis*, eye infection diseases, ocular anatomy, blepharitis, Lacrium cystitis, keratitis

## Introduction

*C. Trachomatis* is a bacterium that causes many diseases including trachoma, lymph granuloma, pelvic, and non-gonococcal urethritis, this can make it (in women) difficult or impossible to get pregnant in the future [1,2]. The life cycle of Chlamydia is characterized by two stages, the Elementary Body (EB), which adheres to and invades the eukaryotic cell in a larger (0.3 to 0.6 Mm in diameter) and the vegetative form (0.6 to 1.5 Mm in diameter), the Reticulate Body (RB) [3,4]. Neonatal conjunctivitis is inflammation occurring within the first 30 days of life. *C. trachomatis* (most common) causative agent is typically contracted during vaginal delivery from exposure to bacteria from the birth canal [5].

Several layers make up the eyeball, it consists of a dense and elastic imperfect of supporting tissue which are opaque sclera and transparent cornea. The outermost layer of the eyes includes the sclera, conjunctiva, and the cornea [6,7].

The cornea is a central transparent front part (outer layer) of the eye (watch glass) and consists of several layers including Bowman's membrane, Epithelium, Dua's layer (pre-Descemet's layer), Stroma (substantia propria), Endothelium, and Descemet's membrane. It is avascular with no blood vessels except the limbus [6].

The sclera is the 'dense white tissue' supporting wall and it is continuous with the clear cornea. The outer surface is covered by the conjunctiva, under which is the episclera and the innermost layer consists of elastic lamina fusca fibers [6]. The anterior chamber is a space filled with aqueous humour, and bounded anteriorly by the cornea, and posteriorly by the iris and pupil [6]. The angle of

the anterior chamber is a peripheral recess, bounded posteriorly by the iris root and the ciliary body and anteriorly by the corneo-sclera [6,8]. Lens is a biconvex mass of peculiarly differentiated epithelium, consisting of three main parts. The uveal tract consists of three parts (two posterior [choroid and ciliary body], while anterior form a free circular diaphragm [iris]) [6].

Iris is thinnest when attached to the ciliary body. It is composed of a stroma have branched connective tissue cells, largely un-pigmented in blue irides with little pigmented, with a rich supply of blood vessels [8].

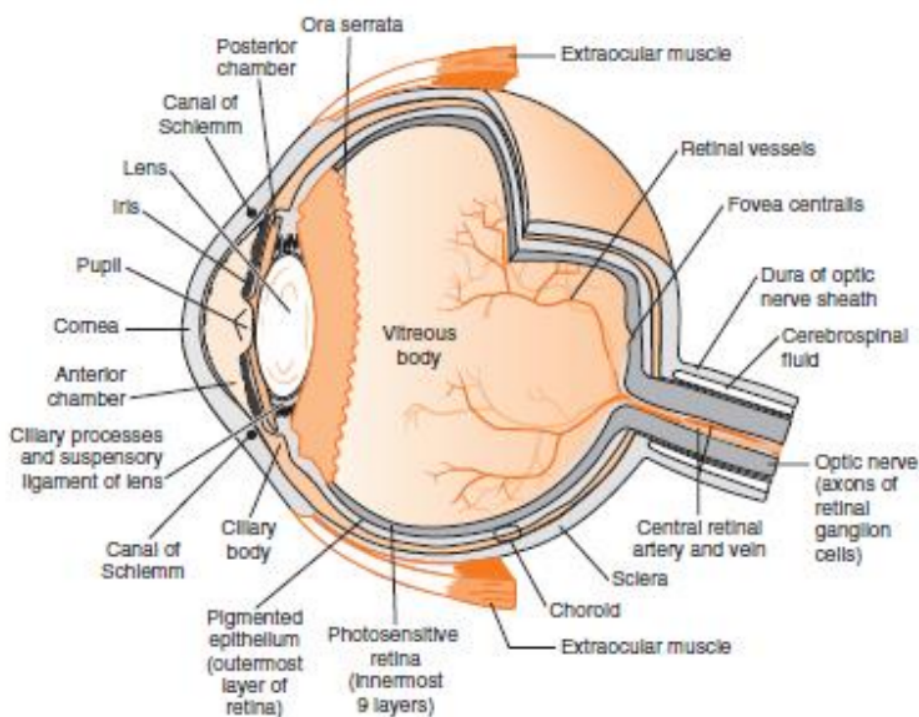
Ciliary body is situated in the antero-posterior section and is shaped roughly like an isosceles triangle, with the base forwards. The chief mass of the ciliary body is composed of ciliary muscle. The inner surface is divided into two portions (the anterior part (pars plicata) and the posterior part (pars plana)) [6]. The choroid is an extremely vascular membrane in contact everywhere with the sclera. On the inner side, the choroid is covered by lamina vitrea or membrane of Bruch as a thin elastic. The blood vessels of the choroid increase in size from within outwards. The posterior chamber and vitreous humour are triangular spaces between the posterior aspect of the iris and the anterior surface of the lens. The vitreous chamber lies behind to lens, containing vitreous humour [6, 8].

The retina corresponds in lines extent to the choroid, it is continued anteriorly as a double layer of epithelium as pupillary margin. It consists of several layers formed by three strata of cells and their synapses, which are visual cells (externally), bipolar cells (intermedially) and ganglion cells (internally), the axons of which run into the central nervous system [6]. The layers of the retina are (outer to inner): rods and cones, retinal pigment epithelium, outer nuclear layer, outer plexiform layer, inner nuclear layer, inner plexiform layer, ganglion cell layer, nerve fiber layer, and cells running centrally into the optic nerve [8].

The tear film end products are released by a lacrimal functional unit which consists of the lacrimal and Meibomian glands, ocular surface, and interconnecting innervation [9].

The conjunctiva is a mucosal surface that extends from the corneoscleral limbus to the eyelid margin and covers the sclera up to the limbus [8]. It divides into three distinct regions (bulbar, fornix, and palpebral) [9] (figure 1).

This study aimed to determine the relationship between ocular anatomy and chlamydial infections in Basrah province.



**Figure 1. General anatomy of the eyeball [6].**

## Methods

### Study population

A 100 swabs were taken from patients who suffering from eye infection disease. Cases who attended the government hospitals in Basrah province from Feb to Jul 2021. DNA was extracted from swabs by a Bacall swab DNA extraction kit and then molecular methods [10]. As shown in table (1) and (2).

**Table 1. PCR reaction setup**

| Chemicals       | Volume       |
|-----------------|--------------|
| Master mix      | 12.5 $\mu$ l |
| Premier Forward | 1 $\mu$ l    |

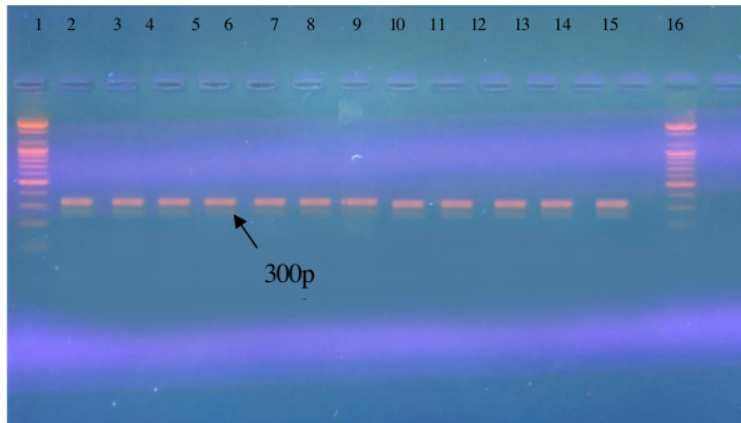
|                     |             |
|---------------------|-------------|
| Premier Reverse     | 1 $\mu$ l   |
| DNA                 | 5 $\mu$ l   |
| dd H <sub>2</sub> O | 5.5 $\mu$ l |
| Total Volume        | 25 $\mu$ l  |

**Table 2. PCR Amplification setup**

| No. of Stage | Steps          | Temperature | Time  | NO. of Cycle |
|--------------|----------------|-------------|-------|--------------|
| 1            | Denaturation 1 | 94° C       | 3 min | 1 Cycle      |
| 2            | Denaturation 2 | 94° C       | 1 min | 30 Cycle     |
| 3            | Annealing      | 64° C       | 1 min |              |
| 4            | Extension 1    | 72° C       | 1 min |              |
| 5            | Extension 2    | 72° C       | 5 min | 1 Cycle      |

## Results

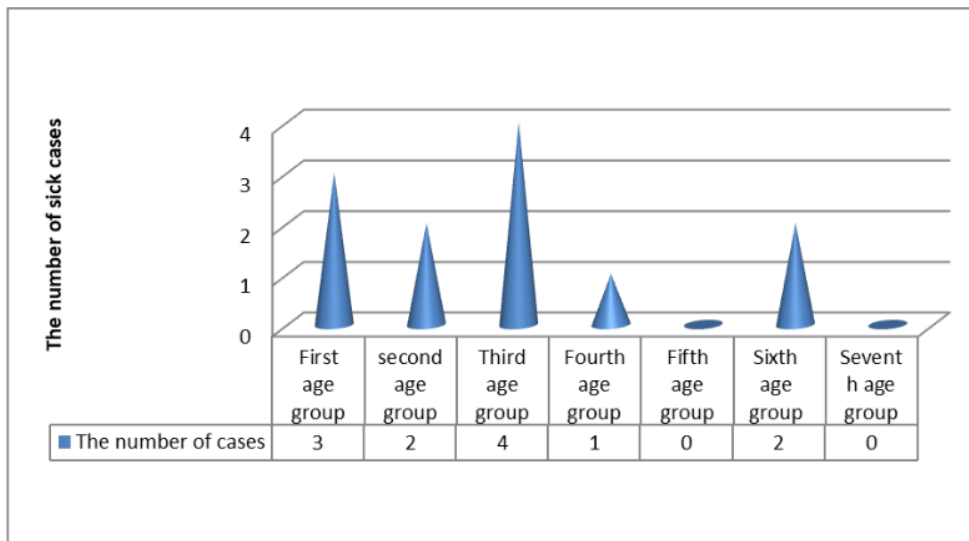
*C. Trachomatis* isolated from patients who suffer from conjunctivitis, blepharitis, Lacrium cystitis, and keratitis. The infection rate of Chlamydia was 12%. Males were infected more than females 66%:34%. PCR assay showed high sensitivity as determined for the presence of *C. Trachomatis* among patients as shown in (figure 2). This study diagnosed *C. Trachomatis* from eye infections for the first time in Iraq. In this study, the patient infected with *C. Trachomatis* was distributed in seven age groups as shown in table (3) and Figure (3).



**Figure (2) Results of 16 SrRNA gene amplification of *C. trachomatis* with a size of (300bp)**  
**1,16= Ladder, (2-13)=Positive samples, 15=Negative samples**

**Table 3. Distribution of patients by age groups**

| Age groups (years)       | No. | <i>C. trachomatis</i> |
|--------------------------|-----|-----------------------|
| 1-10                     | 25  | 12                    |
| 11-20                    | 26  | 8                     |
| 21-30                    | 20  | 20                    |
| 31-40                    | 10  | 10                    |
| 41-50                    | 6   | 0                     |
| 51-60                    | 12  | 15                    |
| 61-70                    | 1   | 0                     |
| $X^2 = 21.021; p < 0.01$ |     |                       |



**Figure 2. Distribution of *C. Trachomatis* isolates by age groups.**

### Discussion

Trachoma is one of the different blinding diseases in the world. It is the common infection cause of blindness. The causative agent (*Chlamydia trachomatis*) infection usually begins in childhood. The WHO estimates 84 million people suffer from trachoma and up to 1.3 million are thought to be blind due to the eye disease [11]. In this study, the infection rate was 12%.

*C. trachomatis* can pass from one person to another within a few minutes [11]. The present study found males were infected more the females, trachoma is a public health problem in developing countries where living conditions are crowded and general hygiene is poor [12]. Diagnosis of *C. trachomatis* from eye infections for the first time in Iraq. Diagnoses of *Chlamydia Trachomatis* eye infection are generally unsuits factory by standard laboratory methods. PCR (this type of test detects the genetic material, DNA, or RNA of *C. Trachomatis*) has been a successful test for the diagnosis of *C. Trachomatis* [13,14]. The younger patients (1-30 years) were more infected by *C. Trachomatis*, with a similar result recorded by [15,16].

### Conclusion

*C. Trachomatis* is a causative agent of eye infections diseases in Basrah province – south of Iraq.



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None

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