

## PREVALENCE OF AGE RELATED CATARACT AMONG THE ATTENDANTS OF THE OPHTHALMIC TERTIARY HOSPITAL AT MOSUL

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Article Received date: 25 April 2024

Article Revised date: 15 May 2024

Article Accepted date: 04 June 2024



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### ABSTRACT

**Background:** Cataracts, caused by opacification of the human lens, are the leading cause of blindness worldwide, affecting over 15 million cases. With 36 million blind people worldwide, over 12 million are due to cataract, with over 90% of disability-adjusted life years lost in developing countries. Understanding cataract prevalence is crucial for disease control and prevention strategies. **Aim of the study:** To evaluate the effect of age on the prevalence of cataract among the population attending the Ophthalmic Tertiary Hospital at Mosul. **Methodology:** A cross-sectional study in Mosul analyzed the prevalence of age related cataract (ARC) in a large population from 2020 to 2023. The study aimed to understand the ARC prevalence, epidemiological, socio-demographic, and risk factors of ARC, which have not been previously studied. The data was collected from outpatient department papers and digital records, and analyzed using IBM SPSS software. **Results:** The study found that cataracts were more prevalent among individuals aged 60-79, with a mean age of  $62.59 \pm 18.231$  years. Males accounted for 52.7% of the sample, while females accounted for 47.3%. Urban areas accounted for 63.8% of the sample. Hypertension, diabetes, and active smoking were found in 41.6%, 27.5%, and 29.7% of the participants. Nuclear sclerosis was the most common type, followed by cortical cataract in 21.9%. Higher-age individuals had higher odds of developing these types. **Conclusion:** As people age, the occurrence of cataracts rises, particularly in those over 60. Health care planners can make better planning and resource allocation decisions if they are aware of the prevalence of cataracts.

**KEYWORDS:** Cataract, Ophthalmic Hospital, Mosul, Prevalence.

### INTRODUCTION

The clear, biconvex structure of the human lens aids in light refractive index and retinal focus. Cataract is the most prevalent treatable cause of blindness in the world. It is defined as a loss of transparency caused by opacification of the lens. With over 15 million cases (45%) of adult blindness, cataracts continue to be the leading cause of blindness.<sup>[1]</sup>

Research shows that 36 million people are blind globally, with cataracts accounting for more than 12 million of those cases.<sup>[2]</sup> In 2020, 13.5 million persons are expected to be included in this projection.<sup>[3]</sup> The fact that over 90% of all disability-adjusted life years lost due to cataract occur in underdeveloped nations underscores the significance of cataract blindness.<sup>[2]</sup>

Aging usually has the unavoidable side consequence of cataract.<sup>[4]</sup> It should be highlighted, nevertheless, that a number of hereditary and environmental factors,

including UV light exposure, smoking, diabetes, uveitis, IOP-lowering drugs and surgery, trauma, steroid use, and specific job types, raise the risk of cataract development.<sup>[5,7]</sup> Therefore, throughout the past three decades, a number of population-based studies have been conducted to give information on the prevalence of cataract and risk factors for the condition in various ethnic groups and geographical areas of the world.<sup>[8]</sup> The amount and burden of the disease, the planning and provision of infrastructure for disease control, and the natural progression of the disease can all be elucidated by knowing the incidence of cataracts.<sup>[9,10]</sup>

Age-related cataracts (ARC) diagnosis and management are crucial factors to take into account internationally in order to lessen the burden of preventable blindness, given the significant burden associated with ARC-related blindness. Various population groups have various patterns and distributions of cataracts, most likely as a result of differences in environmental, genetic, and

geographic variables. In order to design effective prevention strategies and conduct health initiatives, it is imperative to have dependable estimates of the prevalence, pattern, and epidemiological characteristics of cataracts. These estimates can provide newer insights into the genesis of cataracts.<sup>[11,12]</sup> The demographic distribution of cataracts has been the subject of numerous research in the past; yet, Mosul's demographic and morphologic distribution of cataracts is not well-documented.

### Purpose of the Study

To evaluate the effect of age on the prevalence of cataract among the population attending the Ophthalmic Tertiary Hospital at Mosul.

### METHODOLOGY

A cross-sectional study conducted at a tertiary hospital encompassing all ARC patients seen in the department of ophthalmology between January 2020 and January 2023 was conducted. This study, which was the first of its kind, accurately documented the socio-demographic pattern, epidemiology, and attributable risk variables of ARC that have not been previously investigated. It also reflected the magnitude of ARC in a large sample of the Mosul population. Using PubMed and Medline Plus, a Medline search was launched for a set of related keywords, including age-specific, ocular risk, Mosul, prevalence, incidence, epidemiology, etiology, socio-demographic, intervention, cataract, and outcome.

### Sample Size Calculation and Technique

All patients who met the study requirements during the study period were included in the population using convenient sampling. Based on a study by Vasisht *et al.* (2013) titled "Prevalence of cataract in an older population in India," the sample size was determined using the Cochran formula ( $4pq/d^2$ ). With an 80% power of analysis and a 95% confidence interval (CI), the bare minimum sample size was determined to be 399 participants. (Where  $d$  = allowed error [5–20% of P],  $Q$  =  $100-P$ , and  $P$  = prevalence from earlier studies). Patients who were diagnosed with cataracts during the course of the study met the inclusion criteria.

### Exclusion Criteria

1. Presence of ocular comorbidities such as uveitis, glaucoma, intraocular tumors, retinal vascular diseases, and previous history of retinal surgery.
2. The use of medications is likely to be the cause of cataract—steroids, busulfan, phenothiazine, and chloroquine.
3. Incomplete clinical records.

### Study Protocol

Paper records and digital records from the outpatient department (OPD) were used to obtain data. Patients who were admitted to the ophthalmology ward after receiving a cataract diagnosis were categorized. Enrolled for tabulation and analysis were patient data meeting the

inclusion and exclusion criteria. The study removed patient records that were found to be incomplete. After removing datasheets that did not meet inclusion criteria, a total of 615 datasheets were left out of the original 2,342 datasheets. After going over the remaining datasheets, 1,727 datasheets with complete and pertinent records were examined. Information about the patient's demographics, socioeconomic status, place of employment, cataract grading, environmental associations, risk factors, and ophthalmic examination records including visual acuity, tonometry, slit-lamp examination, and indirect ophthalmoscopy were recorded.

### Operational Definitions

**Age:** The World Health Organization's (WHO) population categorization and direct standardization of the Age-standardized prevalence estimate (ASPE) of cataracts and its subtypes overall were used to modify the structural age between various age groups and geographical areas. For those 60–80 years old and older, a subgroup analysis was conducted. As a result, the study groups were divided into four age categories: 20–40, 40–60, 60–80, and over 80.

**Clinical examination:** To grade a cataract and rule out any other ocular ailment, a slit lamp-aided clinical evaluation comprising anterior and posterior segment examination was carried out. In order to provide a standard scale for analysis, all visual acuity measurements were transformed into logMAR units. **Grading of cataracts:** The lens opacity classification system (LOCS 3) grading was followed while grading cataracts using a slit lamp.<sup>[14]</sup> Four types of cataract were identified: cortical, posterior subcapsular, nuclear sclerosis, and mature cataract.

### Statistical Analysis

The collected data were entered into Microsoft Excel™ and examined with IBM SPSS Software™ version 24. Using the Chi-square test, the relationship between different types of cataracts and different risk variables was examined; the unadjusted odds ratio (OR) was used to calculate the strength of the link. In order to account for confounders and identify the risk factors that predicted the various forms of cataracts, multivariable logistic regression was utilized. P-values less than 0.05 were regarded as significant when the study's 95% power was taken into account.

### RESULTS

Distribution of the studied sample according to the socio-demographic characteristics was demonstrated in table (1) which showed that the cataract presented in higher proportion (64.2%) among those within 60–79 years of age and the mean age was  $62.59 \pm 18.231$  years. Males constituted 52.7% while the females accounted for 47.3% of the studied sample. Two third of the sample lived in urban areas (63.8%). Hypertension, diabetes, and

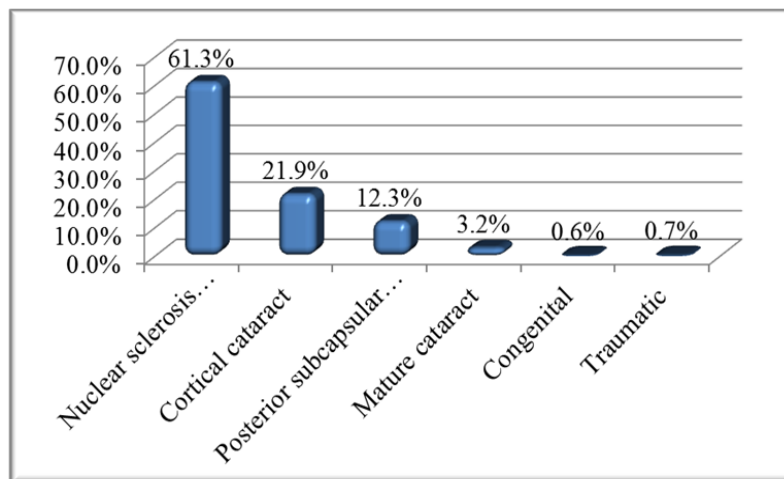
active smoking were found among 41.6%, 27.5%, and 29.7% respectively.

**Table 1: Distribution of the Studied Sample According to the Socio-Demographic Characteristics.**

Variables		No.	%
Age group/ years	<20 years	23	1.3
	20-39 years	55	3.2
	40-59 years	231	13.4
	60-79 years	1109	64.2
	≥80 years	309	17.9
Mean age in years		62.59±18.231 years	
Gender	Male	910	52.7
	Female	817	47.3
Residence	Rural	626	36.2
	Urban	1101	63.8
Hypertension	Absent	1008	58.4
	Present	719	41.6
Diabetes mellitus	Absent	1252	72.5
	Present	475	27.5
Smoking	Absent	1214	70.3
	Present	513	29.7

The most frequent type of cataract prevailed in the locality was nuclear sclerosis that accounted for 61.3%

followed by cortical cataract in 21.9% as shown in figure (1).



**Figure 1: Prevalence of Different Types of Cataracts Among the Study Participants.**

Clinical examination: Anterior and posterior segment examinations were performed as part of a slit lamp-assisted clinical evaluation to grade a cataract and rule out any other ocular condition. To establish a uniform framework for analysis, all measures of visual acuity were converted into logMAR units. Grading of cataracts: A slit lamp was used to grade cataracts according to the lens opacity classification system (LOCS 3).<sup>[14]</sup> Cortical,

posterior subcapsular, nuclear sclerosis, and mature cataract were the four forms of cataract that were found.

**Table 2: Univariate and Multivariate Logistic Regression.**

Age/ years	Types of cataract		Total	Unadjusted OR (95% CI)	P	Adjusted OR (95% CI)	P
	Present No.(%)	Absent No.(%)					
<b>Nuclear sclerosis</b>							
<20	0(0.0)	23(100.0)	23				
20-39	13(23.6)	42(76.4)	55	0.14 (0.12-0.21)	<0.001		
40-59	123(53.2)	108(46.8)	231	0.80 (0.62-0.97)	<0.001	0.69(0.51-0.83)	<0.001
≥60	869(61.3)	549(38.7)	1418	2.01(1.87-2.56)	<0.001	1.98(1.88-2.25)	<0.001
<b>Cortical cataract</b>							
<20	0(0.0)	23(100.0)	23				
20-39	5(9.1)	50(90.9)	55	0.38(0.27-0.52)	<0.001	0.31(0.11-0.49)	<0.001
40-59	46(20.0)	185(80.0)	231	0.97(0.76-0.99)	<0.001	0.68(0.59-0.77)	<0.001
≥60	299(21.1)	1119(78.9)	1418	1.35 (1.44-1.89)	<0.001	1.19(1.04-1.28)	<0.001
<b>Subscapular cataract</b>							
<20	0(0.0)	23(100.0)	23				
20-39	16(29.1)	39(70.9)	55	0.53(0.36-0.69)	0.01	0.49(0.34-0.67)	<0.001
40-59	89(38.5)	142(61.5)	231	0.81(0.63-0.91)	<0.001	0.66(0.56-0.89)	<0.001
≥60	635(44.7)	784(55.3)	1418	1.57(1.23-1.64)	<0.001	1.28(1.04-1.34)	0.01
<b>Mature cataract</b>							
<20	0(0.0)	23(100.0)	23				
20-39	20(36.4)	35(63.6)	55	0.85(0.66-0.98)	<0.001	0.46(0.35-0.59)	<0.001
40-59	82(35.5)	149(64.5)	231	1.16(1.04-1.31)	<0.001	1.02(0.87-1.16)	<0.001
≥60	589(41.5)	829(58.5)	1418	1.36(1.27-1.68)	<0.001	1.22(1.19-1.32)	<0.001

**DISCUSSION**

One of the most prevalent causes of vision impairment worldwide is cataract surgery. As per the World Health Organization (WHO), cataract is the primary cause of blindness worldwide, accounting for 17.7 million blind individuals and 47.8% of blindness cases.<sup>[15]</sup>

Ageing is the most significant risk factor for cataracts, but there are other modifiable risk factors as well, such as UV exposure, diabetes, hypertension, body mass index (BMI), drug use, smoking, and socioeconomic variables.<sup>[16, 17]</sup>

It is noteworthy that the incidence of ARC is observed to rise markedly with age; according to Liu *et al.*<sup>[18]</sup>, 35.7% of the participants were between the ages of 40 and 59, and 54% were between the ages of 60 and 79.

Similar results were also reported by Vashist *et al.*<sup>[13]</sup> WHO found that 58% of adults over 60 had cataracts. Although it is well known that the frequency of cataracts rises with age, in recent years there has been a decline in the age-specific prevalence of cataracts, suggesting that persons 60 years of age or younger have an increased prevalence of the condition.

As proposed by Das *et al.*,<sup>[19]</sup> solar exposure, lifestyle modifications, tobacco use, smoke exposure, axial myopia, and hormonal variables can all account for the rise in the occurrence of cataracts in the pre-senile age range. It is anticipated that the burden of cataracts will rise in the future due to the aging of the population and the rising prevalence of cataracts in pre-senile age groups. As a result, the infrastructure for the delivery of eye care must be optimized to meet the growing burden of cataract blindness, taking into account shifting demographic and epidemiological trends.

The majority of cataract forms, including nuclear sclerosis, cortical cataract, subscapular PSC, and mature kinds, showed this age-related ascending tendency in the current study. Therefore, age and the types of cataracts are closely connected, which is in line with findings from other studies.<sup>[13, 20, 21]</sup>

Nonetheless, several researches view the association between aging and cataracts as the result of multiple risk factors, including oxidative damage and UV radiation. According to the study by Kentayiso *et al.*<sup>[22]</sup> The prevalence of cataract increases with age, going from 5.2% in the 40–49 age group to 21.1% in the 80+ age group. This result is in line with research from the

Gurage and rural India zones.<sup>[23, 24]</sup> Furthermore, Hong *et al.*<sup>[25]</sup> discovered that the prevalence of any cataract varied from 5.7% in individuals 40–49 to 71.7% in those 80 years of age and beyond.

The prevalence of cataract in individuals aged 70–79 (62.9%) is twice as high as that of adults aged 60–69 (29.9%) and 40–49 (5.0%), respectively.

Numerical studies have demonstrated the relationship between aging and lens disease as a risk factor, which aligns with our findings and suggests the lens's natural aging process as well as prolonged exposure to risk factors.<sup>[18, 26, 27]</sup> Oxidative stress is the pathological process directly responsible for lens opacity. It has been discovered that after 40 years of age, the antioxidants and antioxidant enzymes in the eyes will be greatly diminished, making it unable to adequately safeguard the eyes. In addition, the aged eyes' reduced levels of the protective pigment 3-hydroxycyaninuric acid will be transformed into phototoxic yellow uric acid, which could damage the lens.<sup>[28]</sup>

Once potential confounders have been taken into account, age is one of the variables linked to cataract development. According to this study, people 60 years of age and above had a higher risk of cataract development than people 40–49 years of age. Numerous additional research carried out across the globe have observed the correlation between age and the development of cataracts.<sup>[23, 29, 30]</sup> This could be explained by the way that protein clumps, which are the main constituent of lenses and contain water, naturally form over time.

The protein component of the lens, which was carefully arranged to keep the lens clear and let light to pass through, may clump together as a person ages and begin to cloud the lens, which may get larger over time and make it harder to see, hastening the development of cataracts.

## CONCLUSION

As people age, the occurrence of cataracts rises, particularly in those over 60. Health care planners can make better planning and resource allocation decisions if they are aware of the prevalence of cataracts.

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