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Research Article

Comparative Analysis of the Anterior Ocular Health Conditions of Selected Traditional Jeepney Drivers in the City and Province

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Abstract: Background: Traditional jeepneys are designed with open windows and, in some cases, without a driver's side door, leaving drivers exposed to prolonged sunlight and harmful Ultraviolet (UV) rays. This continuous exposure raises concerns about its potential effects on the anterior ocular health conditions.
Objective: This study aimed to compare the anterior ocular health conditions of traditional jeepney drivers in the city and province.
Methods: The study utilized slit-lamp biomicroscopy to assess the anterior ocular health, particularly the eyelids and eyelashes, meibomian gland, puncta, bulbar conjunctiva, palpebral conjunctiva, cornea, and crystalline lens. A comparative research method was employed. The qualified drivers from the city of Manila (route Cubao-Divisoria) were thirty-one (31) traditional jeepney drivers and thirty-four (34) from the province of Batangas (route Lipa City-Mataas na Kahoy).
Results: Majority of the drivers have worked for more than 10 years for both groups, but particularly those in the city are aged 55 with an average of 9 working hours and those in the province are 52 years old working for 6 hours per day. Based on the results from the statistical treatment utilizing Mann-Whitney T-test, the summary of the significance revealed that out of the twelve (12) anterior parts of the eye examined, only four (4) were said to have significant difference. Results show that there is no significant difference between the anterior ocular health conditions of traditional jeepney drivers in the city and province.
Conclusion: While both groups exhibited signs of UV-related ocular damage, the absence of significant differences between city and provincial drivers suggests that prolonged sun exposure poses similar risks regardless of geographic location. This highlights the need for protective measures, such as UV-protective eyewear, and regular eye examinations for all jeepney drivers.

Keywords: Jeepney Drivers, Anterior Ocular Health, Slit-lamp Biomicroscopy, UV Exposure

1. INTRODUCTION

1.1 Background of the Study

Jeepneys, or Public Utility Jeepneys (PUJs), are a common mode of transportation in the Philippines due to their affordability and accessibility. These vehicles are iconic symbols of Filipino culture, originally repurposed from military jeeps after World War II. Today, they serve as the backbone of public transportation in both urban and rural areas, carrying millions of passengers daily across various routes.

Because of the left-hand driving system, jeepney drivers are frequently exposed to sunlight, with their left eye and side of the face receiving the most UV radiation. Traditional jeepneys are designed with open windows and, in some cases, without a driver's side door, leaving drivers exposed to prolonged sunlight and harmful Ultraviolet (UV) rays. Side windows provide minimal UV protection, increasing the risk of ocular damage over time (Boxler Wachler, 2016).

Ultraviolet radiation is classified into three types based on wavelength: UV-A (315-400 nm), UV-B (280-315 nm), and UV-C (100-280 nm). UV-A and UV-B radiation can penetrate ocular tissues, leading to conditions like photokeratitis, pterygium, cataracts, and pinguecula. Long-term solar exposure is considered an occupational hazard, especially for jeepney drivers who spend hours on the road. Research shows that the cornea absorbs 99% of UV radiation,

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posing significant risks to ocular health (Yevseyenkov, 2019).

The cornea absorbs approximately 99% of UV radiation, while the crystalline lens absorbs the remaining UV radiation that passes through the cornea (Boxler Wachler, 2016). This absorption mechanism, while protective of the retina, places the anterior ocular structures at significant risk for UV-induced damage. Conditions associated with chronic UV exposure include photokeratitis, pterygium, cataracts, and pinguecula. These conditions can lead to visual impairment, discomfort, and reduced quality of life, affecting the drivers' ability to perform their duties safely.

The city environment presents unique challenges for jeepney drivers. Urban areas like Metro Manila have higher levels of air pollution, which can exacerbate the effects of UV radiation on the ocular surface. Additionally, the heat island effect in cities can increase temperatures, potentially affecting tear film stability. In contrast, provincial drivers may encounter different environmental conditions, including dust from unpaved roads, agricultural activities, and varying levels of humidity (Ouyang, 2018).

This study gathers information on jeepney drivers' profiles, including age, driving hours, experience, and use of sunglasses. It also discusses an awareness program promoting the use of protective eyewear while driving. The research analyzes the relationship between drivers' profiles, anterior ocular health, and solar radiation exposure.

Moreover, this study compares the anterior ocular health of city and provincial jeepney drivers under prolonged solar exposure. By examining the correlation between UV exposure and ocular conditions, it highlights the need for protective measures. The goal is to emphasize prevention strategies to reduce long-term eye damage among jeepney drivers.

1.2 Statement of the Problem

This study aims to compare the anterior ocular health conditions of selected traditional jeepney drivers in the city (Cubao-Divisoria route) and province (Lipa City-Mataas na Kahoy route). Specifically, it seeks to answer the following questions:

1. What is the profile of the jeepney drivers in terms of:
   a. Driving route
   b. Age
   c. Years of service
   d. Working hours
2. What are the anterior ocular health conditions of the jeepney drivers in terms of:
   a. Eyelids and eyelashes
   b. Meibomian gland
   c. Puncta
   d. Bulbar conjunctiva
   e. Palpebral conjunctiva
   f. Cornea
   g. Crystalline lens
3. Is there a significant difference between the anterior ocular health conditions of traditional jeepney drivers in the city and province?

1.3 Significance of the Study

The findings of this research are significant for several stakeholders:

Jeepney Drivers: The study provides valuable information about the ocular risks associated with their occupation, enabling them to take preventive measures to protect their vision. Understanding these risks empowers drivers to make informed decisions about their eye health.

Optometrists: Eye care professionals gain insights into the specific ocular conditions affecting jeepney drivers, facilitating better diagnosis, management, and preventive care. This knowledge allows optometrists to provide targeted screenings and education for this population.

Ophthalmologists: The study helps ophthalmologists understand the effects of chronic sun exposure on anterior ocular health and collaborate with optometrists for early diagnosis and management of UV-related conditions.

Transport Operators and Government Agencies: The findings support the development of health education programs and policies promoting eye protection for jeepney drivers. Agencies such as the Department of Health and Department of Transportation can use these findings to implement protective measures.

Academic Community: This research contributes to the limited body of literature on occupational ocular health among Filipino jeepney drivers, providing a foundation for future studies.

Public Health Advocates: The study highlights the need for accessible eye care services and protective measures for vulnerable occupational groups.

1.4 Scope and Delimitation

This study focused on 65 traditional jeepney drivers: 31 from the city of Manila (Cubao-Divisoria route) and 34 from the province of Batangas (Lipa City-Mataas na Kahoy route). The research examined the anterior ocular health conditions including eyelids and eyelashes, meibomian gland, puncta, bulbar conjunctiva, palpebral conjunctiva, cornea, and crystalline lens. The study was limited to drivers who consented to participate and met the inclusion criteria.

The study did not include:

1. Drivers from other routes or regions

2. Drivers who refused to participate
3. Female drivers (as the sample consisted entirely of male drivers)
4. Posterior segment ocular health assessment
5. Functional vision testing

1.5 Definition of Terms

Anterior Ocular Health: The condition of the front structures of the eye, including the eyelids, conjunctiva, cornea, and crystalline lens.

Bulbar Conjunctiva: The transparent mucous membrane covering the anterior surface of the sclera (white part of the eye).

Crystalline Lens: The transparent, biconvex structure in the eye that focuses light onto the retina.

Jeepney: A common mode of public transportation in the Philippines, originally modified from military jeeps.

Meibomian Gland: Specialized sebaceous glands in the eyelids that secrete lipids forming the outer layer of the tear film.

Palpebral Conjunctiva: The mucous membrane lining the inner surface of the eyelids.

Pinguecula: A yellowish, raised growth on the conjunctiva caused by UV exposure and environmental irritation.

Pterygium: A wing-shaped growth of conjunctival tissue extending onto the cornea, often associated with chronic UV exposure.

Puncta: Small openings in the eyelids that drain tears into the lacrimal system.

Slit-Lamp Biomicroscopy: A diagnostic instrument used to examine the anterior structures of the eye under high magnification.

Ultraviolet (UV) Radiation: Electromagnetic radiation with wavelengths shorter than visible light, classified as UV-A, UV-B, and UV-C.

2. REVIEW OF RELATED LITERATURE

2.1 Ultraviolet Radiation and Ocular Health

Ultraviolet radiation is a significant environmental factor affecting ocular health. The sun emits UV radiation across the spectrum, with UV-A and UV-B being the most relevant to ocular health. UV-C is largely absorbed by the Earth's atmosphere and does not reach the surface. Prolonged exposure to UV radiation has been associated with various ocular conditions affecting the anterior segment of the eye.

Boxler Wachler (2016) conducted a study assessing levels of ultraviolet A light protection in automobile windshields and side windows. The research found that while windshields provide significant UV-A protection, side windows offer considerably less protection, allowing substantial UV-A transmission. This is particularly relevant for jeepney drivers, who sit close to side windows that provide minimal UV protection. The study concluded that occupants of vehicles with unprotected side windows are at increased risk for UV-related ocular conditions.

The cornea absorbs approximately 99% of UV radiation, making it particularly susceptible to UV-induced damage (Yevseyenkov, 2019). The crystalline lens absorbs the remaining UV radiation that passes through the cornea, protecting the retina but placing the lens at risk for cataract formation. This absorption mechanism, while protective of the posterior segment, makes the anterior ocular structures vulnerable to cumulative UV damage over time.

2.2 UV Exposure and Anterior Ocular Conditions

2.2.1 Pterygium and Pinguecula

Pterygium is a wing-shaped growth of conjunctival tissue that extends onto the cornea, while pinguecula is a yellowish, raised growth on the conjunctiva. Both conditions are strongly associated with chronic UV exposure and environmental irritation. These conditions are more prevalent in individuals who spend significant time outdoors, particularly in sunny, dusty environments.

Yevseyenkov (2019) investigated the predilection of pterygium in the left eye of automobile drivers. The study found that automobile drivers had a higher prevalence of pterygium in the left eye compared to the right eye, consistent with the pattern of UV exposure from the driver's side window. The research emphasized the need for protective measures for drivers, including UV-blocking sunglasses and side window films.

2.2.2 Cataracts

Cataracts are the leading cause of blindness worldwide and are strongly associated with UV exposure. The crystalline lens absorbs UV radiation, which can lead to protein denaturation and the formation of opacities. Nuclear cataracts, in particular, have been linked to cumulative UV exposure over time. The risk of cataract formation increases with age and cumulative UV exposure, making it a significant concern for individuals with occupational sun exposure.

2.2.3 Photokeratitis

Photokeratitis is a painful condition caused by acute UV exposure, similar to a sunburn on the cornea. While typically temporary, repeated episodes may contribute to chronic ocular surface damage. This condition is particularly relevant for drivers who may experience intense UV exposure during peak sunlight hours.

2.2.4 Eyelid and Conjunctival Changes

Chronic UV exposure can lead to various eyelid changes including actinic keratosis, skin cancers, and premature aging of the periocular skin. The conjunctiva may show increased vascularity, inflammation, and the development of growths such as pinguecula and pterygium.

2.3 Occupational Ocular Health Among Drivers

Professional drivers represent a population with significant occupational UV exposure. Studies have demonstrated an increased prevalence of ocular conditions among drivers, particularly pterygium and cataracts. The left eye has been shown to receive more UV exposure due to the position of drivers in left-hand driving countries, leading to a higher prevalence of left eye pathology.

The Philippine context presents unique challenges for jeepney drivers. Traditional jeepneys have open windows and, in some cases, lack a driver's side door, providing minimal protection from UV radiation and environmental pollutants. The combination of prolonged exposure, inadequate protection, and environmental factors puts jeepney drivers at significant risk for ocular conditions (Ouyang, 2018).

2.4 Geographic and Environmental Considerations

The city environment presents unique challenges for jeepney drivers. Urban areas like Metro Manila have higher levels of air pollution, which can exacerbate the effects of UV radiation on the ocular surface. Pollutants can increase oxidative stress and inflammation, potentially accelerating the development of UV-related ocular conditions.

Additionally, the heat island effect in cities can increase temperatures, potentially affecting tear film stability. Higher temperatures can increase tear evaporation, leading to evaporative dry eye and ocular discomfort. The combination of UV exposure, pollution, and heat may create a particularly challenging environment for ocular health (U.S. Department of Health and Human Services, 2022).

In contrast, provincial drivers may encounter different environmental conditions, including dust from unpaved roads, agricultural activities, and varying levels of humidity. While UV exposure may be similar, the presence of dust and particulate matter in rural areas can contribute to ocular surface irritation and the development of conditions such as pinguecula and pterygium.

2.5 Protective Measures

The National Eye Institute recommends protecting eyes from UV radiation through the use of UV-protective eyewear, wide-brimmed hats, and avoiding peak sun hours (U.S. Department of Health and Human Services, 2022). For jeepney drivers, consistent use of UV-protective sunglasses is essential in reducing the risk of long-term eye damage.

3. MATERIALS AND METHODS

3.1 Research Design

The study employed a comparative research method to evaluate and compare the anterior ocular health of traditional jeepney drivers in Metro Manila and Batangas Province. This design was chosen to determine whether there are significant differences in ocular health between drivers operating in urban and rural environments, considering their different exposure conditions.

3.2 Participants

A purposive random sampling technique was used to select participants. The inclusion criteria were:

- Must be a traditional jeepney driver operating on the specified routes
- Must be 18 years or older
- Willing to participate and provide informed consent
- Free from any pre-existing ocular conditions that could confound results

The final sample consisted of 65 participants:

- 31 drivers from the city of Manila (Cubao-Divisoria route)
- 34 drivers from the province of Batangas (Lipa City-Mataas na Kahoy route)

3.3 Instruments and Procedures

Questionnaire: A structured questionnaire was used to gather demographic information including age, years of service, working hours, and use of protective eyewear. The questionnaire was designed to be clear and concise, administered in Filipino or Tagalog to ensure understanding.

Slit-Lamp Biomicroscopy: A slit-lamp biomicroscope was used to examine the anterior ocular structures. The examination was conducted by trained optometrists following standard protocols. The following structures were assessed:

- **Eyelids and Eyelashes:** Assessed for abnormalities including redness, swelling, lesions, and trichiasis (inward-growing eyelashes).
- **Meibomian Gland:** Evaluated for signs of dysfunction including gland dropout, capping, and meibomian gland expression. Graded from 0 (normal) to 4 (severe) based on standard grading scales.
- **Puncta:** Assessed for patency, position, and any signs of blockage or inflammation.
- **Bulbar Conjunctiva:** Evaluated for injection (redness), growths (pinguecula, pterygium), and other abnormalities.

- **Palpebral Conjunctiva:** Assessed for redness, roughness, follicles, and other signs of inflammation.
- **Cornea:** Evaluated for clarity, opacity, edema, and other abnormalities.
- **Crystalline Lens:** Assessed for clarity, presence of cataracts (nuclear, cortical, posterior subcapsular), and other opacities.

3.4 Procedure

Data collection was conducted in two locations:

City Drivers (Cubao-Divisoria): Examinations were held at Centro Escolar University-Manila. Researchers provided transportation to the university for the drivers.

Provincial Drivers (Lipa-Mataas na Kahoy): Examinations were held at a local optical clinic in Lipa, Batangas. Researchers covered transportation expenses for the drivers to facilitate their participation.

The examination protocol was standardized across both locations to ensure consistency. The same slit-lamp biomicroscope and grading criteria were used for all participants.

3.5 Ethical Considerations

The study followed ethical guidelines for research involving human subjects:

1. **Informed Consent:** All participants provided written informed consent after being informed of the nature, purpose, and potential risks of the study.
2. **Confidentiality:** Personal information was kept confidential, and data were anonymized during analysis.
3. **Minimal Risk:** The study posed minimal risk to participants, as all examinations were non-invasive.
4. **Compensation:** Participants received UV-protective eyewear as compensation for their time and participation.
5. **Right to Withdraw:** Participants were informed of their right to withdraw from the study at any time without penalty.

3.6 Statistical Analysis

Data were analyzed using the Mann-Whitney T-test to compare the anterior ocular health conditions between the two groups of drivers. This non-parametric test was chosen because it is appropriate for ordinal data and does not assume normal distribution. The level of significance was set at $p < 0.05$.

The following statistical procedures were employed:

1. **Descriptive Statistics:** Frequency and percentage distributions for demographic data.
2. **Mann-Whitney T-test:** To compare the ocular health conditions between city and provincial drivers.
3. **Interpretation:** Results were interpreted based on the p-value, with $p < 0.05$ indicating statistical significance.

4. RESULTS AND DISCUSSION

4.1 Profile of Jeepney Drivers

4.1.1 Driving Route

Table 1: Distribution of Participants by Driving Route

Driving Route	Frequency	Percentage
Cubao-Divisoria	31	47.69%
Lipa-Mataas na Kahoy	34	52.31%
Total	**65**	**100.00%**

Out of 65 jeepney drivers in the study, 31 (47.69%) operated the Cubao-Divisoria route, while 34 (52.31%) serviced the Lipa-Mataas na Kahoy route. The balanced distribution between city and provincial drivers allowed for meaningful comparison of ocular health conditions between the two groups. This distribution ensures that findings are representative of both urban and rural driving populations.

4.1.2 Age

Table 2: Age Distribution of Jeepney Drivers

Age	Cubao-Divisoria	Lipa-Mataas na Kahoy
47	12.90%	-
52	12.90%	17.65%
55	22.58%	14.71%
Others	51.62%	67.64%

Most Cubao-Divisoria drivers are aged 47 (12.9%), 52 (12.9%), and 55 (22.58%). For Lipa-Mataas na Kahoy, common ages are 52 (17.65%) and 55 (14.71%). The age distribution suggests that most drivers are middle-aged, with the city drivers having a slightly higher concentration at age 55.

The concentration of drivers in the 50+ age range is consistent with the typical demographic of experienced jeepney drivers. This age group has had decades of occupational sun exposure, increasing their risk for age-related and UV-related ocular conditions. The majority of drivers were between the ages of thirty and fifty-five, reflecting the demographic profile of established jeepney drivers with significant work experience.

4.1.3 Years of Service

Table 3: Years of Service

Years of Service	Cubao-Divisoria	Lipa-Mataas na Kahoy
Over 10 years	74.19%	76.47%

Most jeepney drivers have worked over 10 years: 74.19% on the Cubao-Divisoria route and 76.47% on Lipa-Mataas na Kahoy. This indicates that both groups have significant cumulative exposure, with over a decade of occupational sun exposure.

The high percentage of drivers with over 10 years of service (74.19% in the city and 76.47% in the province) suggests that both groups have extensive cumulative UV exposure. This extensive work experience is significant because ocular damage from UV exposure is cumulative, and the risk of conditions such as pterygium and cataracts increases with duration of exposure.

4.1.4 Working Hours

Table 4: Working Hours

Working Hours	Cubao-Divisoria	Lipa-Mataas na Kahoy
9 hours	58.07%	-
6 hours	-	35.29%

Most Cubao-Divisoria drivers work 9 hours daily (58.07%), while Lipa-Mataas na Kahoy drivers average 6 hours (35.29%). City drivers work longer hours, potentially increasing their daily UV exposure compared to provincial drivers.

The longer working hours observed among city drivers (9 hours average) compared to provincial drivers (6 hours average) may contribute to differences in specific ocular conditions. City drivers may experience more continuous UV exposure during the day, potentially increasing their risk for UV-related conditions. However, provincial drivers may encounter different environmental conditions, including dust and particulate matter from unpaved roads.

4.2 Anterior Ocular Health Conditions

4.2.1 Eyelids and Eyelashes

Table 5: Eyelids and Eyelashes Health

Structure	Group	P-value	Interpretation
Eyelashes	Cubao-Divisoria	0.011	Significant
Eyelashes	Lipa-Mataas na Kahoy	0.011	Significant
Eyelids	Cubao-Divisoria	0.314	Not Significant
Eyelids	Lipa-Mataas na Kahoy	0.011	Not Significant

The data shows significant differences in eyelash health between Cubao-Divisoria and Lipa-Mataas na Kahoy drivers, but no difference in eyelid health between left and right eyes within each group. The significant difference in eyelash health may reflect different environmental exposures between urban and rural areas.

The significant findings in eyelash health suggest that environmental factors, such as dust and particulate matter, may differently affect eyelash health in urban versus rural settings. Provincial drivers may encounter more dust on unpaved roads, affecting eyelash health and increasing the risk of trichiasis (inward-growing eyelashes). City drivers, while exposed to pollution, may have different types of eyelash abnormalities.

4.2.2 Meibomian Gland

Most drivers from both routes have Grade 1 meibomian glands in both eyes, with no significant difference between right eyes. Grade 1 meibomian glands indicate mild dysfunction, characterized by minimal capping of the gland orifices. This finding suggests that meibomian gland dysfunction is common among jeepney drivers regardless of location.

Meibomian gland dysfunction is associated with evaporative dry eye and may be exacerbated by environmental factors such as dust, pollution, and UV exposure. The high prevalence of Grade 1 dysfunction among both groups suggests that meibomian gland health should be a focus of preventive care for jeepney drivers.

4.2.3 Puncta

Most drivers from both routes showed identical results in both eyes, with no significant difference in puncta findings. The puncta were clear and patent, with no evidence of blockage or significant pathology. This suggests that puncta health is relatively preserved in this population.

The absence of significant puncta findings is noteworthy, as it suggests that the puncta, which are responsible for tear drainage, are not significantly affected by occupational UV exposure. This may be because the puncta are protected by the eyelids and do not receive direct UV exposure.

4.2.4 Bulbar Conjunctiva

Table 6: Bulbar Conjunctiva Health

Finding	Group	P-value	Interpretation
Overall	Cubao-Divisoria	0.011	Significant
Overall	Lipa-Mataas na Kahoy	0.011	Significant
Pinguecula	Both	0.917	Not Significant
Pterygium	Both	0.886	Not Significant

The data shows significant differences in bulbar conjunctiva for both eyes. However, no significant findings were observed for pinguecula and pterygium specifically. This suggests that while conjunctival changes are present, specific UV-related growths may not differ significantly between groups, possibly due to the relatively advanced age and cumulative exposure of both groups.

The significant differences in bulbar conjunctiva suggest that the conjunctiva is affected by environmental factors such as UV exposure, pollution, and dust. The absence of significant differences in pinguecula and pterygium specifically may be due to the similar cumulative exposure of both groups. Both city and provincial drivers have worked for over 10 years, providing similar cumulative UV exposure.

4.2.5 Palpebral Conjunctiva

Table 7: Palpebral Conjunctiva Health

Finding	Eye	P-value	Interpretation
Lid Redness	OD	0.026	Significant
Lid Redness	OS	0.051	Not Significant
Lid Roughness	OD	0.039	Significant
Lid Roughness	OS	0.012	Significant

The data shows significant differences in palpebral conjunctiva for both eyes. Lid redness was significant in the right eye only, while lid roughness was significant in both eyes. This pattern suggests asymmetrical exposure, consistent with left-hand driving where the left side receives more UV exposure.

The significant findings in palpebral conjunctiva suggest that drivers experience conjunctival inflammation, which may be exacerbated by environmental factors. The asymmetry in findings (significant in the right eye for redness, both eyes for roughness) may reflect the pattern of UV exposure, with the left side receiving more UV radiation due to the position of the driver.

4.2.6 Cornea

The data shows significant corneal differences in both eyes. However, no significant findings were observed for corneal opacity and edema specifically. This indicates that while corneal changes are present, these specific pathologies may not differ significantly between groups.

The significant corneal differences suggest that the cornea, which absorbs 99% of UV radiation, is affected by occupational UV exposure. The absence of significant differences in corneal opacity and edema suggests that these specific pathologies may be relatively similar between groups, possibly due to the similar cumulative exposure of both groups.

4.2.7 Crystalline Lens

Table 8: Crystalline Lens Health

Finding	Eye	P-value	Interpretation
Overall	Both	0.011	Significant
Nuclear Cataract	OD	0.886	Not Significant
Nuclear Cataract	OS	0.885	Not Significant
Lens Clarity	Both	0.917	Not Significant

The data shows significant crystalline lens differences in both eyes overall. However, cataract findings were significant only for overall lens changes, while nuclear cataract specifically was not significant. This suggests that while lens changes are present, the specific type of cataract may not differ significantly between groups.

The significant differences in crystalline lens suggest that the lens is affected by UV exposure. The absence of significant differences in nuclear cataract specifically may be due to the similar cumulative exposure of both groups. Both groups of drivers have worked for over 10 years, providing similar cumulative UV exposure.

4.3 Comparison of Anterior Ocular Health Status

Table 9: Summary of Significant Findings

Parameter	Significant Difference	Group with Higher Prevalence	Possible Factors
Eyelashes	Yes	Lipa-Mataas na Kahoy	Dust, unpaved roads, rural environment
Bulbar Conjunctiva	Yes	Cubao-Divisoria	Urban pollution, longer hours
Lid Roughness	Yes	Cubao-Divisoria	Urban pollution, longer hours
Limbal Redness	Yes	Cubao-Divisoria	Urban pollution, longer hours

The data shows significant differences in ocular health between drivers. Cubao-Divisoria drivers had more lid redness, conjunctival inflammation, and dry eye-related changes. These findings may reflect the effects of urban air pollution and prolonged working hours on the ocular surface.

In contrast, Lipa-Mataas na Kahoy drivers had more pterygium, eyelash issues, and corneal changes. These findings may reflect the effects of sun and dust exposure in the rural environment, where unpaved roads and agricultural activities may increase particulate matter exposure.

However, despite these differences, the overall anterior ocular health conditions did not show a significant difference between the two groups. This suggests that while specific conditions may be more prevalent in one group versus the other, the overall level of UV-related ocular damage is similar for both groups.

4.4 Discussion of Findings

4.4.1 Profile of Jeepney Drivers

The findings revealed that both groups of drivers have been working for more than ten years, with most participants between the ages of 30 and 55, typically working 6 to 12 hours daily. This extensive work experience and long daily hours suggest significant cumulative UV exposure for both groups.

The concentration of drivers in the 50+ age range is consistent with the typical demographic of experienced jeepney drivers. This age group has had decades of occupational sun exposure, increasing their risk for age-related and UV-related ocular conditions. The high percentage of drivers with over 10 years of service (74.19% in the city and 76.47% in the province) indicates extensive cumulative exposure, which is a significant risk factor for UV-related ocular conditions.

4.4.2 Anterior Ocular Health Findings

The significant differences observed in eyelashes, bulbar conjunctiva, lid roughness, and limbal redness suggest that specific environmental factors may affect these structures differently in city and provincial settings.

Eyelashes: The significant difference in eyelash health between groups may reflect differences in environmental exposure, including dust and particulate matter. Provincial drivers may encounter more dust on unpaved roads, affecting eyelash health and increasing the risk of trichiasis.

Bulbar Conjunctiva: The significant difference in bulbar conjunctiva between groups, with city drivers showing more changes, may reflect the effects of urban air pollution. Higher levels of particulate matter and pollutants in the city may exacerbate conjunctival inflammation and increase the risk of pinguecula and pterygium.

Palpebral Conjunctiva: The significant differences in lid redness and roughness suggest that both groups experience conjunctival inflammation, but with different patterns. The asymmetrical findings (significant in right eye for redness, both eyes for roughness) may reflect the pattern of UV exposure, with the left side receiving more exposure but both eyes affected by environmental factors.

Cornea and Crystalline Lens: The overall significant differences in corneal and lens health suggest that both groups experience UV-related changes. However, the absence of significant differences in specific pathologies (corneal opacity, edema, nuclear cataract) suggests that the types of changes may be similar between groups.

4.4.3 Comparison of Anterior Ocular Health Conditions

The finding that there is no significant difference between the anterior ocular health conditions of traditional jeepney drivers in the city and province suggests that prolonged sun exposure poses similar risks regardless of geographic location. This may be explained by several factors:

1. **Cumulative UV Exposure:** Both groups have been working for over 10 years, providing similar cumulative UV exposure regardless of geographic location.
2. **Similar Environmental Conditions:** While city and provincial environments differ, both expose drivers to significant UV radiation and environmental irritants.

3. **Lack of Protective Eyewear:** Most drivers in both groups do not use UV-protective eyewear, exposing them to similar UV risks.
4. **Jeepney Design:** The open design of traditional jeepneys provides minimal UV protection regardless of location.

These findings highlight the need for protective measures for all jeepney drivers, regardless of location. Educational programs and interventions should target drivers in both urban and rural areas.

4.4.4 Implications for Practice

The findings of this study have several important implications:

Eye Care Professionals: Optometrists and ophthalmologists should be aware of the ocular risks faced by jeepney drivers and should conduct regular eye examinations that include assessment for UV-related conditions. They should also educate drivers on the importance of protective eyewear and regular eye care.

Transport Operators: Companies and cooperatives should implement health education programs and provide UV-protective eyewear to their drivers.

Government Agencies: The Department of Health and Department of Transportation should consider policies that require the use of protective eyewear for jeepney drivers and provide subsidies for eye care.

Jeepney Drivers: Drivers should be encouraged to use UV-protective eyewear, take breaks to reduce UV exposure, and undergo regular eye examinations.

5. CONCLUSIONS

Based on the findings gathered by the researchers, the following conclusions were made:

- Both drivers in Cubao-Divisoria and Lipa-Mataas na Kahoy had been working for more than ten years, and most of the participants were between the ages of thirty and fifty-five, who usually worked six to twelve hours a day. This extensive cumulative exposure places both groups at significant risk for UV-related ocular conditions.
- The profile of the external eye health status of the subjects reveals significant findings in their anterior ocular health conditions particularly in:
    - Eyelashes
    - Bulbar Conjunctiva
    - Lid Roughness
    - Limbal Redness
- There was no significant difference found between the anterior ocular health conditions of traditional jeepney drivers in the province and city. This suggests that prolonged sun exposure poses similar ocular health risks regardless of geographic location.
- The awareness plan that the researchers conducted focused mainly on the following:
    - **Patient Education:** Jeepney drivers were educated on the importance of regular eye exams due to their prolonged UV exposure, which increases the risk of eye conditions. Routine check-ups with optometrists and ophthalmologists can help in early detection and prevention of vision problems.
    - **Dispensing UV-Protective Glasses:** Providing UV-protective eyewear (sunglasses) to shield their eyes from harmful sun exposure. Since these drivers typically work an average of nine hours per day, five days a week, consistent UV protection is essential in reducing the risk of long-term eye damage.

6. RECOMMENDATIONS

Based on the findings of the study, the researchers came up with the following recommendations:

6.1 For Optometrists

- Monitor jeepney drivers' ocular health regularly, focusing on conditions like pterygium, pinguecula, and cataract
- Educate drivers on the importance of UV protection and the risks of prolonged sun exposure
- Advocate for regular eye screenings and affordable eye care for drivers
- Document ocular findings to establish baseline measurements for future comparison
- Develop targeted screening protocols for occupational UV exposure

6.2 For Ophthalmologists

- Use the study to understand the effects of chronic sun exposure on anterior ocular health
- Collaborate with optometrists for early diagnosis and management
- Provide medical care for drivers with advanced ocular conditions
- Consider the occupational context when assessing and managing ocular conditions

6.3 For Jeepney Drivers

- Wear UV-protective sunglasses to shield eyes from harmful rays and environmental pollutants
- Consume Vitamin A, C, and E-rich foods to support eye health and prevent vision problems
- Take regular breaks during driving to reduce continuous UV exposure
- Undergo regular eye examinations to detect problems early
- Use wide-brimmed hats or caps for additional sun protection

6.4 For Transport Operators and Government Agencies

- Implement health education programs on ocular health and sun protection
- Advocate for government subsidies to provide eye protection for jeepney drivers
- Consider policies requiring the use of protective eyewear for jeepney drivers
- Support research on occupational ocular health among drivers
- Collaborate with eye care professionals to provide accessible eye care services

6.5 For Future Researchers

- Conduct longitudinal studies to track ocular changes over time among jeepney drivers
- Include meibography to assess meibomian gland structure and function
- Investigate the effectiveness of different types of protective eyewear
- Study other occupational groups with similar UV exposure patterns
- Include a larger sample size from multiple routes and provinces
- Consider the role of other environmental factors such as air pollution and dust
- Investigate the effectiveness of educational interventions

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