Pharmacological management of bacterial conjunctivitis in South Africa

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Abstract

Bacterial conjunctivitis is a common ocular condition that affects individuals across all age groups and is a significant cause of red eye in primary healthcare settings in South Africa. The condition is primarily caused by *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*. This article provides an overview of the current understanding of bacterial conjunctivitis in the South African context, covering epidemiology, clinical presentation, diagnosis, treatment, and emerging concerns such as antimicrobial resistance. The article also highlights the challenges within public healthcare facilities and the importance of local surveillance and standardised treatment guidelines to improve patient outcomes.

Keywords: bacterial conjunctivitis, pharmacological management

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Introduction

The conjunctiva is a transparent mucous membrane covering the anterior sclera and inner eyelids. Inflammation of this tissue, known as conjunctivitis, is characterised by vascular dilation, leading to redness, swelling, and often discharge.[1,2] Conjunctivitis can be classified as acute (lasting three to four weeks) or chronic (persisting beyond four weeks).[3] Infectious causes include viral, bacterial, and parasitic agents, while non-infectious forms may result from allergies, trauma, or chemical exposure.[3,4] Bacterial conjunctivitis typically presents with moderate to severe redness, mucopurulent discharge, and eyelid matting, whereas viral conjunctivitis manifests with milder redness, watery discharge, and minimal eyelid adherence.[5,6] Allergic conjunctivitis is distinguished by itching, tearing, and mild redness.[7]

Although acute conjunctivitis is frequently treated with topical antibiotics, evidence suggests that such therapy is often unnecessary.[8,9] In South Africa, pharmacological management is complicated by the over-the-counter (OTC) availability of ocular medications, with antibiotics dominating sales.[10,11] The misuse of antibiotics exacerbates antimicrobial resistance (AMR), a public health concern, particularly in low- and middle-income countries where resistance rates are high. Studies in Ghana, for instance, reveal widespread resistance to commonly prescribed antibiotics.[3]Community antibiotic use is estimated at 80%, with 20–50% deemed inappropriate, further fueling AMR.[4] Unnecessary antibiotic prescriptions also increase treatment costs, placing an additional burden on patients.[1] Thus, antibiotic stewardship remains important in managing bacterial conjunctivitis effectively.

Bacterial conjunctivitis continues to pose a public health burden in South Africa, particularly in underserved communities. While most cases are mild and self-limiting, effective diagnosis and timely treatment are crucial to avoid complications and reduce transmission. Enhancing diagnostic capabilities, updating treatment protocols, and addressing antibiotic resistance are key to improving outcomes.

Epidemiology of bacterial conjunctivitis in South Africa

Bacterial conjunctivitis is an ocular infection caused by pathogenic bacteria invading the conjunctiva, a thin mucous membrane covering the anterior eye and inner eyelids.[12] The infection triggers inflammation, leading to symptoms such as redness, grittiness, pain, and tearing. While bacterial conjunctivitis affects both children and adults, most cases are mild and resolve without requiring laboratory investigations. However, inappropriate management, particularly the misuse of topical antibiotics, can contribute to complications, including antimicrobial resistance (AMR).[13]

In South Africa, as in many other regions, the overuse of antibiotics classified under the "Watch" group in the AWaRe (Access, Watch, Reserve) classification system exacerbates resistance patterns.[13] These antibiotics are frequently prescribed for bacterial conjunctivitis and other ocular infections, despite growing concerns about their long-term efficacy. This highlights the need for improved antibiotic stewardship and education among healthcare providers and the public to curb unnecessary antibiotic use.

Children are particularly susceptible to bacterial conjunctivitis due to factors such as close contact during play, upper respiratory tract infections, and poor hygiene practices.[14] Additionally, the use of contaminated towels or ointments, as well as underlying conditions like malnutrition or sickle cell anaemia, can weaken ocular defenses, allowing normal flora or pathogens to proliferate.[12] Despite these risks, topical antibiotics remain the

primary treatment for bacterial conjunctivitis, emphasising the need for judicious prescribing to mitigate resistance development.

Pathophysiology of bacterial conjunctivitis

Bacterial conjunctivitis is primarily caused by pyogenic bacteria such as *Staphylococcus aureus, Streptococcus pneumoniae*, *Haemophilus influenzae*, and, in more severe cases, *Neisseria gonorrhoeae* and *Chlamydia trachomatis*.[15,16] The infection typically begins in one eye but often spreads to the contralateral eye due to contamination from touching the eyes with infected hands or contact lenses.[12] Common symptoms include ocular redness, grittiness, mucopurulent discharge (leading to crusting upon waking), and discomfort (Table I). In severe infections, systemic manifestations such as fever, malaise, and photophobia may occur.

The ocular surface harbours a dynamic microbiome that maintains ocular health, but disruptions in this balance, whether from environmental factors, host immunity, or antibiotic misuse, can predispose to infection.[17,18] Excessive antibiotic use further exacerbates the problem by promoting drug-resistant bacterial strains and diminishing protective microbial communities.[19] While *N. gonorrhoeae* and *C. trachomatis* remain notable pathogens, *Neisseria meningitidis* is a rare but serious cause of acute bacterial conjunctivitis. Transmission occurs primarily through hand-to-eye contact, exposure to contaminated fomites, or contact with genital or respiratory secretions. Although the conjunctiva is the usual entry point, infection can also spread from adjacent structures such as the eyelids, lacrimal system, or sinuses. Haematogenous spread is uncommon. Since clinical presentation alone cannot reliably identify the causative organism, microbiological testing is essential for targeted treatment.[15,16]

Common bacterial pathogens

Bacterial conjunctivitis is a common ocular infection characterised by inflammation of the conjunctiva, affecting both children and adults. While children are more frequently affected due to close contact in school settings, adults may develop the condition through occupational exposure, environmental irritants, or airborne particles.[3,4] The disease is highly contagious, facilitating rapid transmission in communal environments. The predominant bacterial pathogens responsible for conjunctivitis include *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Haemophilus influenzae, Moraxella* species, *Chlamydia trachomatis*, and *Neisseria gonorrhoeae*[12] (Table I). However, increasing antibiotic resistance among these pathogens has raised concerns, necessitating the development of effective and well-tolerated topical treatments.

Studies in sub-Saharan Africa, including research conducted at the Malam Aminu Kano Teaching Hospital in Nigeria, have identified *S. aureus, Pseudomonas spp.*, and *Streptococcus spp.* as leading causative agents of bacterial conjunctivitis.[12] Diagnostic methods such as bacterial culture, Gram staining, and antimicrobial susceptibility testing were employed to confirm these findings. The study highlighted the importance of microbiological analysis in guiding appropriate antibiotic therapy, particularly in regions where empirical treatment is common. These findings underscore the need for ongoing surveillance of bacterial resistance patterns to ensure effective management of bacterial conjunctivitis in South Africa and similar settings.

Staphylococcus aureus

Staphylococcus aureus is a Gram-positive, coagulase-positive coccus that commonly colonises human skin and nasal passages, with approximately 30% of the population being permanent carriers.[20,21] This opportunistic pathogen is not restricted to humans but can also be found in animals such as livestock, posing transmission risks through farm workers or contaminated dairy products.[20] In healthcare settings, *S. aureus* spreads easily among workers, medical equipment, and patients, leading to outbreaks in hospitals and long-term care facilities.

Ocular infections caused by *S. aureus* include conjunctivitis, keratitis, blepharitis, endophthalmitis, and post-surgical infections, often complicating chemical injuries or trauma.[22,23] Staphylococcal conjunctivitis is typically bilateral, presenting with purulent discharge, conjunctival redness, and involvement of all conjunctival surfaces. In tropical regions, certain strains can cause cicatricial conjunctivitis, affecting the conjunctival fornices.[22]

As the second most common cause of bacterial conjunctivitis, *S. aureus* spreads through direct contact with infected secretions, contaminated surfaces, or hand-to-eye transmission.[21] The bacterium adheres to ocular epithelial cells via surface proteins (e.g. fibronectin-binding proteins, teichoic acids) and virulence factors (e.g. coagulase, enterotoxins), facilitating tissue invasion.[20] Its pathogenicity is further enhanced by antibiotic resistance mechanisms, including enzymatic drug inactivation, biofilm formation, and altered cell wall permeability.[23] These adaptive traits complicate treatment, emphasising the need for antimicrobial stewardship in managing staphylococcal conjunctivitis.

Streptococcus pneumoniae

Streptococcus pneumoniae is a Gram-positive, catalase-negative diplococcus that represents a cause of bacterial conjunctivitis in South Africa and across the African continent. With an estimated annual incidence of 30 cases per 100 000 individuals (approximately five new cases per 1 000 children per year), outbreaks frequently occur in daycare settings among preschool-aged children.[3] Predominant serotypes associated with conjunctivitis in South Africa include 6A (34%), 23F (15%), and 1 (9%), with serotypes 5, 6A, 12A, 15A, and 23F being particularly prevalent.[4]

The preferred treatment for pneumococcal conjunctivitis in South Africa typically involves topical antibiotics, with chloramphenicol 0.5% eye drops (applied hourly, then tapered to every two hours) being a first-line option.[12] Fluorometholone eye drops may also be used adjunctively for symptomatic relief of inflammation. Clinicians generally favour topical therapy due to its localised effect, reduced systemic side-effects, and faster recovery times compared to oral antibiotics.[13] Additionally, national treatment guidelines and institutional protocols often recommend topical regimens, reinforcing their widespread use.

The preference for topical treatment is further supported by healthcare providers' observations that patients on topical antibiotics experience quicker resolution of symptoms than those prescribed oral therapy.[19] However, in severe or complicated cases, systemic antibiotics may still be necessary. The reliance on topical treatments aligns with antimicrobial stewardship efforts to minimise unnecessary systemic antibiotic use and reduce the risk of resistance development.[15] Continued surveillance of pneumococcal serotypes and resistance patterns remains important to ensuring effective management strategies in South Africa's evolving epidemiological landscape.

Haemophilus influenzae

Haemophilus influenzae is a small, non-motile, Gram-negative bacillus first isolated in 1892 that requires enriched media (blood or chocolate agar) for cultivation.[24] While the introduction of the Hib vaccine has reduced invasive infections, *H. influenzae* remains an important cause of acute conjunctivitis, particularly in children under five years old.[25] The infection typically presents as bilateral hyperacute conjunctivitis with purulent discharge, often accompanied by fever and upper respiratory symptoms like rhinorrhoea.[26]

As part of the normal nasopharyngeal flora, *H. influenzae* can spread to the conjunctiva during respiratory infections. While often self-limiting, prompt treatment with topical antibiotics is necessary to prevent serious complications like keratitis and peri-orbital cellulitis.[25] The inclusion of *H. influenzae* conjugate vaccine in South Africa›s immunisation programme has reduced invasive disease, but conjunctival infections persist, particularly in settings with poor hygiene.[26] This underscores the need for continued vaccination efforts and appropriate antimicrobial management of ocular infections.

Clinical presentation

Bacterial conjunctivitis represents the most common form of conjunctival inflammation, characterised by acute onset of redness, swelling, and ocular discharge.[4] While acute conjunctivitis may result from various causes including viral infection, allergies, or chemical irritation, the bacterial form typically presents with distinctive yellow or green purulent discharge, often accompanied by eyelid swelling and mild itching. Although frequently self-limiting within seven to ten–1 days, proper diagnosis is important as inappropriate antibiotic use for non-bacterial cases contributes to antimicrobial resistance.[4] The classical presentation includes conjunctival injection and crusting of lashes, particularly upon waking. Treatment options range from cost-effective eye gels to more expensive but widely available antibiotic drops, with ointments generally being less preferred due to application difficulties and potential vision blurring. Accurate clinical differentiation between bacterial, viral, and allergic conjunctivitis remains essential before initiating any therapy. Figure 1 depicts clinical presentation.

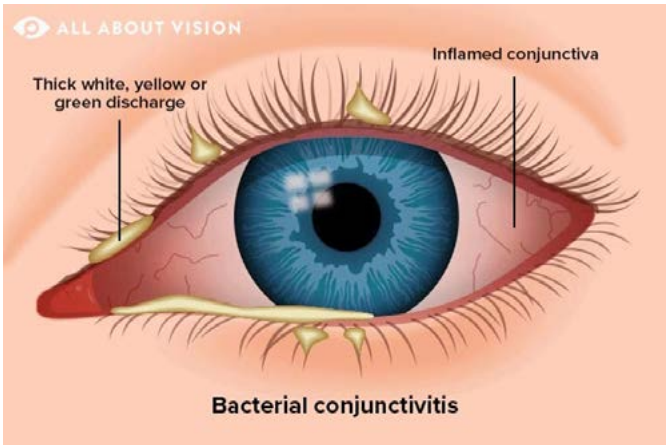

Figure 1: Presentation of bacterial conjunctivitis.[27]

Diagnosis of bacterial conjunctivitis

As one of the most frequent reasons for ophthalmology consultations globally (accounting for up to 5% of visits in the US), bacterial conjunctivitis requires careful diagnostic evaluation.[12] While many cases resolve spontaneously, acute bacterial presentations warrant targeted topical antimicrobial therapy, with systemic antibiotics reserved for severe cases, neonatal infections, or treatment failures. The diagnostic approach differs between primary care and specialist settings – general practitioners typically employ clinical classification while ophthalmologists utilise culture and sensitivity testing for refractory cases.[12]

Paediatric populations demonstrate higher susceptibility, with seasonal peaks during winter months contrasting allergic conjunctivitis' pollen-season predominance. Key diagnostic challenges include distinguishing infectious from non-infectious aetiologies, particularly in primary care settings where diagnostic resources may be limited. Effective management hinges on proper medication administration techniques, making patient education on correct eye drop instillation necessary for treatment success. The development of standardised guidelines for outpatient management, encompassing aetiology, clinical features, therapeutic options, and counselling points, would improve care quality while combating unnecessary antibiotic use in self-limiting cases.

Inquiries to make when interviewing a patient who may have bacterial conjunctivitis:[28]

- What time did the symptoms begin?
- Is one or both eyes impacted?
- Did it start with one eye?
- Do the eyes have any accompanying pain, soreness, or grittiness?
- Does itching accompany it?
- Is there any blurriness or change in the vision?
- Is it possible to describe the discharge? (Thick, coloured, watery)
- Have you recently had any symptoms similar to the flu or cold?
- Are you a contact lens user?
- Has the issue been encountered previously? (If so, what kind of treatment was received and when?)

- Has the situation affected any other members of the household?
- Have you taken any self-care steps?
- Do you suffer from any chronic diseases or conditions?

Pharmacological treatment options

Bacterial conjunctivitis, characterised by conjunctival inflammation with purulent discharge and ocular irritation, requires prompt diagnosis and appropriate treatment to prevent complications like chronic infection and visual impairment.[25] While viral cases are typically self-limiting, bacterial conjunctivitis often necessitates antibiotic therapy. Diagnosis relies on clinical presentation, though Gram stain and culture of ocular specimens remain the gold standard, despite being underutilised in practice.[29] Common treatment options include topical fluoroquinolones (e.g. 0.5% ciprofloxacin or ofloxacin) and fusidic acid as adjunct therapy.

Topical antibiotics

Despite approximately 65% of bacterial conjunctivitis cases resolving spontaneously, topical antibiotics remain overprescribed in South Africa, mirroring trends seen in other African nations like Ghana where inappropriate prescribing rates reach 83%.[13] This overuse stems from patient demand for rapid relief and inadequate adherence to clinical guidelines. While topical azithromycin exists, its high cost limits accessibility. Treatment compliance remains a challenge, influenced by prescription practices and medication affordability. In resource-limited settings, alternative therapies are needed to curb antibiotic resistance while ensuring effective management.

Oral antibiotics

Oral antibiotics are reserved for severe cases, neonates, or treatment failures. In South Africa, the widespread OTC availability of antibiotics like amoxicillin and tetracycline has led to indiscriminate use, exacerbating resistance.[13] Contact lens-related infections, particularly in urban areas like Cape Town, further complicate treatment due to high rates of fluoroquinolone resistance and the prevalence of virulent pathogens such as Chlamydia. The unregulated use of imported or counterfeit antibiotics worsens antimicrobial resistance, highlighting the urgent need for stricter prescription controls and updated treatment guidelines.

Adjunctive therapies

Adjunctive treatments for bacterial conjunctivitis are limited, as anti-inflammatory agents like corticosteroids and NSAIDs are generally discouraged due to risks of masking underlying infections or worsening bacterial virulence.[25] While topical antihistamines and cold compresses may alleviate symptoms, their role in bacterial cases is minimal. Off-label use of antivirals (e.g. ganciclovir) for viral conjunctivitis lacks evidence, and their efficacy remains uncertain. Current guidelines emphasise symptomatic relief with saline rinses and caution against unnecessary steroid or NSAID use in infectious conjunctivitis.

Measures to prevent the spread of bacterial conjunctivitis:[30]

Do's:

- Wash hands with warm water and soap
- Wash pillows, facecloths and towels in hot water
- Replace make-up brushes
- Complete the course of any treatment

Dont's:

- Do not share facecloths and towels
- Do not rub the eyes
- Do not use make-up until resolution of infection
- Do not share any tubes of the treatment prescribed

Antibiotic resistance

Bacterial conjunctivitis, characterised by ocular redness and mucopurulent discharge, contributes to the global clinical burden and typically requires antibiotic treatment.[13] However, the overuse of topical antibiotics, particularly without bacteriological confirmation, remains a major concern, especially in sub-Saharan Africa where data on prescribing practices are limited. In Ghana, a study evaluating 228 prescriptions at an eye hospital revealed

Table I: Clinical features, pathogens and treatment bacterial conjunctivitis in South Africa

Clinical Presentation	Common Pathogens	First-Line Antibiotics (Topical)	Alternative/Reserve Options	Notes
Acute onset, purulent discharge, eyelid crusting, conjunctival redness, ± mild chemosis	*Staphylococcus aureus*	**Chloramphenicol 0.5%** (1–2 hourly, then taper)	**Fusidic acid gel (BD)**	High resistance to erythromycin; MRSA requires culture-guided therapy
Hyperacute (copious purulent discharge), severe redness, ± preauricular lymphadenopathy	*Neisseria gonorrhoeae*	**Ceftriaxone (IM) + saline irrigation**	**Azithromycin (oral)**	Systemic therapy required; urgent ophthalmology referral
Mucopurulent discharge, bilateral, often in children, ± URI symptoms	*Haemophilus influenzae*	**Ciprofloxacin 0.3% (QID)**	**Ofloxacin 0.3% (BD–QID)**	Hib vaccine reduces invasive disease but not conjunctivitis
Chronic/follicular conjunctivitis, ± genital infection	*Chlamydia trachomatis*	**Azithromycin (oral, single dose)**	**Doxycycline (oral, 7d)**	Topical therapy ineffective; treat sexual partners
Contact lens-associated, severe pain, photophobia	*Pseudomonas aeruginosa*	**Ciprofloxacin 0.3% (hourly)**	**Gentamicin 0.3% (QID)**	Immediate lens discontinuation; risk of keratitis

that many patients received unnecessary antibiotic therapy, highlighting widespread inappropriate use.[13] This pattern underscores the urgent need for improved health professional and public education on conjunctivitis management to curb unnecessary antibiotic prescriptions and mitigate rising resistance.

Guidelines for antibiotic use

The inappropriate use of antibiotics for paediatric bacterial conjunctivitis presents a global challenge, with clinicians often prescribing topical antibiotics even for suspected viral cases.[13] In Ghana, despite national guidelines discouraging antibiotic use for unconfirmed bacterial conjunctivitis, prescribing remains rampant. This trend mirrors broader public health concerns about antimicrobial resistance (AMR), which could lead to an estimated 10 million annual deaths by 2050 if unaddressed. In South Africa, the widespread availability of first-line topical antibiotics and aggressive marketing of generics further complicate efforts to regulate OTC use.[13]

To address these issues, a proposed study at a Cape Town specialist eye unit aims to document current prescribing practices and evaluate their alignment with national and international guidelines. Such research is important for developing standardised protocols to promote rational antibiotic use in acute conjunctivitis, particularly in regions like West Africa where empirical data remain scarce. Without intervention, the continued misuse of antibiotics will exacerbate AMR, rendering first-line treatments ineffective and threatening global ocular health outcomes.

Complications

Bacterial conjunctivitis is usually self-limiting, but if untreated or severe it can lead to several complications. The most common includes keratitis (corneal inflammation), which may progress to corneal ulceration and scarring**,** resulting in permanent visual impairment.[31,32] Severe cases, particularly with pathogens like Neisseria gonorrhoeae or Pseudomonas aeruginosa, can cause rapid corneal perforation.[33] Other complications include chronic conjunctivitis, recurrent infections, and secondary spread to periocular tissues causing preseptal or orbital cellulitis.[31,34] In children and immunocompromised patients, these complications may be more pronounced, underscoring the importance of prompt diagnosis and appropriate antibiotic therapy.[31,34]

Prognosis

Uncomplicated bacterial conjunctivitis typically has an excellent prognosis, whether managed expectantly or treated with topical antibiotics.[35] Most cases resolve fully within 7–14 days, often sooner in mild disease, without lasting sequelae.[36] Complications are rare in the absence of corneal involvement or highly virulent organisms. However, if pathogens like Neisseria gonorrhoeae or Chlamydia trachomatis are involved, the risk of corneal damage or systemic spread increases, making early recognition and targeted therapy critical.[36]

Patient education and compliance

Effective management of bacterial conjunctivitis requires comprehensive patient education to ensure proper medication use and adherence to treatment regimens. Educating patients about the nature of the condition (commonly called "pink eye"), its expected duration, and characteristic symptoms is essential for therapeutic success.[29] Compliance can be enhanced through clear verbal instructions supplemented with visual aids such as pamphlets, posters, and demonstration videos. Proper administration techniques for eye medications must be emphasised, particularly for OTC preparations which are frequently misused. Follow-up monitoring, either via telephone or email for mild cases, helps assess treatment response, though severe symptoms like photophobia or pain warrant in-person evaluation.[29] Healthcare providers should implement disclaimers during remote consultations to mitigate liability concerns while maintaining quality care standards.

Poor compliance contributes to treatment failure and increased resistance. Key education points include:[37]

- Completing the full course of antibiotics
- Avoiding touching/rubbing the eyes
- Using separate towels and pillowcases
- Practicing proper hand hygiene
- Not wearing contact lenses during infection

In South Africa, health education campaigns through clinics, schools, and media can enhance public awareness.

Role of healthcare providers

Healthcare providers have a role in differentiating bacterial conjunctivitis – characterised by purulent discharge and conjunctival injection – from viral or allergic forms.[13] While topical antibiotics like sulfacetamide, aminoglycosides, and fluoroquinolones are effective for bacterial cases, their indiscriminate use contributes to antimicrobial resistance, particularly as most conjunctivitis cases are viral and self-limiting. South Africa's bifurcated healthcare system presents unique challenges: the under-resourced public sector struggles with inadequate facilities and staffing, while the better-equipped private sector remains inaccessible to many due to cost barriers.[13] This disparity extends to ophthalmic care, where most specialists practice privately, leaving public hospitals understaffed. These systemic constraints complicate efforts to implement standardised antibiotic stewardship programmes, despite the urgent need to curb resistance patterns emerging from inappropriate prescribing practices.

Cultural considerations in treatment

Cultural beliefs and traditional medicine practices in South Africa influence the management of bacterial conjunctivitis. Many patients initially seek treatment from traditional healers or use home remedies before consulting medical professionals,

potentially delaying appropriate care.[13] This delay can lead to complications, particularly in chronic cases that may have underlying systemic causes like tuberculosis. Healthcare providers must navigate these cultural practices sensitively while educating patients about evidence-based treatments. The widespread availability of OTC antibiotics further complicates management, as self-medication often leads to inappropriate use and antimicrobial resistance.

Impact of socioeconomic factors

Bacterial conjunctivitis remains a prevalent ocular condition in South Africa, disproportionately affecting low-income communities. Poor sanitation, limited access to clean water, and crowded living conditions contribute to its spread, particularly in urban informal settlements.[13] The condition typically presents with conjunctival hyperemia, purulent discharge, and eyelid matting, with bilateral involvement in half of cases. While management typically involves saline irrigation and topical antibiotics, socioeconomic barriers often prevent consistent treatment adherence.

South Africa's water quality issues, including chlorinated municipal water, may exacerbate ocular irritation and susceptibility to infections. This is compounded by the endemic presence of trachoma in some regions. Recent conjunctivitis outbreaks, primarily viral in origin, have strained already limited healthcare resources. Similar challenges exist in neighboring countries like Ghana, where eye care services are concentrated in urban centers, forcing rural patients to travel long distances for treatment.[13] These systemic barriers highlight the need for improved primary eye care services and community-based management strategies to address bacterial conjunctivitis effectively across all socioeconomic groups.

Public health implications

Conjunctivitis represents the most common ocular condition presenting to both primary and tertiary healthcare facilities in South Africa, placing a strain on the public health system.[13] The condition's management is frequently complicated by unnecessary antibiotic prescriptions, particularly for viral and allergic cases that would resolve spontaneously. This inappropriate use of topical antibiotics contributes to rising antimicrobial resistance while creating financial burdens for patients paying out-of-pocket for medications that often provide no therapeutic advantage over simple ocular lubrication.[13]

The conjunctiva's exposed anatomical position makes it particularly vulnerable to infection, leading to liberal use of broad-spectrum topical antibiotics in clinical practice. However, this approach represents a costly and often ineffective strategy for managing what is typically a self-limiting condition. Current prescribing patterns highlight the urgent need for antibiotic stewardship programmes and standardised treatment protocols to guide appropriate medication use.[13] Such measures could reduce unnecessary antibiotic exposure while maintaining therapeutic efficacy for true bacterial cases.

Emerging research into alternative treatment approaches, including nanotechnology-based delivery systems, may offer future solutions to the challenges of drug resistance.[13] However, immediate public health gains can be achieved through improved diagnostic accuracy, better prescriber education, and patient awareness campaigns emphasising the typically benign nature of most conjunctivitis cases. These measures would help conserve antibiotics for situations where they are truly indicated while reducing the economic and resistance-related burdens associated with current overprescribing practices.

Case studies from South Africa

Bacterial conjunctivitis in South Africa presents similarly to global patterns, with characteristic mucopurulent discharge, eyelid matting, and conjunctival injection.[13] While the condition is typically self-limiting, clinical practice often involves unnecessary antibiotic prescriptions, mirroring trends seen throughout Africa. Recent studies demonstrate concerning resistance patterns among common pathogens, particularly to frequently prescribed agents like erythromycin and fluoroquinolones. South African data reveals similar challenges to those documented in Nigeria and Ghana, where bacterial isolates show increasing resistance to first-line topical antibiotics.[13] This resistance profile complicates management in resource-limited settings where diagnostic capabilities are often unavailable to guide targeted therapy.

Comparative analysis with other regions

A Ghanaian study of 878 conjunctivitis cases revealed problematic prescribing patterns, with erythromycin (51%) and ciprofloxacin (26%) being most frequently prescribed despite known resistance concerns.[13] These findings align with South African experiences where broad-spectrum antibiotics are often used inappropriately for mild cases. Comparative analysis shows that low- and middle-income countries face particular challenges with antibiotic stewardship, as evidenced by resistance rates exceeding 25% for commonly used agents. The persistent use of higher-generation antibiotics not recommended for routine conjunctivitis management remains a regional concern, highlighting the need for standardised treatment guidelines across Southern Africa.[13]

Innovations in treatment

Various innovations in the medical sciences have been brought in recently to counter conjunctivitis. Gatifloxacin ophthalmic solution is a novel fourth-generation fluoroquinolone antibacterial drops for the topical treatment of bacterial conjunctivitis. By virtue of its broad-spectrum antibacterial activity against Gram-positive, Gram-negative, and atypical bacteria along with its high tolerability and safety profile, it has made its place as a preferred agent among the latest ocular antibiotics.[25] Various multi-centre clinical trials carried out internationally have demonstrated the efficacy and safety of gatifloxacin ophthalmic solution in the treatment of bacterial conjunctivitis. In addition, the treatment has been shown to possess an excellent pharmacokinetic profile along with a viable commercial available formulation.

Conjunctivitis, the inflammation of the conjunctiva, can be caused by a wide range of conditions, including infections. Infective conjunctivitis is a common ocular condition frequently managed at specialist or general eye clinics. *Streptococcus pneumoniae, Staphylococcus aureus, Moraxella species, Chlamydia trachomatis*, and *Neisseria gonorrhoeae*, are among the common organisms accounting for infectious conjunctivitis. Clinically, conjunctivitis, whether infectious or allergic, presents with redness, watering, and discharge.[13]

Limitations of current therapy

Current management of bacterial conjunctivitis in South Africa experiences challenges, particularly regarding antibiotic overprescription and emerging resistance.[13] While topical antibiotics remain the mainstay treatment, their inappropriate use for viral or self-limiting cases contributes to antimicrobial resistance. Children are particularly affected, with approximately 60% of paediatric conjunctivitis cases being bacterial in origin. The condition's high transmissibility in resource-limited settings, compounded by poor sanitation, creates substantial socioeconomic burdens. Current therapeutic approaches are further limited by the pyogenic nature of bacterial conjunctivitis and the rapid development of crusting discharge, which can complicate treatment adherence.[12]

Recommendations for practice

Effective management of bacterial conjunctivitis in South Africa requires strict adherence to evidence-based guidelines and antibiotic stewardship principles.[13] Despite existing guidelines, many practitioners remain unaware of or noncompliant with recommended protocols. To address this, concise, regularly updated treatment summaries should be made available to healthcare providers, particularly focusing on the following (see Figure 2):

- Accurate differentiation between bacterial, viral, and allergic conjunctivitis
- Appropriate first-line antibiotic selection
- Duration and frequency of topical therapy
- Recognition of resistant cases requiring alternative approaches

Pharmacists have a role in promoting rational antibiotic use and should receive ongoing education about current best practices. Treatment decisions must balance efficacy with affordability and accessibility within South Africa's healthcare system.

Enhancing healthcare team outcomes

With their distinct abilities and knowledge, doctors, nurses, and pharmacists all play important roles in the team-based approach to conjunctivitis treatment and management. In order to distinguish between the many causes of conjunctivitis, clinicians must recognise and diagnose its varied clinical manifestations. On the basis of their evaluations, they should seek consultations with ophthalmology. Nurses, on the other hand, are excellent at caring for and educating patients by using their knowledge. Pharmacists are essential in choosing the right drugs, verifying drug safety and interactions, and putting evidence-based treatment plans into practice.

All medical personnel are required to uphold the highest ethical standards, putting the autonomy and well-being of their patients first during the course of treatment. Sharing important information, talking about treatment plans, and delivering comprehensive patient-centred care all depend on effective interprofessional communication. By enabling smooth transitions between various stages of care and encouraging a unified approach to management, team member care coordination improves patient outcomes. When treating and controlling conjunctivitis, healthcare professionals can improve patient safety, team performance, and patient-centred care by combining their abilities, tactics, ethics, duties, interprofessional communication, and care coordination.

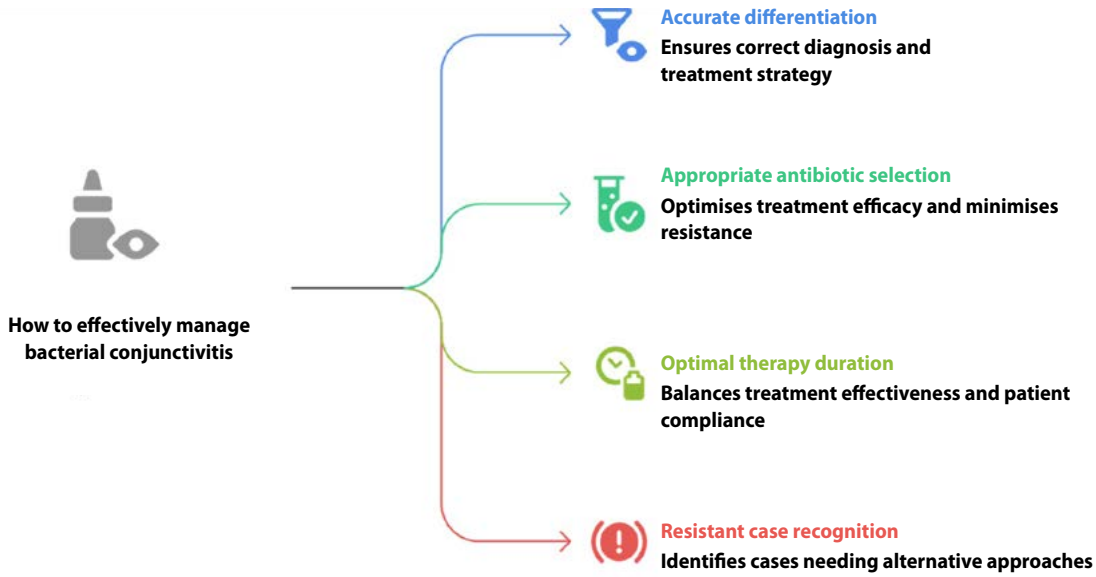

Figure 2: Management of bacterial conjunctivitis in South Africa

Conclusion

Bacterial conjunctivitis remains a public health challenge in South Africa, with substantial implications for individual patient care and broader antimicrobial stewardship efforts. The current epidemiological landscape reveals persistent gaps between clinical practice and evidence-based guidelines, particularly regarding antibiotic prescribing patterns. While Staphylococcus and Streptococcus species continue to dominate as causative pathogens, emerging resistance patterns—especially to fluoroquinolones—demand urgent attention in therapeutic protocols.

The socioeconomic impact of bacterial conjunctivitis in South Africa cannot be overstated. The condition's highly contagious nature leads to considerable productivity losses, particularly in vulnerable populations where crowded living conditions and limited access to clean water facilitate transmission. Children, who account for approximately 60% of cases, face disproportionate burdens including potential vision complications and school absenteeism.[13] These challenges are compounded by systemic issues in healthcare delivery, including inconsistent adherence to treatment guidelines and variable access to ocular medications across public and private sectors.

Future research should focus on developing context-appropriate treatment algorithms that account for South Africa's unique resistance patterns and healthcare infrastructure. Investment in novel therapeutic approaches, including potential vaccine development for high-risk populations, may offer long-term solutions. Ultimately, successful management of bacterial conjunctivitis will require collaboration across all levels of the healthcare system, from policy makers to frontline providers, to balance immediate clinical needs with the imperative of preserving antibiotic efficacy for future generations.

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