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Epidemiology of cataract with laterality in elder population in North Indian town post COVID - 19 lockdown 1

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Abstract
Purpose – To study the epidemiology of cataract with laterality in elder population after covid-19 lockdown-1.
Study design- A cross-sectional study
Methods- Individuals more than 40 Yrs age group with cataract. The examination included visual acuity measurement, dilatation, and anterior and posterior segment examination. The lens was graded by type and severity of opacity using the Lens Opacity Classification System III (LOCS III).Main Outcome Measures -- Age, gender and laterality standardized prevalence of mature cataract and 95% confidence intervals (CIs). We defined type of cataract based on the LOCS III grade in the worse eye of ≥4 for nuclear cataract, ≥3 for cortical cataract, and ≥2 for posterior subcapsular cataract (PSC). Any unoperated cataract was based on these criteria or ungradable dense opacities.
Results-79.17% patients both eye were involved. 57.64% patients were Nuclear, Posterior Subcapsular type cataract.
Conclusion-Posterior subcapsular cataract was more common than other types of cataract, also compared to western studies.
Women had higher rates of cataract, which was not explained by differential access to surgery.
The study concluded that cataract significantly associated with various socio- demographic factors. Therefore, these factors need to be addressed to reduce the burden of cataract among elderly population.
Keywords- *Cataract, Eye, Age*

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I. Introduction

Cataract is clouding of the lens of the eye which prevents clear vision. Although most cases of cataract are related to the ageing process, occasionally children can also be born with the condition, or a cataract may develop after eye injuries, inflammation, and some other eye diseases. According to the latest assessment, cataract is responsible for 51% of world blindness, which represents about 20 million people. Cataract remains the leading cause of blindness. As people in the world live longer, the number of people with cataract is anticipated to grow.[1]

Prevalence of cataract increases with increasing age. Although the percentage of aged population is more in developed countries, because the size of the population is low, the burden of cataract is much less in these countries. It is also seen that cataract develops approximately 10 to 14 years earlier in Indian population than in industrialized countries.[2]The population increase is much marked in developing countries than industrially advanced countries. The age adjusted prevalence of cataract in India is three times that of U.S with 82% of Indian of 75-85 years old having visually significant cataract or aphakia compared to 46% percent of those aged 74-85 years in U.S.[3] If no interventions would done, the number of people with blindness will increase from 44 million to 76 million in 2020 globally. So vision 2020- the right to sight initiative if implemented properly could decrease the number of blind persons to half of current level.[4]

Material and method

A cross-sectional study was carried out among elderly population residing at north Indian town post COVID - 19 lockdown 1. The study took place in Regional Hospital in a district of Himachal Pradesh. It included rural and urban (small towns) populations served by the participating eye hospital. A total of 288 patients were randomly selected and population would be aged ≥40 years.

With these numbers, we had high power to estimate the prevalence of cataract because cataract is much more common than age-related macular degeneration.

Informed consent was taken from all participants. The study complied with the guidelines in the Declaration of Helsinki.

Eye Examination

Visual acuity (VA) was tested in each eye separately with the subject wearing habitual spectacles (if any) using the Snellen equivalent (≥4 of 5 letters correctly identified in each row). If VA in either of the 2 eyes of a participant was worse than logarithm of the minimum angle of resolution 0.6, refraction was performed using an auto refractor and best-corrected acuity was recorded. Pupillary dilation to ≥6 mm was achieved using 1% tropicamide. A clinical examination of each eye was performed, which included anterior and posterior segment assessments using slit-lamp biomicroscopy. Fundus photography was undertaken.

Grading of Lens Images

Lens opacities were graded according to the Lens Opacities Classification System III (LOCS III).

Inclusion criteria

Individuals with cataract

Those individuals who gave consent

Age more than 40 yrs

Exclusion criteria

Individuals who did not give consent.

Those individuals in whom the lens couldn't be visualized due to any superficial corneal opacity. Informed verbal consent was taken from each individual.

Data was analysed using SPSS version 20. Tests of proportion (Wald's method to calculate confidence interval) and chi-square test was used.

II. Result

Table 1. Age distribution

Age Group	Number of Patients	Percentage
43-65 yrs	169	58.68
66-94 yrs.	119	41.31
Total	288	100

Table 2. Sex distribution

	Number of Patients	Percentage
Male	126	43.75
Female	162	56.25
Total	288	100

Table 3. Type of cataract

Code		Number of Patients	Percentage
1	Cortical	1	0.35
2	Cortical, Nuclear	3	1.04
3	Cortical, Posterior Subcapsular	3	1.04
4	Hypermature Nuclear Posterior Subcapsular	7	2.43
5	Hypermature Nuclear Posterior Subcapsular Cortical	4	1.39
6	Mature, Nuclear	1	0.35
7	Mature, Nuclear Posterior Subcapsular	8	2.78
8	Nuclear	23	7.99

9	Nuclear, Cortical. Posterior subcapsular	12	4.17
10	Nuclear, Cortical	1	0.35
11	Nuclear, Posterior Subcapsular	166	57.64
12	Posterior Polar	3	1.04
13	Posterior Polar, Nuclear	3	1.04
14	Posterior Subcapsular	45	15.63
	Total	288	100

Table 4. Eye

	Number of Patients	Percentage
B/E	228	79.17
L/E	27	9.38
R/E	33	11.46
Total	288	100.00

Table 5. Age distribution with type of cataract

		Age Group		Total
		43-65 yrs	66-94 yrs	
1	Cortical	1	0	1
2	Cortical, Nuclear	1	2	3
3	Cortical, Posterior Subcapsular	2	1	3
4	Hypermature Nuclear Posterior Subcapsular	4	3	7
5	Hypermature Nuclear Posterior Subcapsular Cortical	0	4	4
6	Mature, Nuclear	1	0	1
7	Mature, Nuclear Posterior Subcapsular	3	5	8
8	Nuclear	17	6	23
9	Nuclear, Cortical. Posterior subcapsular	9	3	12
10	Nuclear, Cortical	0	1	1
11	Nuclear, Posterior Subcapsular	86	80	166
12	Posterior Polar	0	3	3
13	Posterior Polar, Nuclear	3	0	3
14	Posterior Subcapsular	37	8	45
	Total	164	116	280

Table 6. Sex distribution with type of cataract

		Sex		Total
		Male	Female	
1	Cortical	1	0	1
2	Cortical, Nuclear	1	2	3
3	Cortical, Posterior Subcapsular	0	3	3
4	Hypermature Nuclear Posterior Subcapsular	3	4	7
5	Hypermature Nuclear Posterior Subcapsular Cortical	1	3	4
6	Mature, Nuclear	1	0	1
7	Mature, Nuclear Posterior Subcapsular	2	6	8
8	Nuclear	8	15	23

9	Nuclear, Cortical. Posterior subcapsular	5	7	12
10	Nuclear, Cortical	0	1	1
11	Nuclear, Posterior Subcapsular	77	89	166
12	Posterior Polar	0	3	3
13	Posterior Polar, Nuclear	3	0	3
14	Posterior Subcapsular	20	25	45
	Total	122	158	280

III. Discussion

No study was found on Epidemiology of cataract with laterality in elder population in post COVID - 19 lockdown 1

Higher magnitude of cataract prevalence was reported by Haq et al to be 80.9% among elderly population in Aligarh district. [5] The study done by Maroof et al showed that the prevalence of cataract was 79.6% in the elderly population.[6] Raizada et al 79.31% cataract prevalence was reported in 60 year and above age group in western Uttar Pradesh.[7] Lower prevalence of cataract in elderly compared to this study reported by Thakur et al in Pune to be 29.2%.[8] Sharma et al in their study done in Northern India reported that 30% of the elderly population had cataract.[9] Makwana et al in Western part of India reported the prevalence of cataract to be 24.17% in the study population.[10]

Qadri et al in their study done in Mullana revealed that the prevalence of cataract increased significantly with the age.[11] Kakkar et al in rural Dehradun reported that the prevalence of cataract significantly increased with the age.[12] The prevalence of cataract increases with the age also reported by Haq et al in their study. Association of cataract prevalence with age was also shown by RAAB study (Neena et al).[13] Shankar et al in their study in Varanasi also found significant association of cataract with the age.[14]

The prevalence of visual impairment and blindness is high in this population, in accordance with previous studies in the area. Certainly not all visual impairment and blindness in this population are due to cataract. In fact, a previous study of the causes of vision loss in this area of central Tanzania found corneal opacities to be the leading cause of blindness (responsible for 44% of bilateral blindness), whereas cataract was second (22% of bilateral blindness). [15] Corneal opacity was thought to be secondary to trachoma, vitamin A deficiency, and keratoconjunctivitis. [16]

Increasing prevalence of the various types of cataract with older age was to be expected. The fact that a large proportion of severe grades also occurred among older persons is different from the pattern observed in many US-based populations, where the most severe grades of lens opacity often undergo cataract extraction and are thus less prevalent. [16]

Higher age-adjusted prevalence and incidence rates of nuclear [17] and cortical [18,19] cataract has been reported for women in previous population-based studies among both African and European-derived populations. This finding is not completely understood. One hypothesis is that changes in the hormonal milieu at menopause somehow increase the risk of lens opacity among women. Evidence in favor of this theory includes a decreased risk of nuclear sclerosis among current users of estrogen replacement therapy [20 21] and a protective effect of younger age at menarche and older age at menopause against nuclear and cortical opacities, respectively. [20]

A total of 288 people aged ≥40 years were identified from enumeration (Figure 1).All attended the hospital OPD for an eye examination. 20.84% people had aphakia/pseudophakia in 1 eye, but the images from the fellow eye were unavailable. Of 288 patients, 45 (15.62%) were gradable for nuclear opacity,

1 (0.34%) for cortical opacity, and 23 (7.98%) for PSC opacity; 207 (71.8%) were gradable for mixed types of opacity.

Posterior subcapsular cataracts were the most common type of opacity and present in 85% of people with a gradable image. These were either pure posterior subcapsular (15.6%) or mixed (69.41%). Cortical opacities were much less common (11%). In Nuclear (79.1%). There were significant differences between the centers in the age- and gender-standardized prevalence rates of different types of cataracts.(Table 2).

The areas in our study were chosen to represent the typical population in a district area of Himachal Pradesh. Our results therefore do not apply to the city populations served by the hospitals where cataract surgery uptake and cataract prevalence may be different. We also cannot assume that our results are generalizable to other populations in the same area.

Because very few studies have published 95% CIs, the point estimates do not include the range of possible prevalence. Comparisons by type of opacity

are even more problematic because of differences in methods, definitions, and the cataract surgical rate in the surveyed populations because information on the type of cataract before operation is not usually available.

Studies describing the prevalence of unoperated cataract vary according to access and uptake of cataract surgery eye care.

Using a cutpoint of LOCS III ≥3, cortical opacities were lower in our study compared with other studies in India and Asia (Table 5). If we used a cutpoint of LOCS III ≥2, our results were closer to other studies (23%). The exception was the Tanjong Pagar study, with very high rates of cortical cataract, Differences between populations in cataract prevalence and especially in the cataract subtypes may reflect environmental or genetic factors. The evidence that ultraviolet radiation is a risk factor for cataract is strongest for cortical cataracts. Exposure to ultraviolet

radiation depends on latitude, occupation, and behavioral factors, but it seems unlikely that the lower prevalence of cortical cataract in India, compared with Hispanic and African Caribbean populations, could be due to lower exposures to ultraviolet radiation. Genetic factors have also been most strongly identified for cortical cataract, although few genes have been identified. Recently variants in the EPHA2 gene have been found to be associated with cortical cataracts, and to a lesser extent with nuclear cataracts.

Studies examining the incidence of cataract have also reported higher rates among women than men. Lower cataract surgical coverage by women has been documented in many populations and is a major priority focus for organizations such as Vision 2020 (available: http://www.v2020.org/; accessed January 15, 2010). Our results suggest that the higher rates of cataract in women in our study are not explained solely by differential access to health care, but may be due to other factors such as higher levels of exposures to risk factors such as biomass cooking fuels or intrinsic differences such as hormonal factors.

IV. Conclusion

The study concluded that cataract significantly associated with various socio- demographic factors. Therefore, these factors need to be addressed to reduce the burden of cataract among elderly population.

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