

■ REVIEW ARTICLE

Forensic Optometry: A New Tool for Forensic Identification

¹Paramita Deb, ²Jaskaran Singh, ³Anshu Nanda, ⁴Karan Singh

ABSTRACT

Optometry is an eye care profession that involves examining the eye and visual system. It also helps in prescribing the correction of refractive error with glasses, contact lenses, and the treatment of various eyes diseases. Likewise, the use of optometrical studies for the criminal justice system is a new paradigm in forensic sciences. Additionally, individual identification of a person may be done by examining certain characteristics of eye. Hence, eye shape, iris color and contact lenses are prevailing vital roles in forensic investigation. This review provides examining iris color for personal identification of the individual in different ethnic population as a whole.

KEY MESSAGES: This review enumerates the role of personal identification with the help of iris color.

KEYWORDS | optometry, iris color, personal identification, ethnic population

INTRODUCTION

The human eye is the gateway to one of our five senses. Reaction of light to the eyes leads to light perception and color vision. The most fragile organ, eye contain eyelashes, eyelids for protection from injuries, cornea for making eye to focus light, sclera, iris the colorful part of the eye, pupil controlling the excessive light rays, lens for focusing light rays to retina and retina that connect light rays into nerve signals.¹ As per laws of individuality, eyes are unique. Every person's eyes are different, with aspect to shape and color. Hence these characteristics of difference among different population relates to the personal identification of the individual.

Eye Color

The color of eye of an individual is determined by iris pigmentation known as melanin. The iris pigmentation has been classified into six colors such as amber, blue, brown, gray, green, hazel, or red. The color of eye is directly

proportionate to the quality of melanin in the front layer of the iris. It has been reported that the large amount of melanin is found in brown eyes, whereas less amount of melanin is found in blue eyes.^{1,2} These differences in the color of eyes is the most impressive feature which makes person unique in the ethnic population. On the basis of melanin pigmentation of iris, it was found that Negroid population shows the distinct color of iris. The following pie graph depicts the percentage distribution of eye color where in 69% was dark brown found to be common and 16.30% was light brown, 12.30% was dark and 2.30% was blue or gray.

Similarly, percentage distribution of eye color in Mongolian population is found to be 50% hazel, 21% green or gray, 20% brown and 9% blue.⁴

Likewise, the Caucasian population shows 45% brown, 27% blue, 18% hazel and 10% others.⁵

Author's Credentials:

¹Assistant Professor, Department of Optometry, School, ²Assistant Professor, Department of Forensic Science, ³Assistant Professor, Department of Clinical Research, School of Allied Health Sciences, Sharda University, Greater Noida, Uttar Pradesh 244001, India.

⁴Trainee, Department of Forensic Sciences, Punjabi University, Patiala 147002, Punjab, India.

Corresponding Author:

Paramita Deb, Assistant Professor, Department of Optometry, School, School of Allied Health Sciences, Sharda University, Greater Noida, Uttar Pradesh 244001, India.

Email:

deb.paro85@gmail.com



How to cite this article

Paramita Deb. Forensic Optometry: A New tool for Forensic Identification. *Indian J Forensic Med Pathol.* 2021;14(3 Special):667-668.

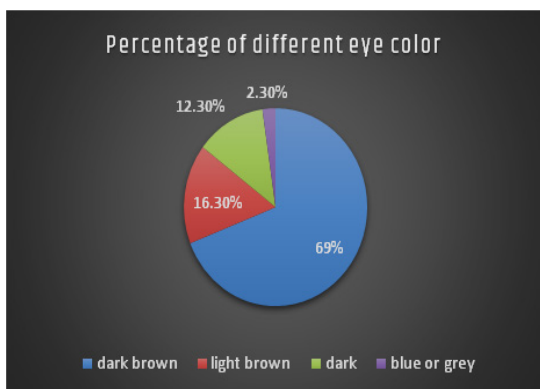


Figure 1: The distribution of eye color among the nigroids population. "dark brown" was the most common color in nigroids, whereas blue or gray color was the least prevalent.³

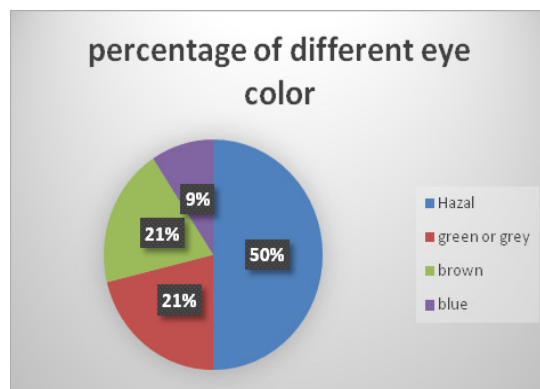


Figure 2: Distribution of different eye colors in a Mongolian population.

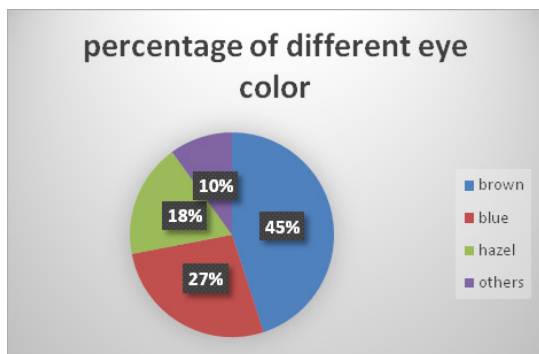


Figure 3: The distribution of different eye colors among the caucasian population

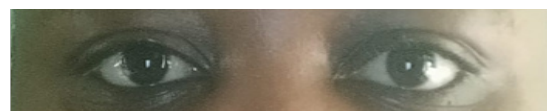


Figure 4: Downturned' eye shapes is mostly seen in Negroid population

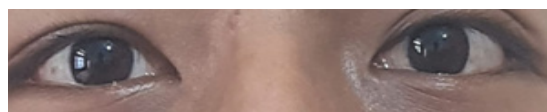


Figure 5: Hooded' shape eye is mostly seen in Mongloid population. In this slant which is going from the outer corner of the eye to the inner corner known as the palpebral slant

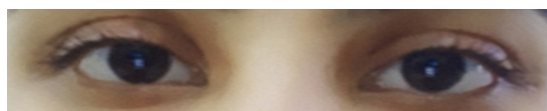


Figure 6: Almond-shaped eyes are mostly seen in the Caucassian population. Here, the iris properly touches the upper and lower eyelid margin

Eye shape

The shape of eye mainly depends on the position of the upper and lower lid, palpebral height, and crease. Eye shape can be categorized into six types: round, monolid, hooded, downturned, upturned, and almond. Visibility of colored part and creases indicates round shape eye.⁶ Downturned type of eye defines drooping of outer corner of eye. Whereas, hooded eye represents the nonvisibility of creases due to skin flap. Likewise, when iris touches the bottom and top of eyelids margin it indicates almond shape eye and when flick is in outward direction of the outer corner of eye it shows upturned eyes.

CONCLUSION

In a nutshell, it is reported that iris color and

shape of the eye plays pivotal role in personal identification of the individual. These findings and in forensic investigation as an substantial tool for criminal justice system. **IJFMP**

REFERENCES

1. **Kanski John Jack.** *Clinical Ophthalmology.* Sixth edition. (Edinburgh London new York oxford Philadelphia St Louis Sydney Toronto 2007).
2. **Barnicot NA.** *Human pigmentation.* 1957;57:114-120.
3. **Ukoha Ukoha, Uchechukwu Dimkpa.** *The prevalence and pattern of human color traits in nigerian adults.* *International Journal of Biological & Medical Research Int J Biol Med Res.* 2013; 4(2) : 3032- 3036.
4. **Ulivi, S., Mezzavilla. Et al.,** *Genetics of eye colours in different rural populations on the Silk Road.* *Eur J Hum Genet* 21, 1320-1323 (2013). <https://doi.org/10.1038/ejhg.2013.41>
5. **Dan T. Gudgel.** *Your eyes are not reall tblue.* Mar 8,2021. <https://heffingtons.com>.
6. **Chrissy Callahan.** *What is my eye shape.* Aug. 13, 2019. <https://www.today.com>.