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Analyzing Power of Eyewear for Individual Identification

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Abstract

Crime scenes offer a wealth of tangible evidence crucial for reconstructing events, identifying suspects, and substantiating or refuting facts. Eyewear fragments, though often overlooked, constitute valuable forensic evidence. Eye power, indicative of the prescription required for corrective lenses, is determined by individual ocular characteristics such as eyeball shape, size, corneal curvature, and lens properties. This study aimed to explore the distinctiveness of eye powers and their potential for predicting biological profiles based on prescription eyewear. Additionally, it sought to examine correlations between eye power, gender, age, and other variables. Data from 100 samples (50 male, 50 female) were collected via an online Google form and analyzed using Microsoft Excel and statistical software. The sample was evenly distributed across age groups (10-34 and 35-59 years), with prevalent blood groups being B+VE and O+VE. Findings revealed higher eyewear usage among participants with both parents wearing glasses and minimal use among siblings. Myopia was more common than hyperopia, and participants reported significant daily screen time, correlating with poorer vision. A notable finding was a strong positive correlation between left and right lens powers, with no significant gender disparities. In conclusion, while eye power effectively distinguishes age groups, its potential for individual identification warrants further refinement and broader application. The study underscored the absence of a centralized database or web tool in India, suggesting the potential benefits of developing such resources to enhance forensic accuracy and accessibility. Limitations included a relatively small sample size and the use of non-standardized questionnaires, indicating opportunities for methodological improvement in future research endeavors.

Keywords: Eye power; Forensic optometry; Lensometer; Eyewear fragments; Refractive error

Introduction

Eyesight refers to a person's ability to see. More specifically, it is someone who can see without using equipment such as glasses or contact lenses. Not everyone has a clear vision. Some people have errors in eye power. But people's vision can change, depending on their health and environment.

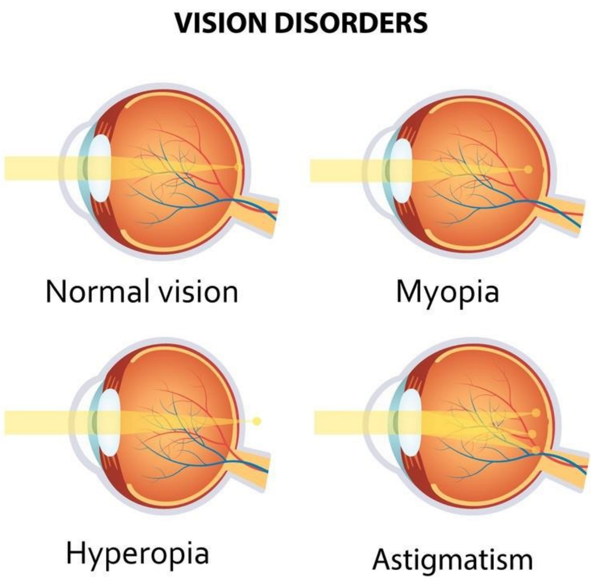


Figure 1: Vision Disorders

Refractive Error

The cornea and lens of the eye aid to focus. A refractive error is a vision problem that occurs when the quality of the eyes is prevented from seeing properly. This may be due to the length of the eye, variation in the cornea, or lens aging.

A refractive error is when the shape of the eye does not bend light properly, causing blurry images.

The main types of refractive errors are:

- Myopia (nearsightedness),
- Hyperopia (farsightedness)

In myopia (nearsightedness), the focal point is in front of the retina due to greater curvature of the cornea, long axis length, or both. Distant objects are blurred, but near objects can be seen clearly. Concave (negative) lenses are used to correct near vision. In children, refractive error usually increases until growth stops.

In hyperopia (farsightedness), the focal point is behind the retina because the cornea is too curved or the eye axis is too short, or both.

For adults, near and far objects are blurred. Babies and children with mild hyperopia can see clearly due to their position. Use convex (positive) lenses to correct long vision.

In astigmatism, the aspheric (variable) curvature of the cornea or lens causes light rays coming from different directions (such as vertical, oblique, horizontal) to focus differently at the same points. A cylindrical lens (a section cut from a cylinder) is used to correct astigmatism.

Cylindrical lenses have no power along one axis and are concave or convex along the other axis.

Forensic Significance

Eyeglass fragments such as eyeglass frames, fragments, and contact lenses can be found at crime scenes, as can any other physical evidence. The likelihood of finding eyeglass fragments at a crime scene depends on a variety of factors, including the nature of the crime, the type of glasses used, the extent of the violence, the thoroughness and expertise with which the crime scene is processed and evidence collected, and the circumstances of the incident. Spectacle fragment characteristics have unique properties and prescribed criteria for correcting an individual's vision, which can provide crucial clues to understanding an individual's visual capabilities. When such evidence is found in association with human remains, it can also be used to estimate the wearer's age, sex, or race, based on the enormous data. They can also help reconstruct the events that led to crime and what happened after the crime, providing a clearer picture of what happened.

Prescription glasses offer features that narrate refractive errors associated with the wearer's visual characteristics. When it turns up at a crime scene as evidence, it can help establish a connection to the owner. If glasses found at a crime scene match the prescription of a known suspect or victim, it can help establish their presence at the scene and provide key information for the investigation. It can also reveal the wearer's physical characteristics, such as the degree of myopia or farsightedness, which can help profile an individual. Spectacle characteristics can be statistically measured, allowing for scientific verification of details of evidence beyond mere owner attribution. The role of eyewear glasses in forensic identification has not been explored; therefore, it is essential to understand their potential to assist in identification.

Forensic optometry is one such field that examines and analyzes evidence such as glasses and other spectacles related to crime scenes that may aid in the investigation and prosecution of criminals or save an innocent from suspicion. It is a field that has yet to be streamlined along with routinely observed investigative techniques and scientifically researched.

It is important to note that the accuracy of prescription identification will depend on the condition of the fragments and the availability of complete and identifiable parts of the lens. In some cases, pieces may be too damaged or degraded to provide meaningful prescription information.

Instruments of Use

Lensometer

A lensometer, also called a lensmeter is an instrument that is used to authenticate the prescription of spectacles or eyewear. Numerous lensmeters can clarify the power of contact lenses by adding up a special lens. The values acquired from a lensmeter are the values specified on the patient's eyewear prescription such as axis, cylindrical, and sphere. It is repeatedly used before an eye scrutiny to acquire the previous prescription on the patient that was given, in arrangement to accelerate the examination.

Optometer

It is also known as an Optometer, it is an instrument that helps in the evaluation of refraction. It finds out the refractive error in conflict with the conventional refractive technique. This context is called Optometer or refractometer.

Several implications executed by Optometer are Myopia, Hyperopia, Astigmatism, Spectacle prescription, and contact lens prescription which work as an initial spike for subjective refraction for Ophthalmologists or Optometrists.

Figure 2: Lensometer instrument

UV Visible Spectrometer

In the analysis of spectacles UV (Ultra Violet) visible Spectroscopy also takes part. It measures the spectacles and analyzes the absorption and transmission of light in the UV-visible region of the Electromagnetic Spectrum. It helps distinguish the optical properties of the lens used in the eyewear such as tint, regulate its transparency, and light-blocking competence. This technique or system layout the valuable topic about the materials and coatings used in the lens.

It is important to note that the accuracy of prescription identification will depend on the condition of the fragments and the availability of complete and identifiable parts of the lens. In some cases, pieces may be too damaged or degraded to provide meaningful prescription information.

Figure 3: Autorefractor instrument

Objectives

Aim

Explore the possibilities of predicting biological profiles using eye power from the eyewear fragment evidence.

Objective

1.To understand the possibilities of using the eyewear fragment evidence from the crime scene to predict the eyewear power.

2.To understand the relation between left and right eyewear powers.

3.To understand the relationship between age group and power of eyewear.

4.To understand the difference between male and female subjects on the power of eyewear.

5.To study the impact of various independent variables like heredity and screen time on eye power.

Methodology

Variables

Independent variable: age, gender, blood group, heredity, screen time.

Dependent variables: eye power

Inclusion criteria: Participants who are above the age of 9. Individuals having myopia, hyperopia or astigmatism

Exclusion criteria: Participants above the age of 59. Individuals who do not have myopia, hyperopia, and astig matism. Individuals who developed refractive errors due to physical or medical accidents.

Hypothesis

1.There is no difference between male and female subjects on the power of the eyewear.

2.There is no relationship between the power of the left lens and the right lens of the eye.

3.There is no relationship between age groups on the power of the eyewear.

4.There is no impact of various independent variables on the eye power

Procedure

1.Primary data, from 100 samples were collected, wherein 50 were male and 50 were female.

2.The primary data was collected through the survey (Google form).

3.The data were analyzed using Microsoft Excel and statistical software.

4.This study was conducted using the online Google form. Informed consent was included at the beginning of the form so that only the participants could go to the next section if they provided their consent. The Google form contained demographic and eye power-related questions. 100 participants were selected using the random sampling method, among which 50 were male and 50 were female. The sample was also equally divided as 50 each belonging to the age group 10-34 and 35-59.

5.After giving all the necessary instructions, the subjects were asked to answer all the questions. The data was then organized for statistical analysis and subjected to qualitative and quantitative interpretation. The data collected was analyzed using descriptive analysis, independent t-test, and Pearson correlation coefficient.

Statistics:

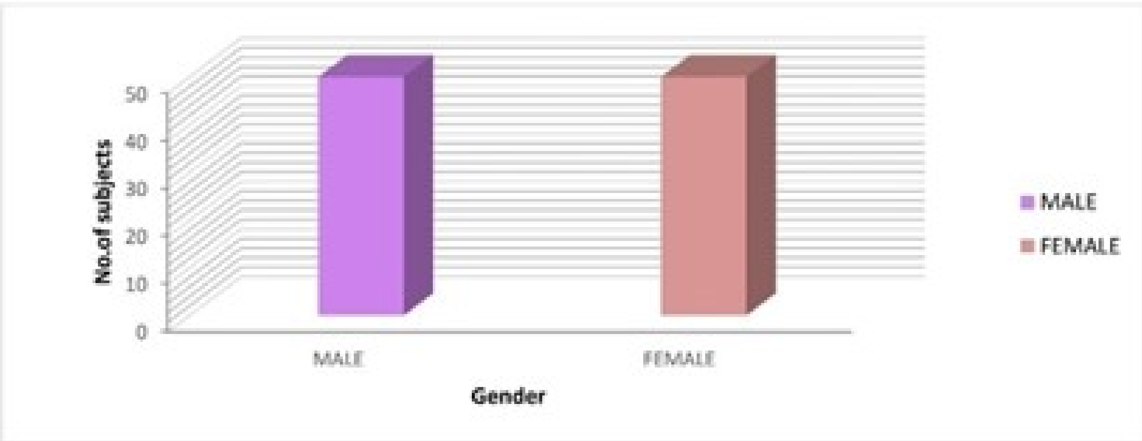
6.Data entry and analysis were done using Microsoft Excel. The responses of participants have been expressed in terms of frequency and percentage. The data follows a normal distribution as assessed by Kolmogorov–Smirnov test. t-test was applied to find the difference between male and female participants concerning the power of the left lens and right lens respectively. Pearson correlation test was used to find the correlation between powers of the left eye and right lens among the total sample and among the two age groups respectively. $P < 0.05$ was considered statistically significant.

Data Analysis

Graphical Representation and Interpretation

Table 1: Shows the gender-wise distribution of the sample

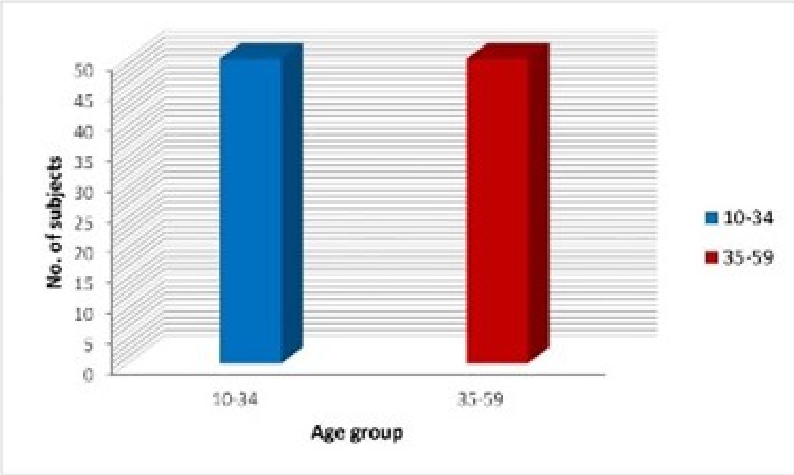
GENDER	NO. OF SUBJECT
MALE	50
FEMALE	50



Graph 1: Shows the gender-wise distribution of the sample

Table 2: Shows the age wise distribution of the sample

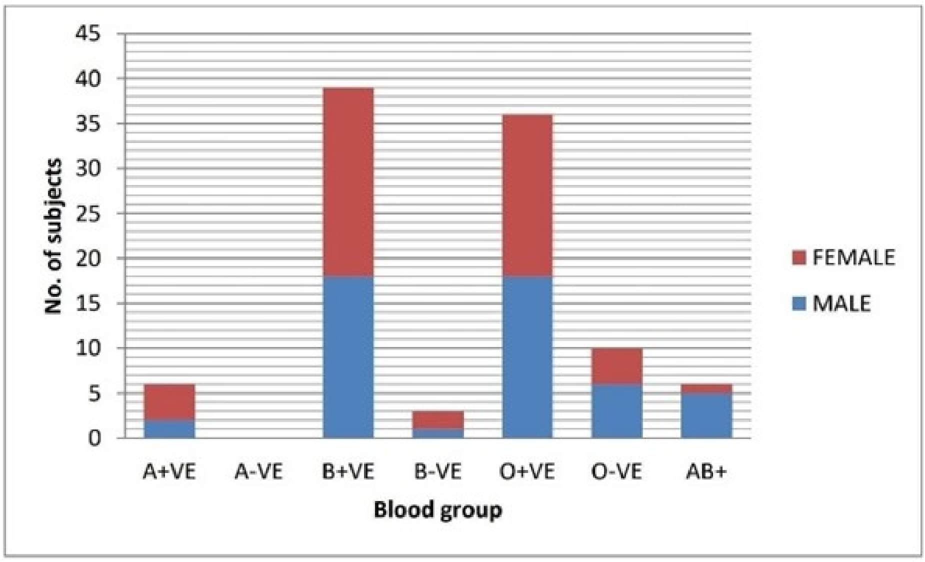
AGE GROUP	TOTAL
10-34	50
35-59	50



Graph 2: Shows the age wise distribution of the sample

Table 3: Shows the distribution of samples based on blood group

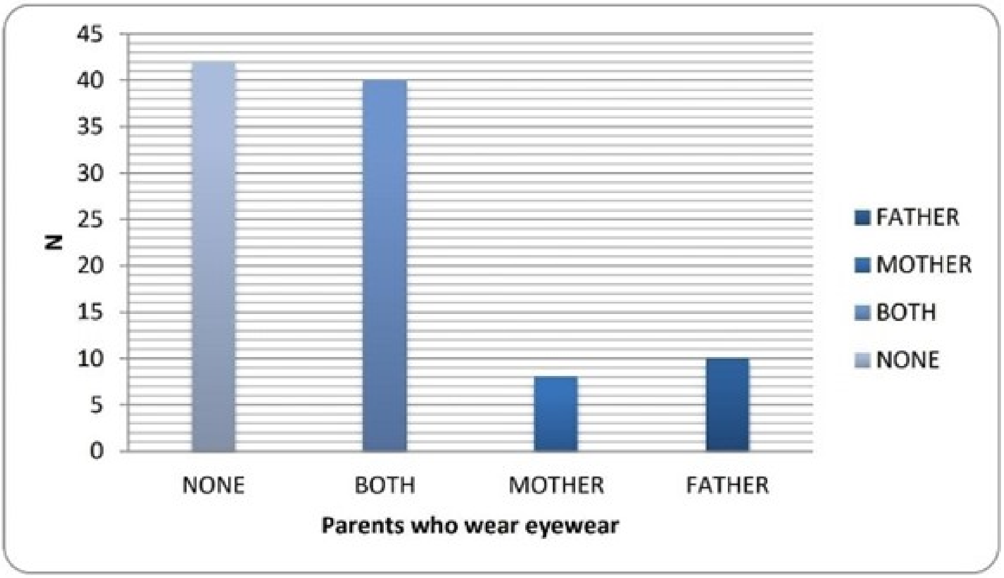
BLOOD GROUPS	MALE	FEMALE
A+VE	2	4
A-VE	0	0
B+VE	18	21
B-VE	1	2
O+VE	18	18
O-VE	6	4
AB+	5	1



Graph 3: Shows the distribution of samples based on the blood group

Table 4: Shows the distribution of sample based on how many of their parents use eyewear

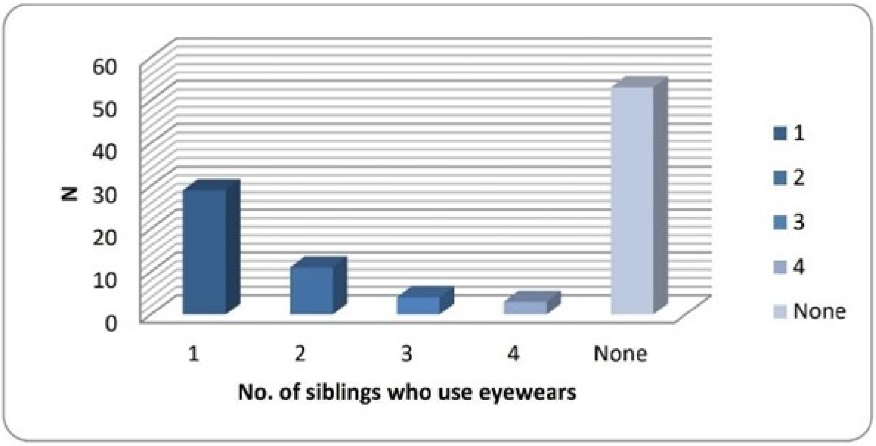
NO. Of SIBLINGS WHO USEEYEWEAR	TOTAL NO. OFSIBLINGS
1	29
2	11
3	4
4	3
None	53



Graph 4: Shows the distribution of sample based on how many of their parents use eyewear

Table 5: Shows the distribution of sample based on number of siblings who use eyewear

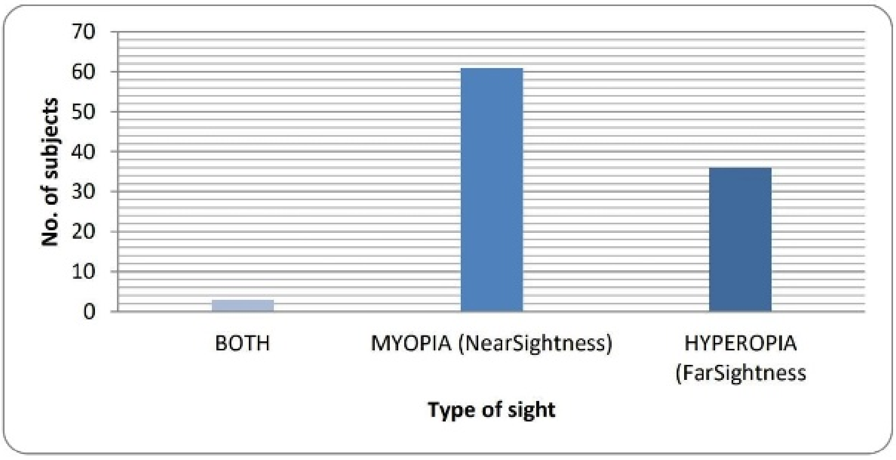
PARENTS WHO WEAR EYEWEAR	TOTAL
FATHER	10
MOTHER	8
BOTH	40
NONE	42



Graph 5: Shows the distribution of sample based on number of siblings who use eyewear

Table 6: Shows the distribution of sample based on type of sight

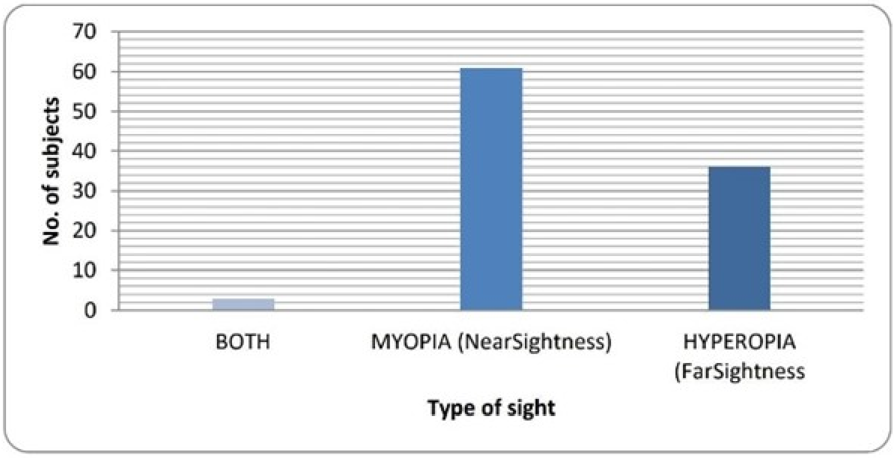
TYPE OF EYESIGHT	TOTAL
HYPEROPIA	36
MYOPIA	61
BOTH	3



Graph 6: Shows the distribution of sample based on type of sight

Table 7: Shows the distribution of sample based on screen time per day

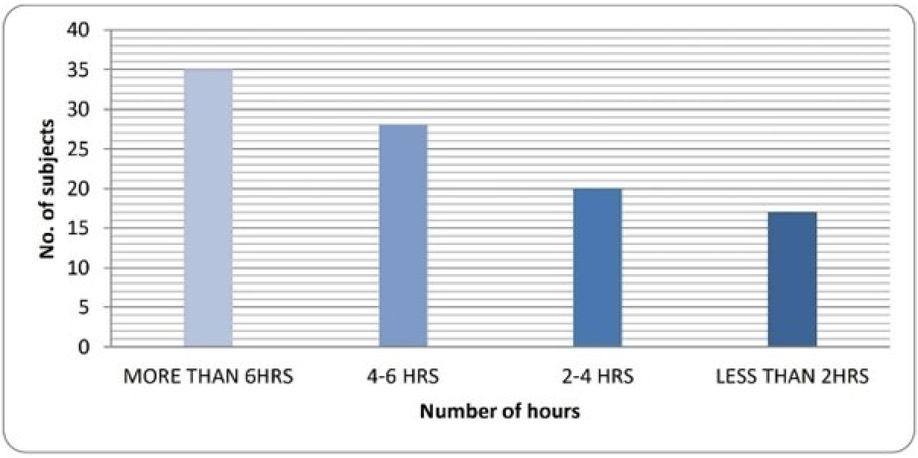
NO. OF HOURS	TOTAL
LESS THAN 2HRS	17
2-4 HRS	20
4-6 HRS	28
MORE THAN 6HRS	35



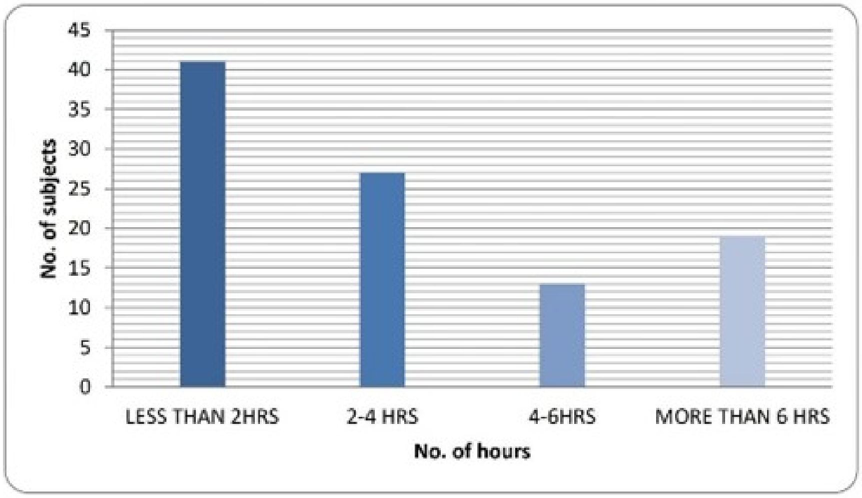
Graph 7: Shows the distribution of the sample based on screen time per day

Table 8: Shows the sample distribution based on continuous indulgence in screen time per day.

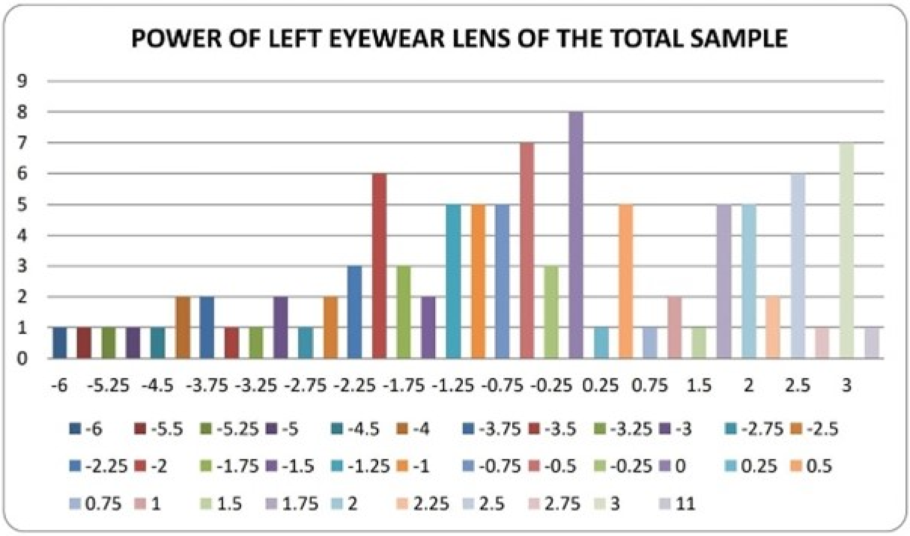
CONTINUOUS SCREEN TIME	TOTAL
LESS THAN 2HRS	41
2-4 HRS	27
4-6HRS	13
MORE THAN 6 HRS	19



Graph 8: Shows the distribution of the sample based on continuous indulgence in screen time per day.



Graph 9: Shows the variations in the power of left eyewear lens of the total sample



Graph 10: Shows the variations in the power of right eyewear lens of the total sample

Results and Discussion

Table 9: Shows the results and analysis of total sample on power of lens

SL.NO	GENDER	AVERAGE	
		LEFT	RIGHT
1	MALE	-0.5	-0.44
2	FEMALE	-0.46	-0.71

Table 10: Shows the results and analysis of Male and Female variables on power of lens

TOTAL	AVERAGE	
	LEFT	RIGHT
100	-0.48	-0.58

Table 11: Shows the results and analysis of age group on power of lens

SL.NO	AGE GROUP	AVERAGE	
		LEFT	RIGHT
1	11 – 35	-1.64	-1.94
2	36 - 60	0.63	0.75

Difference Scores Calculation in T-Test

Left Eye

Treatment 1: Male

N1: 50

df1 = N - 1 = 50 - 1 = 49

M1: -0.14

SS1: 392.91

s21 = SS1/(N - 1) = 392.91/(50-1) = 8.02

Treatment 2: Female

N2: 50

df2 = N - 1 = 50 - 1 = 49

M2: -0.43

SS2: 208

s22 = SS2/(N - 1) = 208/(50-1) = 4.24

T-value Calculation

s2p = ((df1/(df1 + df2)) * s21) + ((df2/(df2 + df2)) * s22) = ((49/98) * 8.02) + ((49/98) * 4.24) = 6.13

s2M1 = s2p/N1 = 6.13/50 = 0.12 s2M2 = s2p/N2 = 6.13/50 = 0.12

t = (M1 - M2)/√(s2M1 + s2M2) = 0.3/√0.25 = 0.6

The t-value is 0.5997. The p-value is .275044. The result is not significant at $p < .10$ RIGHT EYE

Treatment 1: Male

N1: 50

df1 = N - 1 = 50 - 1 = 49

M1: -0.17

SS1: 389.6

s21 = SS1/(N - 1) = 389.6/(50-1) = 7.95

Treatment 2: Female

N2: 50

df2 = N - 1 = 50 - 1 = 49

M2: -0.66

SS2: 253.93

s22 = SS2/(N - 1) = 253.93/(50-1) = 5.18

T-value Calculation

s2p = ((df1/(df1 + df2)) * s21) + ((df2/(df2 + df2)) * s22) = ((49/98) * 7.95) + ((49/98) * 5.18) = 6.57

s2M1 = s2p/N1 = 6.57/50 = 0.13 s2M2 = s2p/N2 = 6.57/50 = 0.1

t = (M1 - M2)/√(s2M1 + s2M2) = 0.49/√0.26 = 0.96

The t-value is 0.95686. The p-value is .170497. The result is not significant at $p < .10$.

Pearson Correlation Coefficient

1) For Powers of Left and Right Lens

X Values

∑ = -32.2

Mean = -0.322

∑(X - Mx)2 = SSx = 591.672

Y Values

∑ = -43.58

Mean = -0.436

∑(Y - My)2 = SSy = 646.67

X and Y Combined N = 100

∑(X - Mx)(Y - My) = 581.497

R Calculation

r = Σ((X - My)(Y - Mx)) / √((SSx)(SSy))

r = 581.497 / √((591.672)(646.67)) = 0.9401

Meta Numerics (cross-check)

The value of R is 0.9401.

The p- Value is <.00001. The result is significant at p<.10.

This is a strong positive correlation, which means that high X variable scores go with high Y variable scores (and vice versa).

The value of R2, the coefficient of determination, is 0.8838.

2) Correlation for Variables Of Age Group

a) LEFT LENS

X Values

Σ = -62.1

Mean = -1.242

Σ(X - Mx)2 = SSx = 289.782

Y Values

Σ = 33.55

Mean = 0.671

Σ(Y - My)2 = SSy = 221.8

X and Y Combined N = 50

Σ(X - Mx)(Y - My) = -28.731

R Calculation

r = Σ((X - My)(Y - Mx)) / √((SSx)(SSy))

r = -28.731 / √((289.782)(221.84)) = -0.1133

Meta Numerics (cross-check)

R = -0.1133

The P-Value is .262977. The result is not significant at p < .10

There is a negative correlation,

B) Right Lens

X Values

∑ = -79.5

Mean = -1.59

∑(X - Mx)2 = SSx = 328.8

Y Values

∑ = 37.72

Mean = 0.754

∑(Y - My)2 = SSy = 183.341

X and Y Combined N = 50

∑(X - Mx)(Y - My) = -6.98

R Calculation

r = ∑((X - My)(Y - Mx)) / √((SSx)(SSy))

r = -6.98 / √((328.8)(183.341)) = -0.0284

Meta Numerics (cross-check)

The value of R is -0.0284.

The P-Value is .782138. The result is not significant at p < .10.

There is a negative correlation

Interpretation

The mean for left and right lens power, of the total sample is -0.48 and -0.58 respectively. The sample consists of 50 male and 50 female. The mean of the male subjects for left and right eye lens power is -0.5 and -0.44 respectively. The mean of the female subjects for left and right eye lens power is -0.46 and -0.71 respectively. The mean for left and right lens of the 11 to 35 age group subjects is -1.64 and -1.94 respectively, whereas the mean for left and right lens of the 36 to 60 age group subjects is 0.63 and 0.75 respectively. From this it can be understood that after mid adulthood, there is no significant change in eye power.

Data was subjected to further analysis using inferential statistics such as the'‘t-test’ and Pearson’s correlation coefficient test.

The‘t-test’ was conducted to identify the difference between male and female participants on left and right eye lens power. The computed t-test have shown a *t*-value of *0.5997* and the *p*-value of *.275044* which by the conventional criteria indicates that the results are not significant at $p < .10$ (single tailed). The t-test for right eye lens power was found to be *0.95686* and p-value of *.170497*. These't-test' results assert that the difference between male and female participants in association with left and right lens power is considered to be statistically not significant indicating that there is no considerable difference. Thus, the null Hypothesis$_0$ no.1 is accepted. Pearson's correlation test was conducted, for the left and right lens power variables. The value of R was 0.9401. The p-Value was found to be <*.00001*. The result is significant at p<.10. This indicates that there is a strong positive correlation, which means that high X variable scores go with high Y variable scores (and vice versa). Thus, the null Hypothesis no.2 is rejected.

Similarly, the test was conducted for left and right eye of the two age group variables; the p- value for the left and right lens powers of the two age group variables was *.262977* and *.782138,* respectively which indicates a negative correlation. But relationship between the variables is only weak; hence the null Hypothesis$_0$ no.3 is rejected.

Total of 58 of the total samples parents, wear eyewears, and total of 47 of the samples siblings wear eyewears. The average of left and right eyewear powers of subjects whose screen time per day is more than 6 hours, was found to be -1.30 and -1.18 respectively. The average of left and right eyewear powers of subjects, whose screen time per day is 4-6 hours, was found to be -1.44 and -1.7 respectively. The average of left and right eyewear powers of subjects whose screen time per day is 2-4 hours, was found to be -0.25 and -0.60 respectively. The average of left and right eyewear powers of subjects, whose screen time per day is less than 2 hours, was found to be 2.3 and 2.39 respectively.

The average of left and right eyewear powers of subjects, whose continuous screen time per day is more than 6 hours, was found to be -1.34 and -1.34 respectively. The average of left and right eyewear powers of subjects, whose continuous screen time per day is 2-4 hours, was found to be -1.93 and -2.14 respectively. The average of left and right eyewear powers of subjects, whose continuous screen time per day is 4-6 hours, was found to be -0.47 and -0.75 respectively. The average of left and right eyewear powers of subjects, whose continuous screen time per day is less than 2 hours, was found to be 0.81 and 0.81 respectively. Thus, the null Hypothesis$_0$ no.4 is rejected.

Findings

1.Average scores of the two age groups are different; the mid adulthood age shows a slow standstill in the eye power compared to the younger age groups.

2.The lower time of continuous indulgement in screen time indicates better vision and eye health and vice-versa.

3.In the total sample, 36 of them have hyperopia, 61 of them have myopia, and 3 of them have astigmatism.

4.Siblings of over half of the sample, wear eyewears.

5.Parents of over 60 percent of the sample, wear eyewears.

6.The blood groups, B+ve, and O+ve are more prevalent in the sample.

7.The 't-test' results (p-value of .275044 and .170497) asserts that the difference between male and female participants in association with left and right lens power is considered to be statistically not significant indicating that there is no considerable difference.

8.Pearson's correlation test result for the left and right lens power variables, shows value of R to be 0.9401 and p-Value to be

<.00001. The result is significant at $p<.10$. This indicates that there is a strong positive correlation, which means that high X variable scores go with high Y variable scores (and vice versa).

9.Pearson's correlation test, shows that the p-value for the left and right lens powers of the two age group variables was .262977 and .782138, respectively which indicates a negative correlation. But relationship between the variables is only weak.

The research studies on the forensic application of prescription eyewear present a diverse and evolving field, highlighting the potential and limitations of using eyewear for personal identification in forensic investigations. Here's a discussion of how the findings from these studies align with or differ from the existing literature on similar topics:

Age Estimation Using Eyewear

Berg and Ta'ala's Pilot Study: This study found that age could be estimated within ±10 years with an 81% accuracy rate using prescription lenses, and 100% accuracy for bifocal prescriptions. This finding aligns with the general understanding that presbyopia and other age-related vision changes are relatively predictable, which is corroborated by the study by Aparna, Iyer, and Thomas, which also established a significant relationship between refractive errors and age.

Existing Literature: The alignment with existing literature confirms that eyewear prescriptions can provide clues about a person's age, particularly in older age groups where vision changes are more pronounced.

Sex and Race Estimation Using Eyewear

Berg and Ta'ala's Pilot Study: The study concluded that sex and race could not be estimated with sufficient accuracy using prescription lenses. This result is consistent with findings from other studies, such as Aparna, Iyer, and Thomas, which found no significant relationship between refractive errors and sex.

Existing Literature: This aligns with existing literature, suggesting that while certain vision issues can be age-specific, they do not vary significantly between sexes or races in a manner that would allow for accurate forensic identification based solely on prescription eyewear.

Based Tools for Prescription Matching

Collins and Berg's Study: The introduction of a web-based tool to assess the strength of a match between spectacle prescriptions and patient records represents a significant advancement. This tool allows for the calculation of the frequency of specific prescriptions, aiding forensic investigations by providing a statistical basis for matches.

Existing Literature: This approach is innovative and represents an enhancement over traditional methods, which typically only allow for a match/no-match determination. The tool's ability to provide error rates and statistical probabilities is a valuable addition to forensic methodology.

Contact Lens as Forensic Evidence

Swerling's and Zwerling et al.'s Studies: These studies highlight the use of contact lenses as forensic evidence, showing how contact lens remnants can be used to refute or support testimonies in criminal cases. They also present protocols for the forensic analysis of contact lenses.

Existing Literature: The innovative use of contact lenses in forensic investigations is a relatively new area, with these studies providing foundational guidelines and demonstrating practical applications. The findings align with the broader forensic goal of using any available biological or material evidence for identification and investigative purposes.

Instrumentation in Eyewear Analysis

Cordero's Gurnani and Kaur's Studies: These papers discuss the use of instruments like lensmeters and autorefractors in verifying eyewear prescriptions. These tools provide accurate measurements of lens power, which are crucial for forensic analysis.

Existing Literature: The emphasis on precise instrumentation aligns with existing best practices in both clinical and forensic optometry. Accurate prescription measurements are essential for matching eyewear to individuals.

DNA and Biochemical Analysis of Tears and Eyewear

Aparna and Iyer's Review: This study discusses the potential of using tears and eyewear for personal identification through DNA analysis and unique eye characteristics. It highlights the possibility of creating prescription databases for forensic use.

Existing Literature: This approach represents a cutting-edge intersection of molecular biology and forensic science. The potential for DNA analysis from tears and the use of prescription databases are emerging areas with promising implications for forensic identification.

Correlation Studies

Aparna, Iyer, and Thomas's Study: This study found strong positive correlations between left and right lens power variables, and weak correlations between age group variables. The statistical methods used provide a detailed understanding of the relationships between different variables in eyewear prescriptions.

Existing Literature: These statistical findings support the broader body of research indicating that while there is a strong internal consistency in individual prescriptions (left vs. right eye), broader demographic factors (such as age) do not show as strong a correlation, except in the context of age-related changes.

Overall, the findings from these studies contribute valuable insights to the field of forensic optometry, aligning well with existing literature in many respects, while also introducing new methodologies and tools that enhance the capabilities of forensic investigators. The ability to estimate age with reasonable accuracy, use web-based tools for prescription matching, and analyze contact lenses and tears for forensic purposes are particularly noteworthy advancements.

Limitations

1.This study is a minor project work on a sample of only 100 participants.

2.Not all areas of biological traits were included.

3.Language barrier may be one of the reasons for the respondent's mortality.

4.Certain level of disinterest shown by some of the participants could have affected the overall results.

5.The test questionnaire used here was not a standardized one because here it is used to only collect primary data and not for interpreting them (by giving them values).

Conclusions

The study is a smaller-scale research project that involved a sample of only 100 participants, which may limit the generalizability of the findings. It's important to note that not all areas of biological traits were included in the study, potentially impacting the comprehensiveness of the results. Furthermore, language barriers among the respondents may have contributed to biased or incomplete data, particularly regarding mortality rates. Additionally, it's worth considering that varying levels of participant disinterest could have introduced bias and affected the overall results. It's important to highlight that the test questionnaire used in the study was not derived from standardized measures, as its primary purpose was to gather raw data rather than provide quantifiable interpretations.

The data at present may be utilized for age group identification but cannot facilitate individual identification however, if codification and further research is conducted, there is probability of individual identification. There is no established unified database or web-based tool in India, and if such a database is present, it facilitates accuracy, accessibility, and feasibility. AI technology, in the near future may also be used for more accurate individual identification.

Appendix

1. Name (optional) :

2. Gender:

a) Maleb) Female c) Prefer not to say

3. Age:

4. Blood group:

5. Does any of your parents wear spectacles or contact lenses. If so who?

a) Father b) Mother c) Both d) None

6. Does any of your sibling wear spectacles or contact lenses? If so how many of them do?

7. What is the power of your left eye?

8. What is the power of your right eye?

9. What type of sight/vision do you have?

a) near sightedness b) far sightedness c) astigmatism

10. What is your screen time per day? (may include phone /laptop/tv)

a) less than 2 hours b) 2-4 hours c) 4-6 hours d) more than 6 hours

11. For how many hours can u continuously indulge in screen time?

a) less than 2 hours b) 2-4 hours c) 4-6 hours d) more than 6 hours

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