

RELATIONSHIP BETWEEN CONTACT LENS USE AND RISK OF VISION IMPAIRMENT IN OPTICS MALANG GLASSES

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ABSTRACT

and young adults due to their comfort, activity efficiency, and aesthetics. However, improper use, prolonged wear (more than 12 hours or taken to bed), and poor care and hygiene practices carry a high risk of triggering various eye health problems. These complications can range from mild irritation, eye fatigue, dry eye syndrome due to tear film instability, to serious infections such as keratitis and decreased visual acuity. The purpose of this study was to analyze the relationship between contact lens use and the risk of visual impairment. This type of research is quantitative with an observational analytical design using a cross-sectional approach. The population in this study were all contact lens users at Optik Kacamata Malang. Sampling was carried out using a simple random sampling technique of 74 people. Data collection used a questionnaire. Data analysis used the Kendal tau test. The results showed that contact lens use among respondents was mostly in the good category, with 38 respondents (51.4%). The risk of visual impairment among respondents showed that the low risk and high risk categories each numbered 30 respondents (40.5%). The results of the correlation test showed a significant positive relationship between contact lens use and the risk of visual impairment ($P = 0.001$), the better the use of contact lenses, the lower the risk of visual impairment, while the use of poor contact lenses could increase the risk of visual impairment. Based on the results of the study, it can be concluded that there is a relationship between contact lens use and the risk of visual impairment, the better the use of contact lenses, the lower the risk of visual impairment.

Keywords: Contact Lens Use, Risk Of Visual Impairment.

INTRODUCTION

Contact lenses have become a rapidly growing visual aid in the digital age, with their use increasing, particularly among adolescents and young adults. This is evidenced by the current 125 million global users. Contact lenses are visual aids placed on the cornea, easy to use, comfortable for activities and sports, and aesthetically pleasing (Ariyani et al., 2025).

Improper contact lens use can pose various eye health risks, ranging from mild irritation to serious infections. Many contact lens wearers who experience eye discomfort report dryness as a symptom, and many other contact lens-related pain symptoms also include irritation and fatigue (Waghmare & Jeria, 2022). Another study showed complications from contact lens wear affecting vision, including decreased visual acuity, red eyes, and blurred vision (Budiana et al., 2026).

Contact lenses reduce the reflex production of the tear film due to decreased sensitivity of the ocular surface. The tear film becomes unstable due to friction between the contact lens and the ocular surface, increasing the occurrence of dry eye syndrome (Earlyanti, 2024). A study by (Rahmawati et al., 2022) showed that 70% of users experienced a sensation of dry eyes, and 80% felt their eyes felt swollen or uncomfortable. This is related to the selection of soft contact lenses based on 80% water content.

Contact lenses worn for long periods of time and duration cause a continuous cycle of dry eye disease preservation until clinical manifestations appear (Izza, 2024). Duration of contact lens wear for more than 12 hours is associated with an approximately 4-fold increase in the risk of contact lens-related keratitis (CLNK), and overnight contact lens wear

increases the risk of CLNK by 2.6-fold (Sakr et al., 2024).

In addition to paying attention to the duration of use, contact lens wearers must maintain cleanliness. However, many contact lens wearers pay little attention to proper contact lens wear procedures (Riyanto & Umami, 2021). Unhygienic contact lens wear can lead to serious complications. Poor adherence to contact lens hygiene rules results in a high prevalence of contact lens-related keratitis (Sakr et al., 2024). A previous study showed that 68.7% of contact lens wearers had experienced negative effects from contact lens use, 46.6% of whom experienced eye irritation, and 80% of complications from contact lens wear were related to poor contact lens care (Fakhrudin, 2024).

Many contact lens wearers still neglect risk factors such as duration of wear, hygiene, and risky behaviors. Therefore, research is crucial to determine the relationship between contact lens use and the risk of vision impairment.

The general objective of this study was to determine the relationship between contact lens use and the risk of visual impairment at Optik Kacamata Malang. The specific objectives of the study were to analyze contact lens use, the risk of visual impairment, and the relationship between contact lens use and the risk of visual impairment.

This research is expected to contribute to the development of science in the field of eye health and optometry and serve as a reference for further research. This research is expected to be a learning resource for students, additional teaching materials and references for educational institutions, and assist health professionals such as optical refractionists and optometrists in providing education on the safe use of contact lenses. In addition, the research results can be used as evaluation material for opticians in improving services and providing information regarding the use, care, and risks of contact lenses, increasing public knowledge about the proper use of contact lenses, and serve as a reference for future researchers to develop research with broader variables and methods.

The eye is a sensory organ that functions to receive light stimuli and convert them into nerve impulses that are then transmitted to the brain, resulting in visual perception. Anatomically, the eye is composed of several important parts, namely the cornea, iris, pupil, lens, aqueous humor, vitreous humor, retina, and optic nerve. The cornea functions as the primary refracting medium for light entering the eye, while the iris regulates the amount of light entering through the pupil. The lens of the eye plays a role in focusing light so that the image falls precisely on the retina. The retina contains photoreceptor cells in the form of rods and cones that function to convert light energy into electrical impulses. These impulses are then transmitted through the optic nerve to the visual cortex in the brain, allowing a person to see objects clearly (Guyton AC, Hall JE., 2021).

Contact lenses are visual aids placed on the cornea of the eye. They are easy to use, comfortable for everyday activities, provide a wider field of vision, and are aesthetically pleasing. Initially invented with the advancement of technology, contact lenses were used as a replacement for glasses for people with refractive disorders. However, today, they are not only used to correct refractive disorders but are also widely used as a cosmetic tool to enhance the eyes with a variety of attractive colors to enhance appearance (Rahmadilla, 2020).

Risk indicators for contact lens use include:

1) Duration of Contact Lens Use

Overnight contact lens wear has been practiced for several years. Both the prevalence and severity, particularly of microbial keratitis, increase with extensive wear, extending beyond one or more sleep cycles. The FDA limits extended wear of hydrogel lenses to a maximum of six nights, while some silicone hydrogel and high-Dk contact lenses are approved for use for up to one consecutive month. However, several studies have found that

even extended wear of highly oxygen-permeable contact lenses increases the risk of corneal infection (Simanjuntak, 2020) .

2) Contact Lens Usage Behavior

The risk of eye infections increases due to poor personal care and hygiene, such as not filling the storage case with disinfectant solution and washing contact lenses with clean water. Preventive efforts by raising awareness about the importance of proper contact lens hygiene, which can encourage contact lens wearers to adopt healthy habits, such as keeping water away from contact lenses, disposing of used disinfectant solution from the case, and cleaning with fresh solution daily, as well as replacing the contact lens case every three months, can reduce the chance of developing eye infections (Waghmare & Jeria, 2022) .

Digital Eye Strain (DES), also known as Computer Vision Syndrome (CVS), is a group of symptoms that arise from prolonged use of digital devices such as computers, smartphones, and tablets. According to the American Optometric Association, DES is a condition characterized by visual disturbances and eye discomfort resulting from prolonged, continuous use of digital screens. This condition occurs because the eyes have to work harder to focus on the screen compared to reading printed text (American Optometric Association, 2026).

Risks of eye health problems include:

1) Irritation

The risk of eye health problems in the form of mild irritation in contact lens users is generally characterized by complaints such as dry eyes during wear, redness, itching, burning, and a sensation of a foreign object in the eye. According to a recent journal, eye irritation is a condition characterized by redness, discomfort such as itching and burning, and mild pain due to disturbances on the surface of the eye (Fakhrudin, 2024). Contact lens users often experience a sensation like a foreign object in the eye, which is an indication of a disturbance on the surface of the cornea or lens incompatibility (Ahmad et al., 2021).

Eye irritation in contact lens wearers can also be characterized by symptoms such as blurred vision, unstable vision, and excessive glare. Recent research shows that improper contact lens wear can cause corneal hypoxia and temporary refractive errors, resulting in blurred and inconsistent vision, especially after prolonged wear. Furthermore, lens deposits or decreased lens quality can also interfere with light transmission to the retina, contributing to excessive glare and decreased vision quality (Fitriani et al., 2023).

2) Infection

The risk of eye health problems in the form of infections in contact lens wearers is characterized by symptoms such as excessive watery eyes, discharge , and eye pain. This condition generally occurs due to microbial contamination on contact lenses, cleaning fluids, or unhygienic usage habits. According to recent research, improper contact lens use can increase the risk of infections such as keratitis, an inflammation of the cornea caused by bacteria, fungi, or parasites. This infection triggers an inflammatory response that causes excessive tear production, discharge, and pain that can range from mild to severe (Athavina et al., 2025).

3) Activity disturbance

The risk of eye health problems in contact lens users can also impact daily activities, such as discomfort that causes contact lenses to interfere with activities, including using gadgets, and the need to remove lenses during activities. This condition is generally associated with the emergence of visual discomfort due to dry eyes and digital eyestrain. Prolonged contact lens wear, especially when looking at digital screens, can exacerbate tear evaporation, causing eye fatigue, discomfort, and impaired visual focus while working or studying. Contact lens users often experience decreased comfort during intensive activities

such as computer or smartphone use, forcing them to remove their lenses to alleviate these symptoms. This disruption not only reduces productivity but also affects quality of life because daily activities are limited (Fitriani et al., 2023).

METODE PENELITIAN

The type of research is quantitative using a cross-sectional approach, which involves collecting data on independent and dependent variables simultaneously. The cross-sectional approach is considered effective for epidemiological research because it can quickly and efficiently describe the relationships between variables in a population, especially in situations with limited time and resources (Sugiyono, 2020).

This research was conducted at Optik Kacamata Malang in May 2026. The variables in this study include independent and dependent variables. The independent variable is contact lens use. The dependent variable is the risk of visual impairment.

The population is the entire object/subject of the research determined by the researcher (Machali, 2021). In this study, the population was all 200 contact lens users at Optik Kacamata Malang. A sample is a portion of the entire research object and is considered representative of the entire population (Machali, 2021). The research sample was drawn using a probability sampling technique, namely simple random sampling, to provide an equal opportunity for each member of the population to be selected as a respondent. The sample obtained in this study was 74 respondents.

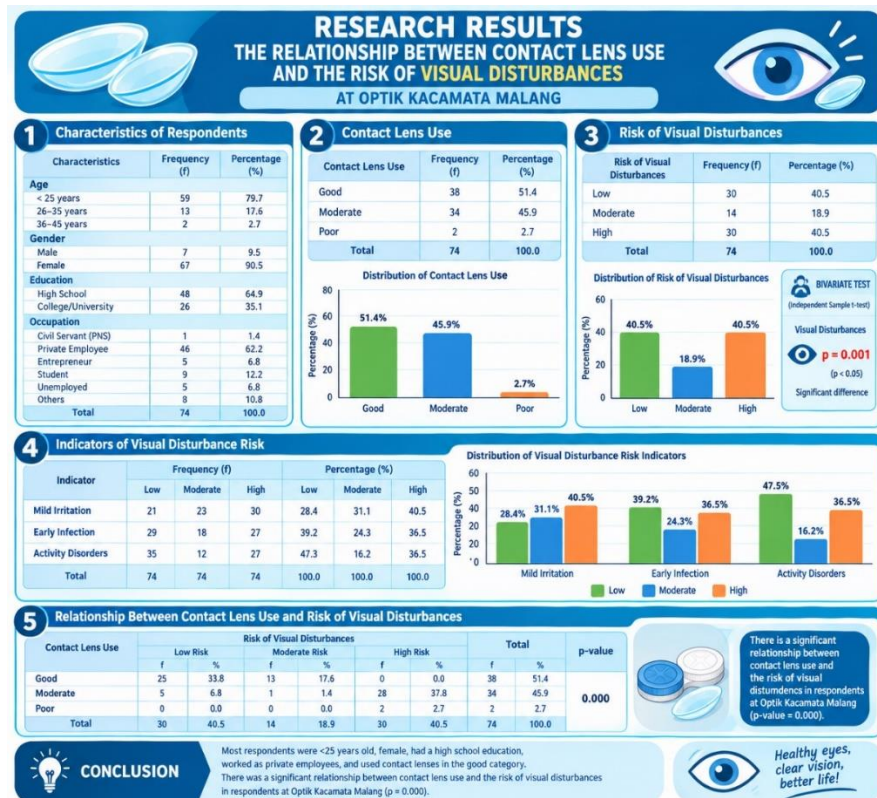
The operational definition in this study consists of two variables, namely contact lens use and the risk of visual impairment. Contact lens use is defined as the way and behavior of respondents in using contact lenses daily, which is measured using a Likert scale questionnaire with an ordinal data scale and categorized based on a total score, namely 1 = good, 2 = sufficient, and 3 = poor. Meanwhile, the risk of visual impairment is defined as the possibility of developing eye disorder symptoms due to contact lens use, which is measured using a Likert scale questionnaire with an ordinal data scale and categorized based on a total score, namely 1 = low, 2 = moderate, and 3 = high.

The instrument used was a questionnaire. Data analysis was performed by processing the research results to obtain a distribution of each variable through frequencies and percentages. Furthermore, the relationship between contact lens use and the risk of visual impairment was analyzed using the Kendall's tau test because both variables are ordinal. Test results are determined based on the p-value with a significance level of 0.05. A p-value <0.05 indicates a significant relationship between contact lens use and the risk of visual impairment.

RESEARCH METHODS

The majority of respondents were aged <25 years (59 people) (79.7%), were female (67 people) (90.5%), had a high school education (48 people) (64.9%), and worked as private employees (46 people) (62.2%). Overall, the characteristics of the respondents were dominated by young adults, women, secondary education, and worked as private employees.

The results of the study showed that the majority of respondents had contact lens use in the good category, namely 38 respondents (51.4%), followed by the sufficient category of 34 respondents (45.9%), and the less than adequate category of 2 respondents (2.7%). These results indicate that the majority of respondents have had relatively good contact lens use behavior, although there are still almost half of respondents who have not implemented optimal contact lens use.



Proper contact lens use reflects user compliance with hand hygiene before inserting lenses, cleaning and storing lenses using appropriate solutions, replacing lenses on schedule, and avoiding wearing contact lenses beyond the recommended time (Corina, 2022) . Implementing these behaviors is crucial to prevent irritation, infection, and other complications in the eyes.

The results of this study align with those of Budiana et al. (2026) , who stated that contact lens use and care significantly impact eye health. This study showed that improper contact lens use can lead to various complications, such as red eyes, blurred vision, and decreased visual acuity. Therefore, education regarding proper contact lens use needs to be continuously improved to minimize complications resulting from contact lens use.

The results showed that respondents with a low and high risk of visual impairment were equally divided, with 30 respondents (40.5%) each, while 14 respondents (18.9%) were in the moderate category . This finding suggests that while some respondents had a low risk, a similarly large proportion were at high risk of visual impairment.

The risk of vision impairment in contact lens wearers can be influenced by various factors, including poor contact lens hygiene, excessive wear, wearing lenses while sleeping, and a lack of regular eye examinations (MW Budiana, 2026) . These factors can increase the risk of irritation, dry eyes, corneal infections, and even decreased visual acuity if not properly managed.

These findings are supported by research by Sakr et al. (2024) , which reported that inappropriate contact lens wear behaviors, such as wearing them for more than 12 hours per day, sleeping with them in, and cleaning them with tap water, were associated with an increased risk of keratitis in contact lens wearers. These results indicate that adherence to contact lens wear and care procedures is an important factor in preventing eye health problems.

The analysis using Kendall's Tau-b test showed a correlation coefficient of 0.703 with a p-value <0.001 , indicating a significant relationship between contact lens use and the risk of visual impairment. This coefficient value indicates a strong , positive correlation, meaning that the poorer the contact lens use, the higher the risk of visual impairment.

Good contact lens use mostly had a low risk of vision impairment, and none were in the high risk category. Conversely, respondents with moderate and poor use were predominantly at high risk of vision impairment. These findings indicate that good contact lens use behavior plays a role in reducing the risk of vision impairment.

In theory, contact lenses are visual aids that work by attaching directly to the surface of the cornea, thus requiring proper use and care (Hayati, 2024). According to eye health theory, improper use of contact lenses, such as failing to maintain hand hygiene before insertion, failing to clean the lenses as recommended, using lenses beyond their expiry date, wearing lenses for too long, or sleeping with contact lenses, can disrupt the physiology of the ocular surface. This condition causes reduced oxygen supply to the cornea (corneal hypoxia), increased evaporation of the tear film, and facilitates the colonization of microorganisms on the lens and corneal surfaces. As a result, users are at risk of experiencing dry eyes, irritation, conjunctivitis, keratitis, corneal abrasion, and decreased visual acuity if not treated promptly.

The theory of health behavior compliance also explains that individuals who have good contact lens use behavior will be better able to minimize the risk factors for eye disorders (Inayatullah et al., 2019). Compliance with instructions for use, lens cleanliness, proper storage, and regular eye examinations are forms of preventive behavior that can maintain ocular surface health (Indonesian Ophthalmologist Association, 2020). Conversely, low compliance with contact lens use procedures increases the chance of complications that can affect visual function.

The results of this study support the theory that better contact lens wear behavior lowers the risk of visual impairment, while poor wear is associated with an increased risk of visual impairment. This suggests that user behavior plays a significant role in maintaining eye health while wearing contact lenses. Therefore, education on proper contact lens wear, adherence to usage instructions, and regular eye examinations are crucial for preventing visual impairment in contact lens wearers.

The results of this study align with Earlyanti's (2024) study, which showed a link between contact lens use and eye disorders such as dry eye syndrome. This study used a cross-sectional design and also involved contact lens users as respondents, although the dependent variables studied were different.

However, the results of this study differ from those of Izza (2024) and Apriliona et al. (2022), which reported no significant association between the length or duration of contact lens use and the incidence of dry eye syndrome. This discrepancy is likely due to differences in the dependent variables, respondent characteristics, sample size, and measurement instruments used. This study assessed the risk of visual impairment in general, while the two previous studies focused solely on dry eye syndrome.

Furthermore, the results of this study are also supported by research by Sakr et al. (2024) who found that various inappropriate contact lens wear behaviors, such as wearing them for more than 12 hours, wearing them while sleeping, and poor lens hygiene, increase the risk of eye complications such as keratitis. Overall, the results of this study indicate that proper contact lens use is an important factor in maintaining eye health and reducing the risk of vision impairment. Therefore, education regarding proper use, care, and regular eye examinations needs to be continuously improved for all contact lens wearers.

CONCLUSION

Based on the results of the study on the relationship between contact lens use and the risk of visual impairment, it can be concluded that the use of contact lenses in the majority of respondents is in the good category, namely 38 respondents (51.4%), the sufficient category is 34 respondents (45.9%), and the poor category is 2 respondents (2.7%). The risk of visual impairment shows the low and high categories of 30 respondents (40.5%) respectively, while the moderate category is 14 respondents (18.9%). The results of the Kendall's Tau-b test show a value of $\tau = 0.703$ with a p-value < 0.001 , which means there is

a strong and significant relationship between contact lens use and the risk of visual impairment. Based on these results, contact lens users are advised to pay attention to cleanliness, how to use, care, lens lifespan, and to have regular eye examinations. Opticians and health workers are expected to increase education regarding the proper use and care of contact lenses through counseling and information media. For future researchers, it is recommended to use a wider sample size and coverage area and consider other factors, such as the duration and type of contact lens use, history of eye disease, treatment compliance, and use of digital devices, with a longitudinal or cohort research design to obtain more comprehensive results.

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