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Assessment of Awareness & Contact Lens Related Complications among Contact Lens Users

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Abstract: ***An estimated 240 million Indian residents enjoy the benefits of contact lens wear, but many of them might be at increased risk for complications stemming from improper wear and care behaviors.[5] One of the most serious complications of contact lens wear is a corneal infection known as microbial keratitis also there are some serious non-compliance behaviour that may lead to complications such as Conjunctivitis, Acanthamoeba keratitis which can sometimes result in reduced vision or blindness. Purpose of this review article is to note most common complications related contact lens usage and what are the best strategies to avoid such difficulties among contact lenses wearers and what are the modern strategies for handling such complicated conditions. We reviewed the most common contact lens-related complications and risk factors among contact lens wearers and their management according to the studies that published in the last 10 years.[7,8]***

Keywords: Contact lens, Contact lens complication, Dry eye, Keratitis, Hypoxia, Conjunctivitis, Acanthamoeba keratitis

1. Introduction

Millions use contact lenses globally for correction of vision, cosmetics or therapeutics.

The market is projected to hit $19.83 billion globally in 2025 and is expected to witness a gradual increase during the next few years.[1]

The growth of contact lenses market is fuelled by rising prevalence of refractive errors, technological development in lenses and growing acceptance of decorative lenses. Furthermore, daily disposable lenses are increasing in popularity thanks to convenience and hygiene benefits.[2,3]

Lens Type Preferences

- **Soft Disposable Lenses:** Represent about 93% of all contact lens use in the United States, with daily disposables accounting for a rapidly growing segment, now nearly half of new soft lens fittings.[4]
- **Rigid Gas Permeable (RGP) Lenses:** Comprise roughly 7% of users. Within RGPs, specialized designs like scleral lenses (for keratoconus or severe dry eye) and orthokeratology (overnight corneal reshaping) are growing in niche popularity but still represent a small fraction of overall fits.[4,5]

The shift toward disposable soft lenses aligns with convenience and safety benefits. RGPs remain an important option for patients with irregular corneas or high astigmatism and are sometimes more durable, but they require specialized fitting and consistent wear time for adaptation.[5]

Daily disposable lenses

One of the most significant shifts in recent years is the surge in daily disposable contact lenses. Formerly considered premium-priced, single-use lenses now make up close to half of new soft lens fits. Practitioners note that daily disposables reduce the risk of contamination associated with cleaning and storing lenses, which translates into fewer lens-related eye infections.

Despite the higher annual expense, many wearers find the convenience and enhanced safety worth the cost. Some also report better end-of-day comfort, as each pair of lenses is used only once.

This study aims to provide a contemporary approach to addressing contact lens and care-related issues. Currently, an increasing number of people worldwide are worried about negative eye-related behaviors in contact lens wearers and allergy sufferers. While many contact lens wearers who experience ocular discomfort report feeling dry, other symptoms of contact lens pain include fatigue and irritation. Additionally, managing coexisting diseases must be done in accordance with contact lens wear, which undoubtedly makes discomfort worse.[2]

Issues with contact lenses are frequent and, if left untreated, can lead to serious, even blinding consequences or contact lens dropout. Based on the literature published in the past ten years, we conducted a systematic evaluation of the most significant and prevalent contact lens-related problems, as well as their diagnosis, epidemiology, and therapy.[21]

Artificial devices termed contact lenses (CL) are placed over the front surface of the eye. In addition to correcting eyesight, the lenses also fix corneal anomalies by changing the anterior surface of the cornea. When CL is worn over the eye, improper management can lead to hypoxia alterations, chemical toxicity, hypersensitivity reactions, mechanical trauma, infection, and desiccation, which can cause conjunctival and corneal problems. Microcysts, abrasions, superficial punctate keratitis, peripheral corneal staining, sterile corneal infiltrates, corneal neovascularization, microbial infection, infection keratitis, warpage, and endothelial modifications are some of the many corneal problems, superior limbic keratoconjunctivitis, papillary conjunctivitis, and allergic conjunctivitis are among the

conjunctival problems. The discoloration and physical harm to the lens are possible further concerns. Advances in ocular cleanliness, manufacturing methods, and CL materials have reduced the number of issues associated with CL. The clinical relevance, problems of concern, and consequences of CL are covered in this activity.[3,4,5]

Some of the common complications are – Keratoconjunctivitis, Acanthamoeba keratitis, Dry eye, Neovascularization of cornea, Infective keratitis, Corneal ulcer etc.

Keratoconjunctivitis

Keratoconjunctivitis causes inflammation of the conjunctiva, which is the thin membrane that lines the inside of the eyelids and covers the white portion of the eye, as well as the cornea, which is the transparent, front portion of the eye. Environmental irritants, autoimmune diseases, allergies, and infections such bacterial, viral, fungal are some of the causes of keratoconjunctivitis.[8,12]

Contact lens users who use CL for a long time without proper compliance and handling can lead to such infections, it is important for CL users to follow proper guidelines for cleansing and usage of CL to avoid such microbial infections.[12]

Keratoconjunctivitis is an inflammation of the cornea and conjunctiva, and it can be related to contact lens wear.[13]

Here are some key points to consider:

Symptoms:

Common symptoms include redness, pain, tearing, discharge, sensitivity to light, and blurry vision. It's important to seek medical attention if you experience any of these symptoms.

Prevention:

To prevent keratoconjunctivitis, it's crucial to maintain proper contact lens hygiene. This includes:

- Rubbing and rinsing lenses with MPDS & Hydrogen peroxide solution.
- Replacing contact lens cases regularly.
- Giving your eyes a break from lenses periodically.
- Using daily disposable lenses if possible.

Treatment:

Treatment may involve avoiding usage of contact lenses using antibiotic or antifungal eye drops, and addressing any underlying issues. In severe cases, a corneal transplant may be necessary.

Acanthamoeba keratitis:

Acanthamoeba keratitis is a serious eye infection caused by a microscopic amoeba called Acanthamoeba. It's particularly concerning for contact lens wearers. Here are some key points:

The primary risk factor is improper handling and hygiene of contact lenses. This includes using contaminated water or solutions, not cleaning lenses properly, and wearing lenses while swimming or in hot tubs.[5]

Environmental Exposure: Acanthamoeba is commonly found in water sources like tap water, swimming pools, and soil.

Symptoms

- Eye Pain: Severe pain that feels disproportionate to the visible signs.
- Redness: Persistent redness that doesn't clear up with drops.
- Blurry Vision: Vision may become blurry or distorted.
- Light Sensitivity: Increased sensitivity to light.
- Tearing: Excessive tearing or the feeling of something in the eye.

Prevention

- Proper Hygiene: Always wash and dry your hands before wearing contact lenses.
- Use Fresh Solution: Never use water to clean lenses or store them use MPDS or hydrogen peroxide solution.
- Avoid Swimming with Lenses: Remove lenses before swimming or using hot tubs.
- Follow Lens Care Instructions: Adhere to the care and wearing instructions provided by your eye doctor.

Treatment

- Antimicrobial Eye Drops: Treatment often involves the use of antimicrobial eye drops.
- Discontinuing Lens Use: It's crucial to stop wearing contact lenses until the infection is fully resolved.
- Medical Attention: Seek immediate medical attention if you suspect an infection to prevent potential vision loss.[13,14]

Dry Eye:

Dry eye can indeed be a common issue for contact lens wearers. Here are some key points to understand the connection and how to manage it.[10]

It causes due to breaking of Tear Film pattern, contact lenses sit on the surface of the eye and can disrupt the natural tear film, leading to dryness. Lenses can increase tear evaporation that also lead dry eyes. The movement of lenses can create friction, further contributing to dryness.[13]

Symptoms:

- Grittiness: A feeling of sand or grit in the eyes.
- Burning Sensation: Discomfort or burning in the eyes.
- Redness: Persistent redness that doesn't clear up.
- Blurry Vision: Vision may become blurry due to dryness.
- Light Sensitivity: Increased sensitivity to light.

Prevention and Management:

- Proper Hygiene: Ensure you follow proper lens care instructions.
- Use Lubricating Drops: Use eye drops specifically designed for contact lens wearers to keep your eyes moist.
- Switch to Daily Disposables: Consider using daily disposable lenses to reduce the risk of dryness.
- Take Breaks: Give your eyes a break from lenses periodically.[12,13]

Neovascularization on cornea:

Corneal neovascularization is the growth of new blood vessels into the cornea, which normally does not have blood vessels. This condition can be caused by contact lens wear

due to factors like reduced oxygen supply to the cornea, inflammation, infection, or trauma.

Main causes are reduced oxygen supply, Contact lenses can reduce the amount of oxygen reaching the cornea, leading to hypoxia (low oxygen levels).[20,21,22]

Symptoms:
- Hazy Vision: The new blood vessels can obstruct light entering the eye, causing blurry or hazy vision.
- Eye Discomfort: You might feel discomfort or a foreign body sensation in your eye.
- Redness: Persistent redness that doesn't clear up with usual treatments.

Prevention and Management
- Proper Lens Care: Follow proper lens care instructions to avoid infections and reduce inflammation.
- Oxygen-Rich Lenses: Use contact lenses with higher oxygen permeability.
- Regular Breaks: Give your eyes regular breaks from contact lenses.
- Consult an Eye Care Professional: Regular check-ups with an eye care professional can help detect and manage the condition early.
- A study in Japan shows that cause of serious contact lens–associated ocular complications was microbial keratitis, and P. aeruginosa and Acanthamoeba were the major pathogens.[3]

Infective keratitis:
Infective keratitis is one of the complications among contact lens wearers. This condition can be caused by bacteria, viruses, fungi, or parasites that enter the eye through a scratch, injury, or contact lenses as per the study in Singapore Infective keratitis secondary to soft lens wear was the most common complication followed by the epithelial keratitis and allergic conjunctivitis.[4]

Estimates show that for every 10,000 persons who wear contact lenses each year, there are 2 to 5 occurrences of infective keratitis.[1]



Figure 1: Infective Keratitis.

Symptoms
- Eye redness
- Eye pain
- Watering eye or discharge
- Blurred vision
- Glare & photophobia
- Foreign body sensation

General Measures
- Avoid Contact Lenses: Discontinue the use of contact lenses.
- Maintain Eye Hygiene: Keep the eye clean and avoid touching it with dirty hands.
- Follow Medical Advice: Adhere to the prescribed treatment regimen and attend follow-up appointments.
- If you suspect you have infectious keratitis, it's crucial to seek prompt medical attention to prevent complications.

Corneal Ulcer: Corneal ulcers can be a serious complication for contact lens wearers. They are essentially open sores on the cornea, often caused by infections that break through. Corneal ulcers are often due to bacterial infections, particularly from bacteria like Pseudomonas aeruginosa. Poor hygiene, wearing lenses for extended periods, or sleeping in them can increase the risk.[15]

Symptoms: Symptoms include redness, pain, tearing, blurred vision, and sensitivity to light.

Prevention: To prevent corneal ulcers, it's crucial to follow proper lens care guidelines, avoid sleeping in lenses, and maintain good hygiene corneal surface.



Figure 2: Corneal Ulcer.

2. Methodology:

This is questionnaire based cross sectional, prospective clinical based study.

All patients who visited Era Hospital Lucknow were given consent form that they signed and verbal explanation was done of the protocol before giving questionnaire form.

3. Result

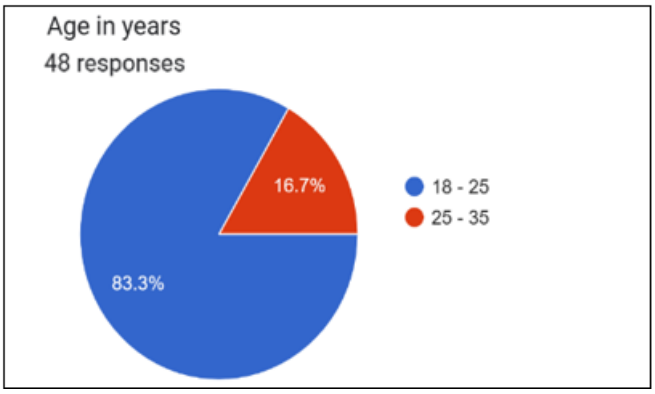


Diagram 1: Showing participants age where 18 to 25 Y/O is in highest range.

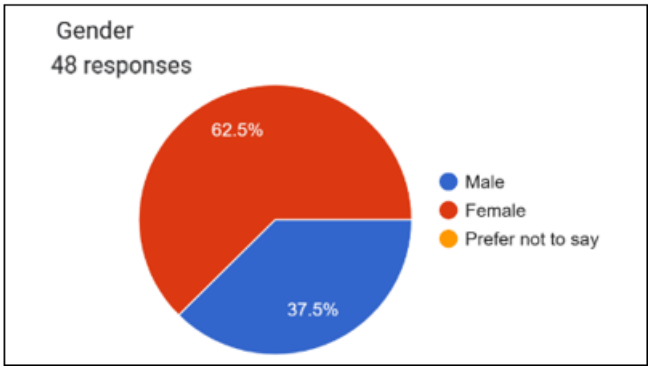


Diagram 2: Showing gender percentage.

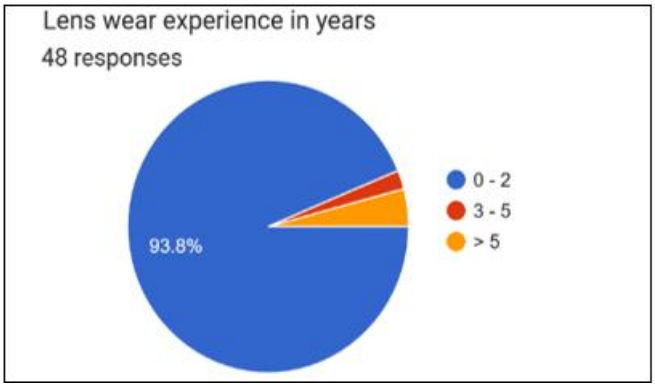


Diagram 3: Showing CLs wear experience in years

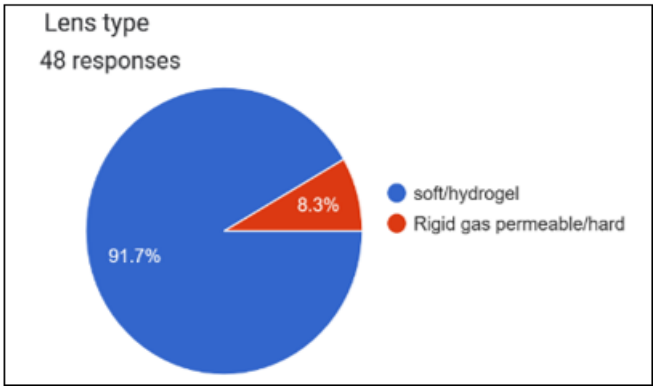


Diagram 4: Showing type of lens

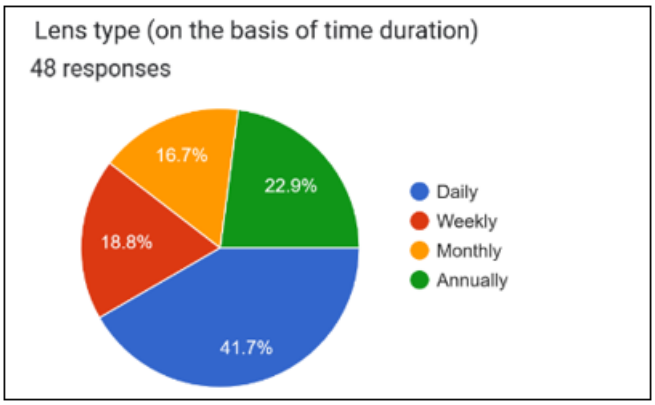


Diagram 5: Showing lens type on basis of time duration.

Result 2: Related awareness and complications

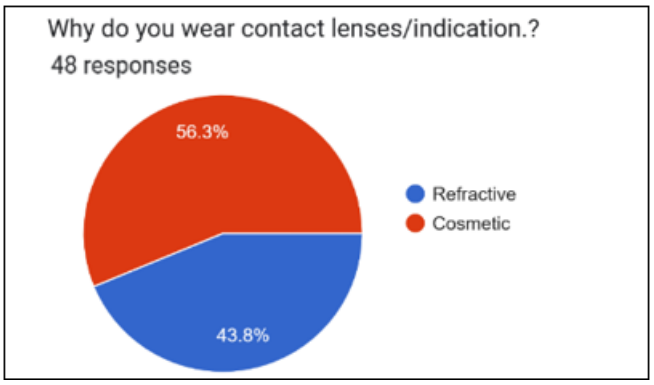


Diagram 6: Showing percentage of CLs indications and preference to use.

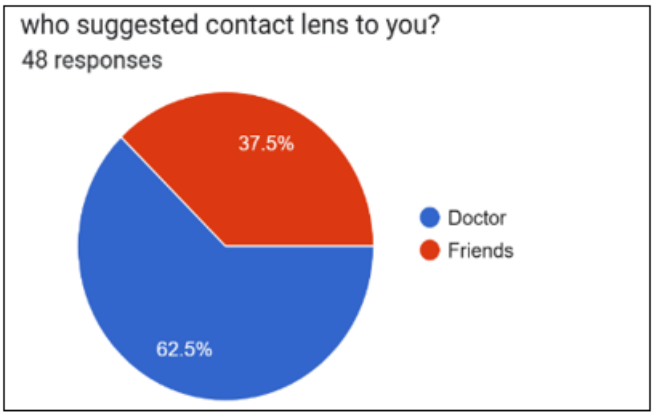


Diagram 7: Showing percentage of suggested CLs via professionalist or non-professionalist.

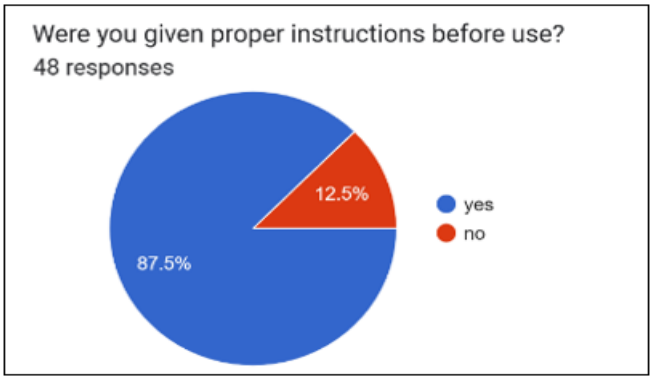


Diagram 8: Showing percentage of given proper instrutions to wearers or not via eye health practitioners.

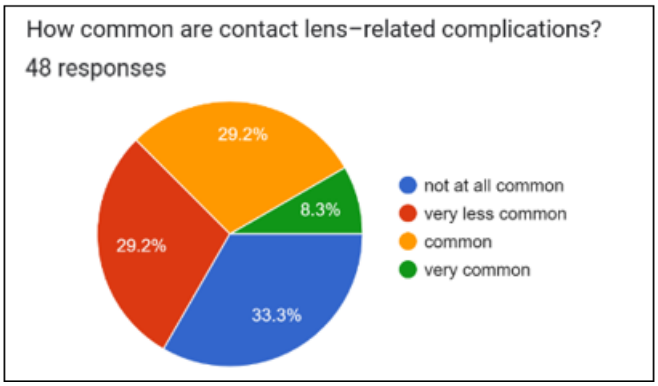


Diagram 9: Showing how common are contact lens related complications

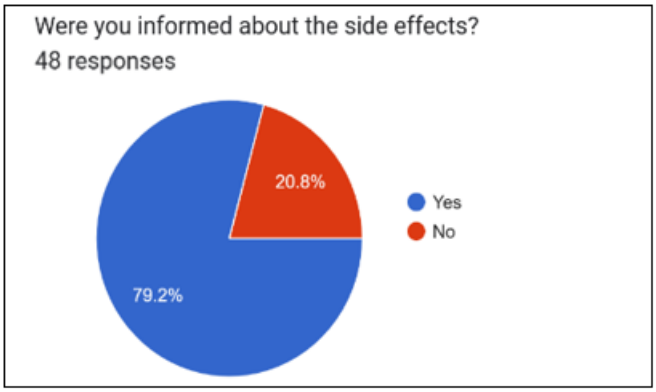


Diagram 10: Showing percentage of common side effects

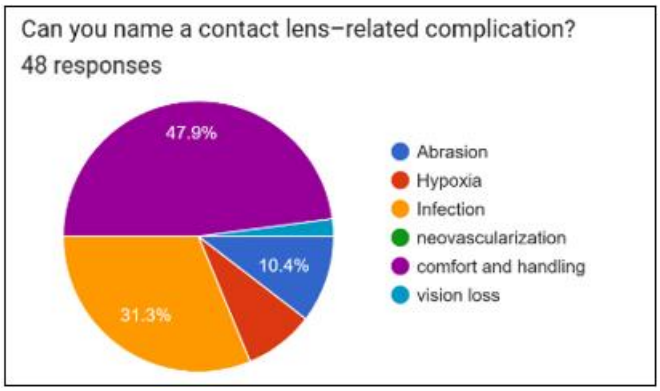


Diagram 11: Showing percentage of CLs wearers awreness related to CLs complications.

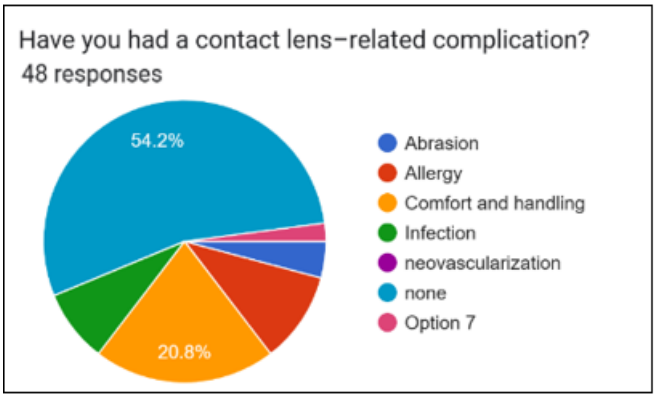


Diagram 12: Showing percentage of CLs related complication that wearers suffered from.

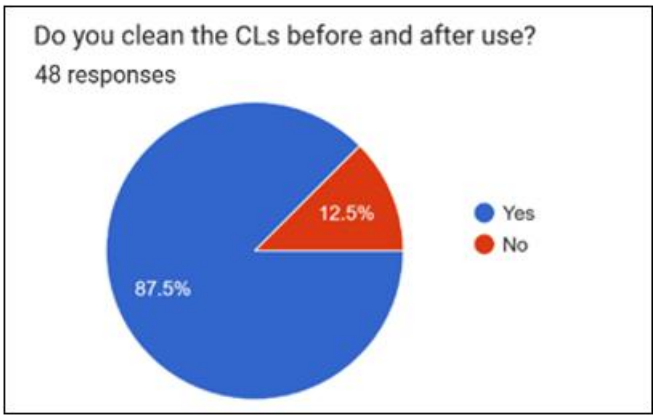


Diagram 13: Showing percentage of cleansing CLs before and after use.

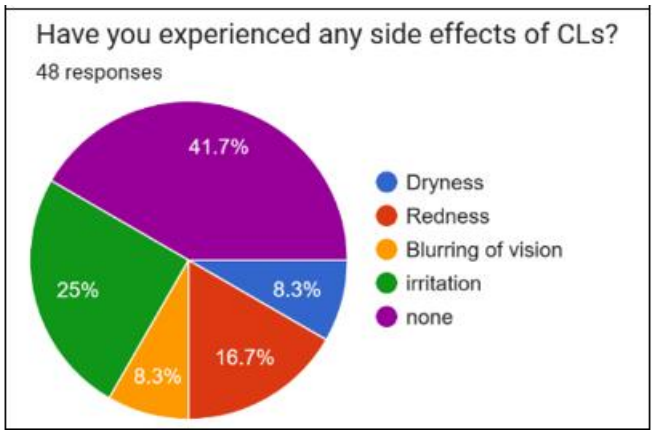


Diagram 14: Showing percentage of experienced side effects such as Dry eye, Redness, Blurring of vision & irritation.

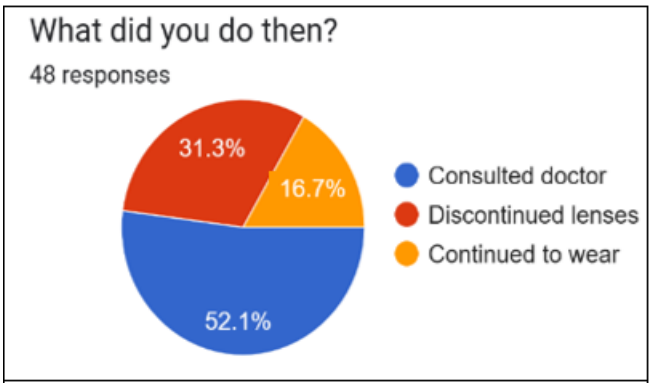


Diagram 15: Showing percentage of what step wearers took after experiencing side effects from CLs usage, about 52.1% consulted to the Doctor, 31.3% discontinued usage of CLs and 16.7% continued to wear.

4. Conclusion

The conclusion of study is that the CLs users need proper guidelines and handling skills before using it. Although awareness of CLs related complication plays a key role to avoid eye infections such as bacterial, fungal keratitis, acanthamoeba keratitis and other complications such as corneal oedema, hypoxia, dry eye. Awareness of such eye related conditions due to improper usage of CLs can be helpful to save cornea from vision loss conditions.

Safe contact lens usage is an effective kind of vision correction as well as cosmetically recommendation for the millions of people who need them. The risk of eye infection rises as a result of a lack of care, awareness and personal cleanliness that also involves filling storage cases with disinfection solution and washing contact lenses with multi-purpose disinfect solution. Since contact lens technology has evolved, those who prefer not to wear glasses have increasingly chosen this technique of vision correction. To intervene as needed, eye care practitioners must be completely informed of the various potential issues that lens wearers may face. This will encourage our patients to utilize this safe and successful way of eyesight restoration, This study has limitation of small sample size further studies recommendation is large sample size to evaluate awareness and complications related contact lens usage.

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