International Journal of Medical Ophthalmology

**E-ISSN:** 2663-8274
**P-ISSN:** 2663-8266
www.ophthalmoljournal.com
IJMO 2024; 6(1): 27-30
Received: 25-10-2023
Accepted: 30-11-2023

**Nagham R Ghaffori Kanaan**
Baghdad Al-Karkh Health Directorate, Baghdad, Iraq

**Jinan DH Hadi**
Baghdad Al-Karkh Health Directorate, Baghdad, Iraq

**Sahar Kareem Raheem**
Family Medicine Specialist, Al-Salam University College, Baghdad, Iraq

**Hind I Murad**
Department of Physics, College of Science, Baghdad University, Baghdad, Iraq

**Corresponding Author:**
**Nagham R Ghaffori Kanaan**
Baghdad Al-Karkh Health Directorate, Baghdad, Iraq

# Increase intra ocular pressure

**Nagham R Ghaffori Kanaan, Jinan DH Hadi, Sahar Kareem Raheem and Hind I Murad**

**DOI:** https://doi.org/10.33545/26638266.2024.v6.i1a.176

**Abstract**
In clinical practice, elevated intraocular pressure (IOP) is commonly observed in cases of glaucoma or ocular hypertension. Glaucoma has a global impact on 60 million individuals, with 8.4 million experiencing complete blindness in both eyes as a result of this persistent condition. Methods for decreasing intraocular pressure (IOP) involve the use of pharmaceutical substances, laser therapies, and surgical procedures, which can be either invasive or non-invasive. Over the past two decades, there have been substantial alterations in all of these tactics. Increased intraocular pressure (IOP) is the primary and most influential risk factor for the onset and advancement of glaucoma. As of now, it is the only risk factor that has been definitively proven to be adjustable. Excessively elevated intraocular pressure (IOP) leads to fast and significant deterioration of vision, accompanied by severe impairment of the optic nerve. Ocular hypertension refers to a long-term, slight increase in intraocular pressure (IOP), which can cause gradual alterations in visual function and the appearance of the optic nerve.

**Keywords:** Increase, intra, ocular, pressure

## Introduction
Ocular hypertension is a critical ocular condition characterized by an intraocular pressure (IOP) exceeding the normal range of 10-21 millimeters of mercury (mm Hg), without the presence of glaucomatous damage or visual field loss. This condition presents a significant challenge in the field of ophthalmology due to its potential to progress to glaucoma, one of the leading causes of irreversible blindness worldwide. The medical community has long recognized the importance of early detection and management of ocular hypertension to prevent the onset of glaucoma and preserve vision. The definition and understanding of ocular hypertension have evolved over the years, leading to a refined approach in its diagnosis and treatment [1, 2]. The anatomy of the eye plays a pivotal role in the regulation of IOP. The eye consists of three main layers: the fibrous tunic (including the sclera and cornea), the vascular tunic (comprising the iris, choroid, and ciliary body), and the nervous tunic (consisting of the retina). These structures work in concert to maintain the balance of aqueous humor production and drainage, a critical factor in the regulation of intraocular pressure. The eye's anterior and posterior chambers are filled with aqueous humor, a fluid that provides nutrients to the eye and maintains its shape. Normal IOP is a result of the equilibrium between the production of aqueous humor by the ciliary body and its drainage through the trabecular meshwork and Canal of Schlemm [2, 4]. Research has shown that various systemic and ocular factors can influence IOP. For instance, higher diastolic blood pressure, increased body mass index (BMI), and certain demographic factors such as age and ethnicity have been associated with variations in IOP. Notably, studies have demonstrated a correlation between obesity and elevated IOP, highlighting the impact of systemic health on ocular conditions. Similarly, the depth of the eye's anterior chamber and physical characteristics such as height have been linked to IOP variations, suggesting a complex interplay between physiological factors and intraocular pressure [5, 6]. The pathophysiology of ocular hypertension involves the imbalance in aqueous humor dynamics, leading to increased IOP without the characteristic optic nerve damage seen in glaucoma. Despite the absence of immediate vision loss, individuals with ocular hypertension are at a heightened risk of developing glaucoma, necessitating vigilant monitoring and potential intervention. The risk factors for ocular hypertension include a family history of glaucoma, diabetes, high blood pressure, and certain ethnic backgrounds, which underscore the multifaceted nature of this condition [7, 8]. The clinical significance of ocular hypertension extends beyond its potential to progress to glaucoma. It serves as a modifiable risk factor, where early intervention can significantly reduce the risk of developing glaucoma.

The Ocular Hypertension Treatment Study and other research efforts have emphasized the importance of managing elevated IOP, particularly in individuals with additional risk factors such as thin corneas or high cup-to-disc ratios. These findings have led to advancements in the diagnostic and therapeutic approaches to ocular hypertension, aiming to prevent the onset of glaucoma and preserve visual function [9, 10]. Treatment options for ocular hypertension are varied and tailored to the individual's risk profile and the severity of the condition. They range from pharmacological interventions, such as beta-blockers and carbonic anhydrase inhibitors, to surgical and laser procedures aimed at enhancing aqueous humor outflow. Recent years have seen significant innovations in treatment modalities, including novel glaucoma procedures that offer less invasive options with potentially fewer complications. These developments reflect the ongoing commitment of the medical community to improving the management of ocular hypertension and preventing glaucoma-related vision loss [11, 12].

The aim is to study the effect of Increase intra ocular pressure.

## Method

The investigation was conducted on 57 participants using a non-probability convenient sampling approach. These participants had not received any eye surgery or medical treatment for conditions such as hypertension, glaucoma, or diabetes. Consent was obtained and a comprehensive history was gathered prior to collecting the data. The parameters utilised in this investigation were weight, height, age, OD, and OS. Visual acuity was assessed using a Snellen chart, intraocular pressure (IOP) was measured using an air puff tonometer, weight was measured using a weight machine in kilogrammes, and height was measured using a height scale in feet. Information was recorded on the Performs platform. The data was analyzed using multiple linear regressions tests in SPSS version 26.

## Results

Table 1 showed that total 17 (29.8%) males and 40 (70.2) females out of 57 patients. Table 2 shows the parameter according to gender. Males have longer height then females and more weights then females. IOP more related with high weight, height and age as shown in Fig 1, 2.

**Table 1:** Statistical analysis of data

| Parameter | Weight | Height | Age | OD | OS |
|---|---|---|---|---|---|
| Average | 67.1228 | 161.0877 | 29.57895 | 18.29825 | 18.84211 |
| Maximum | 98 | 190 | 45 | 26 | 24 |
| Minimum | 30 | 120 | 16 | 13 | 12 |
| Male No. (%) | 17 (29.8%) | | | | |
| Female No. (%) | 40 (70.25) | | | | |

**Table 2:** The results according to Gender

| Parameter | Gender | Average | Maximum | Minimum |
|---|---|---|---|---|
| Weight | Male | 67.82 | 45 | 98 |
| | Female | 66.82 | 30 | 97 |
| Height | Male | 171.88 | 148 | 190 |
| | Female | 156.50 | 120 | 178 |
| Age | Male | 29.64 | 17 | 40 |
| | Female | 29.55 | 16 | 45 |
| OD | Male | 18.47 | 14 | 24 |
| | Female | 18.22 | 13 | 26 |
| OS | Male | 19.17 | 15 | 23 |
| | Female | 18.7 | 12 | 24 |

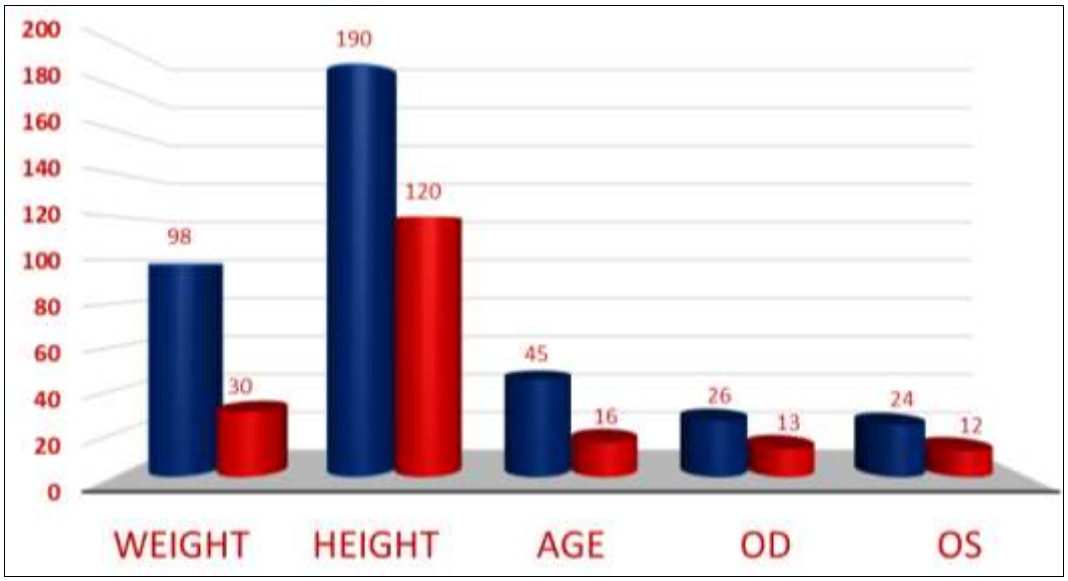


**Fig 1:** Correlations between IOS and parameters

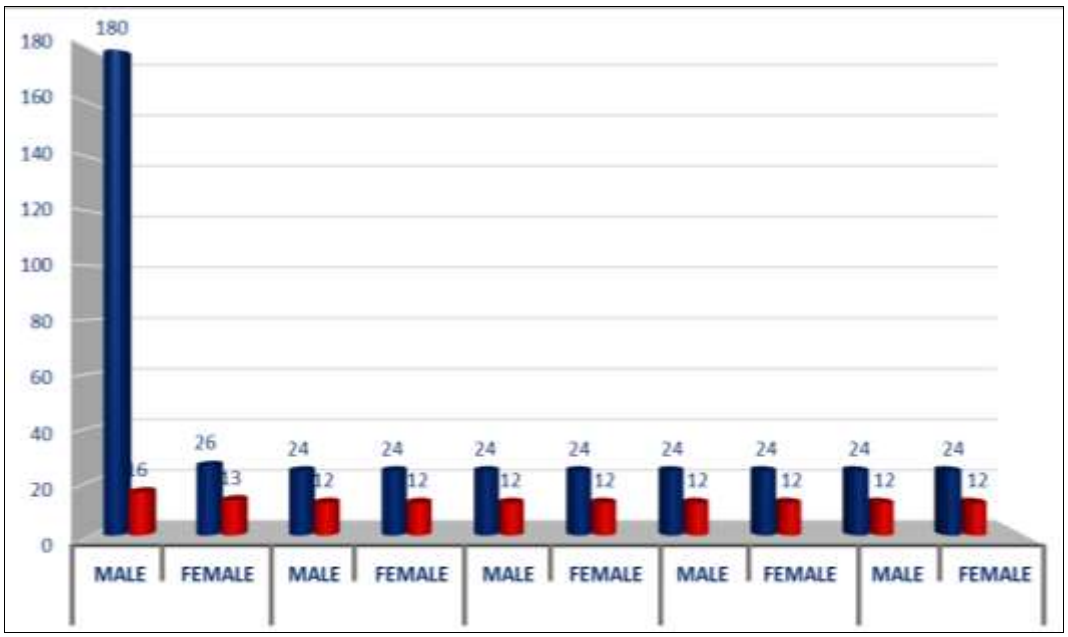


**Fig 2:** IOS correlation according to gender

## Discussion

The gender-based distribution of intraocular pressure (IOP) and its correlation with physical parameters such as height, weight, and age presents a nuanced perspective on the etiological factors influencing ocular hypertension. The observed data, indicating a predominance of females (70.2%) over males (29.8%) among the patients studied, aligns with existing research that suggests gender-specific differences in the prevalence and risk factors associated with elevated IOP and glaucoma. This disparity necessitates a gender-sensitive approach in the evaluation and management of ocular hypertension. The association between physical characteristics and IOP is particularly noteworthy. Males, on average, exhibited greater height and weight than their female counterparts, which correlates with higher IOP readings. This finding is consistent with prior studies that have identified body mass index (BMI) and height as significant predictors of IOP variations. For instance, a study by Klein BE *et al*. demonstrated that BMI is positively associated with IOP, suggesting that obesity may contribute to elevated eye pressure, potentially due to increased episcleral venous pressure and resistance to aqueous outflow [13]. Similarly, the relationship between height and IOP, as highlighted in our results, is supported by findings from other research, such as the work by Hepsen IF *et al*., which posited that taller individuals tend to have deeper anterior chambers and, consequently, different IOP dynamics [14]. Age as a correlate of IOP further enriches the discussion. The data indicating a relationship between higher IOP and advancing age is corroborated by numerous studies. A longitudinal study by Lee JS *et al*. found that IOP gradually increases with age, a trend attributed to changes in the eye's drainage system and rigidity of ocular tissues over time [15]. This age-related increase in IOP underscores the importance of regular ocular assessments in older populations to early detect and manage potential ocular hypertension. The gender differences in physical parameters and their relationship with IOP necessitate a tailored approach to assessing and managing ocular hypertension risk. While males may present with higher IOP due to larger body size and weight, the overall higher prevalence of ocular hypertension and glaucoma in females, as demonstrated in our cohort and supported by the literature, suggests that hormonal, genetic, and lifestyle factors may also play significant roles in the gender disparity observed in ocular conditions [16, 17].

## Conclusion

Prior research demonstrated the fluctuating changes in body mass index (BMI) and their impact on intraocular pressure (IOP). BMI is determined by two primary factors: weight and height. The present study suggests that weight has a more pronounced impact on intraocular pressure (IOP) than height. Male individuals, due to their greater height and higher weight, exert a greater influence on intraocular pressure (IOP) compared to females, based on gender. Evaluating intraocular pressure in obese individuals is crucial in clinical practice. Administering lipid-lowering medications and implementing lifestyle adjustments can effectively postpone the advancement of glaucoma, while also enabling timely treatments to prevent its onset.

**Conflict of Interest**
Not available

**Financial Support**
Not available

## References:

1. https://www.allaboutvision.com/conditions/hypertension.htm
2. Whitney Seltman; c2020. Health/Ocular-Ocular Hypertension. https://www.webmd.com/eye-hypertension#:~:text=The%20term%20ocular%20hypertension%20usually, greater%20than%2021%20mm%20Hg.
3. Hollows FC, Graham PA. Intra-ocular pressure, glaucoma, and glaucoma suspects in a defined

population. Br J Ophthalmol. 1966;50:570-586. PMID: 5954089
4. Klein BE, Klein R, Linton KL. Intraocular pressure in an American community. The Beaver Dam Study. Invest Ophthalmol Vis. Sci. 1992;33:2224-2228.
5. Zhou Q, Liang YB, Wong TY, Yang XH, Lian L, Zhu D, *et al*. Intraocular pressure and its relationship to ocular and systemic factors in a healthy Chinese rural population: the Handan Eye Study. Ophthalmic Epidemiol. 2012;19:278–284.
6. Abramoff MD, Garvin MK, Sonka M: Retinal imaging and image analysis. IEEE Rev Biomed Eng. 2010;3:169-208.
hups://www.laramyk.com/resources/education/occular-anatomy/major-ocular-structures/
7. Nirmala N, Adhilakshmi A, Harshila J& Karthika P. A comparative study of intraocular pressure changes in postmenopausal normotensive and hypertensive women. International Journal of Research in Medical Sciences. 2014;2(3):876-880.
8. Siddiqui F, Alkhairy S, Hassan M, *et al*. Relationship between Body Mass Index and Intraocular Pressure in Diabetic and hypertensive Adults. Pak J Ophthalmol. 2016;32(1):1-7.
9. Xu L, Li J, Xia C, *et al*. Anterior chamber depth correlated with anthropomorphic measurements the Beijing Eye Study. Eye (Lond). 2009;23(3):632-634.
10. Karadag R, Arsalanyilmaz Z, Aydin B, *et al*. Effects of body mass index on intraocular pressure and ocular pulse amplitude. Int J Ophthalmol. 2012;5(5):605-608.
11. Cohan E, Kremer M, Shochat T, *et al*. Relationship between Body Mass Index and Intraocular Pressure in Men and Women. J Glaucoma. 2016;25(5):509-513.
12. Tomoyose E, Higa A, Sakai H, Sawaguchi S, Iwase A, Tomidokoro A, *et al*. Intraocular pressure and related systemic and ocular biometric factors in a population-based study in Japan: the Kumejima study. Am J Ophthalmol. 2010 Aug;150(2):279-86.
DOI: 10.1016/j.ajo.2010.03.009. Epub 2010 Jun 8. PMID: 20570236.
13. Kim WK, Ryu IH, Yoo J, Kim SW. Effect of Gender, Age, and Ocular and Growth-Related Factors on Corneal Epithelial and Stromal Thickness in Children. J Clin Med. 2020 Nov 27;9(12):3849.
DOI: 10.3390/jcm9123849. PMID: 33260816; PMCID: PMC7760657.
14. Figueiredo BP, Cronemberger S, Kanadani FN. Correlation between ocular perfusion pressure and ocular pulse amplitude in glaucoma, ocular hypertension, and normal eyes. Clin. Ophthalmol. 2013;7:1615-21.
DOI: 10.2147/OPTH.S44523. Epub 2013 Aug 9. PMID: 23966769; PMCID: PMC3745293.
15. Jonas JB, Xu L, Zhang L, Wang Y, Wang Y. Optic disk size in chronic glaucoma: the Beijing eye study. Am J Ophthalmol. 2006 Jul;142(1):168-70.
DOI: 10.1016/j.ajo.2006.01.068. PMID: 16815273.
16. Qiu Y, Yu J, Tang L, Ren J, Shao M, Li S, Song Y, Cao W, Sun X. Association Between Sex Hormones and Visual Field Progression in Women With Primary Open Angle Glaucoma: A Cross-Sectional and Prospective Cohort Study. Front Aging Neurosci. 2021 Dec 24;13:756186.
DOI: 10.3389/fnagi.2021.756186. PMID: 35002675; PMCID: PMC8741302.

**How to Cite This Article**
Kanaan NRG, Hadi JDH, Raheem SK, Murad HI. Increase intra ocular pressure. International Journal of Medical Ophthalmology. 2024;6(1):27-30.